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# Memo

**November 30, 2021**

**To**: Consensus Standards Approval Committee (CSAC)

**From**: All-Cause Admissions and Readmissions Project Team

**Re**: All-Cause Admissions and Readmissions Spring 2021 Cycle

## CSAC Action Required

The CSAC will review recommendations from the All-Cause Admissions and Readmissions project at its November 30 and December 1, 2021, meeting, and vote on whether to uphold the recommendations from the Committee.

This memo includes a summary of the project, measure recommendations, themes identified, responses to the public and member comments, and results from NQF member expression of support. The following documents accompany this memo:

1. **All-Cause Admissions and Readmissions Draft Report**. The draft report has been updated to reflect the changes made following the Standing Committee's discussion of public and member comments. The complete draft report and supplemental materials are available on the project webpage.

## Background

Reducing avoidable hospital admissions and readmissions continues to be an important focus of quality improvement across the healthcare system. Unnecessary hospitalizations can prolong the illness of patients, increase their time away from home and family, expose them to potential harms, and significantly contribute to the high rate of healthcare spending in the United States. Quality improvement has a critical goal of reducing avoidable hospital admissions and readmissions. Performance measures have continued to be a key element of value-based purchasing programs to incentivize collaboration in the healthcare delivery systems, driving progress in admissions and readmissions.

The All-Cause Admissions and Readmissions Standing Committee oversees the NQF All-Cause Admissions and Readmissions measure portfolio. On June 29 and 30, 2021, the 22-member Standing Committee evaluated one newly submitted measure and three measures undergoing maintenance review against NQF's measure evaluation criteria. The Standing Committee recommended all four measures for endorsement. The four recommended measures are listed below:

- NQF #2860 Thirty-day All-Cause Unplanned Readmission Following Psychiatric Hospitalization in an Inpatient Psychiatric Facility (IPF) (Centers for Medicare & Medicaid Services (CMS)/Mathematica Policy Research (MPR)) (Maintenance)

- NQF #2880 Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF) (CMS/(Yale New Haven Health Services Corporation – Center for Outcomes Research and Evaluation (Yale CORE)) (Maintenance)
- NQF #2882 Excess Days in Acute Care (EDAC) After Hospitalization for Pneumonia (CMS/Yale CORE) (Maintenance)
- NQF #3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure Under the Merit-based Incentive Payment System (CMS/Yale CORE) (New)

## Draft Report

The All-Cause Admissions and Readmissions spring 2021 draft report presents the results of the evaluation of four measures considered under the Consensus Development Process (CDP). All four measures are recommended for endorsement. The measures were evaluated against the 2019 version of the measure evaluation criteria.

| Measures under Review | Maintenance | New | Total |
|---|---|---|---|
| Measures under review | 3 | 1 | 4 |
| Measures recommended for endorsement | 3 | 1 | 4 |
| Measures not recommended for endorsement or trial use | 0 | 0 | 0 |
| Reasons for not recommending | Importance – 0<br>Scientific Acceptability - 0<br>Use – 0<br>Overall – 0<br>Competing Measure – 0 | Importance – 0<br>Scientific Acceptability – 0<br>Use – 0<br>Overall – 0<br>Competing Measure – 0 | 0 |

## CSAC Action Required

Pursuant to the CDP, the CSAC is asked to consider endorsement of four candidate measures.

### Measures Recommended for Endorsement

- #2860 Thirty-day All-Cause Unplanned Readmission Following Psychiatric Hospitalization in an Inpatient Psychiatric Facility (IPF) (CMS/MPR) (Maintenance)
    - Overall Suitability for Endorsement: Yes-15; No-0 (denominator = 15)

- #2880 Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF) (CMS/Yale CORE) (Maintenance)
    - Overall Recommendation for Endorsement: Yes-15; No-0 (denominator = 15)

- #2882 Excess Days in Acute Care (EDAC) After Hospitalization for Pneumonia (CMS/Yale CORE) (Maintenance)
    - Overall Recommendation for Endorsement: Yes-13; No-2 (denominator = 15)

- #3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure Under the Merit-Based Incentive Payment System (CMS/Yale CORE) (New)
    - Overall Recommendation for Endorsement: Yes-13; No-1 (denominator = 15)

## Comments and Their Disposition

NQF received two comments from one organization (no comments received from NQF members or organizations) pertaining to the draft report and to the measures under review.

Comments submitted during the comment period, with the responses to each comment and the actions taken by the Standing Committee and measure developers, can be found in the All-Cause Admissions and Readmissions, spring 2021 Draft Report.

Comments about specific measure specifications and rationale were forwarded to the developers, who were invited to respond.

The Standing Committee reviewed all the submitted comments (general and measure specific) and developer responses. Committee members focused their discussion on measures or topic areas with the most significant and recurring issues.

### *Measure-Specific Comments*

#### #2880 Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF) (CMS/Yale CORE)

The Heart Failure Society of America (HFSA) raised concern with the unintended consequences of the measure, stating that heart failure patients are discharged too early from acute care, when their blood pressure is still unstable, or their fluid overload is far from resolved. In addition, HFSA states that this would add additional financial burden to hospitals due to the length of stay from patients.

##### Committee Response

The Standing Committee discussed the content of the comment during the post-evaluation meeting on October 15, 2021. The Standing Committee had no further concerns with the developer's response and accepted NQF's proposed response to the commenter. No further action was taken by the Standing Committee.

##### Developer Response

Thank you for your feedback. The intent of this measure is to capture the very outcome that you state that members see, by collectively measuring a set of adverse acute care outcomes that can occur post- discharge: 1) emergency department (ED) visits, 2) observation stays, and 3) unplanned readmissions at any time during the 30 days post-discharge. While increased LOS could be one response to this measure (i.e., hospitals appropriately do not discharge patients before they are clinically stable, so they are not readmitted, go to the ED, or experience an observation stay), ideally this measure incentivizes care transitions so that patients with HF receive adequate follow-up and post-discharge ambulatory care to reduce the risk of a post-discharge hospital visit.

#### #3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients With Heart Failure Under the Merit-Based Incentive Payment System (CMS/Yale CORE)

The Heart Failure Society of America (HFSA) raised concerns with assigning hospitalization rates per capita to a single clinician (or clinician groups), mainly when the current healthcare system is increasingly team-based. HFSA argues that this measure is inappropriate for physician-level accountability programs, like the Merit-based Incentive Payments System (MIPS). HFSA also believes

that metrics that count hospitalizations are misguided. They focus purely on utilization without regard to quality and create perverse incentives by rewarding clinicians who up-code, avoid certain high-risk patients, or die without being admitted to the hospital. HFSA also recognizes that this measure does not seem to account for the competing risk of death. HFSA posits that every major heart failure trial looking at hospitalizations as an adverse event does so, accounting for the competing risk of death. Lastly, HFSA raised concern with the risk adjustment methodology associated with this measure, arguing that it is inadequate in that it relies exclusively on claims data and on generally rigid variables that do not fully account for severity of illness, medical complexity, and social determinants of health, all of which are critical drivers of heart failure admissions. Similarly, HFSA expressed concern that this measure does not adjust for social determinants and other risk factors.

#### Committee Response

The Standing Committee discussed the content of the comment during the post-evaluation meeting on October 15, 2021. The Standing Committee had no further concerns with the developer's response and accepted NQF's proposed response to the commenter. No further action was taken by the Standing Committee.

#### Developer Response

Yale/CORE has replied below to each subtopic within the HSFA's comment, repeating their comment for context.

**HFSA Comment**: On behalf of the Heart Failure Society of America (HFSA), we are writing to provide comments on the Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure under MIPS measure (#3612) currently under consideration by the NQF's All-Cause Admissions and Readmissions Committee. HFSA is a multidisciplinary organization working to improve and expand heart failure care through collaboration, education, research, innovation, and advocacy. Its vision is to significantly reduce the burden of heart failure.

HFSA agrees with the measure steward that hospitalizations put patients at risk of exposure to adverse events, and we recognize the importance of continuity of follow-up post-discharge. However, we have significant concerns about assigning hospitalization rates per capita to a single clinician (or even clinician groups), particularly when our current health care system is increasingly team-based. As such, we do not believe this measure is appropriate for a physician-level accountability program like MIPS. We urge the NQF the abstain from endorsing this measure for use under MIPS and will similarly urge CMS not to finalize its recent proposal to adopt this measure for use under MIPS starting in 2022. A more appropriate strategy for measurement of this patient population, particularly in a pay-for-performance program, would be to focus on actions that are in the direct control of the physician or else to use this type of measure for facility or system-level accountability (e.g., ACOs, the VA, etc.).

HFSA also believes that metrics that count hospitalizations are misguided in that they focus purely on utilization, without regard to quality, and create perverse incentives by rewarding clinicians who up- code, avoid certain high-risk patients, or whose patients die without being admitted to the hospital. We are already seeing the impact of these perverse incentives in hospital-level programs that target readmissions. At the hospital level, "success" on the 30-day readmission metric (relative to "predicted", the latter based on a weak predictive model) has been found to be associated with an excess mortality over the same time frame. If CMS were to shift this framework to MIPS and penalize individual providers by essentially capping the number of patients "they" may hospitalize, this would create a powerful disincentive to deliver

potentially life-saving care and could be disastrous for our patients, particularly the sickest and most vulnerable ones.

HFSA strongly supports efforts to improve ambulatory care quality and care coordination, but we believe that clinician-level measurement of heart failure management needs to shift its focus from pure utilization metrics to coupling utilization with quality care delivery and reducing adverse events. For example, clinician-level metrics should focus on providing guideline-directed medical therapy (GDMT) and improving management of hypertension and diabetes, which all have the potential to reduce hospitalizations by making our patients healthy. Outcomes, namely survival, should be measured at the hospital-level. Similarly, it would be much more valuable to evaluate whether systems are in place to arrange follow-up care— for example, counting a hospital readmission if the patient did not have a follow-up arranged in 7-10 days or the hospital did not discharge a patient on GDMT. Clinician-level metrics should incentivize the adoption of these processes and tools that drive quality and favorable outcomes, including reductions to both hospitalization rates and mortality.

**Yale/CORE Response**: Yale-CORE appreciates the concerns raised by the HFSA. The measure is focused on acute unplanned CV-related admissions because they represent an actionable subset of admissions that can be influenced by primary care providers (PCPs) and cardiologists. Acute CV-related admissions occur when outpatient management of HF fails, or when patients develop new or worsening symptoms or CV complications. There is strong evidence supporting the assertion that ambulatory care clinicians can influence acute unplanned cardiovascular-related admission rates by providing high quality of care [1-7]. For example, Brown et al. pointed to four ambulatory care-focused Medicare Coordinated Care Demonstration programs that reduced hospitalizations for high-risk patients by 13-30 events per 100 beneficiaries per year (8-33% of hospitalizations). Brown et al. highlighted six program features that were associated with successfully reducing hospitalizations: 1) supplementing patient telephone calls with in-person meetings; 2) occasionally meeting in-person with providers; 3) acting as a communication hub for providers; 4) providing patients with evidence-based education; 5) providing strong medication management; and 6) providing comprehensive and timely transitional care after hospitalizations [1]. In addition, van Loenen et al. found that higher levels of provider continuity decreased the risk of avoidable hospitalizations for ambulatory care-sensitive conditions (ACSCs) and chronic diseases [6].

Hussey et al. [8] found that among Medicare beneficiaries, greater continuity of care was associated with lower hospitalization odds (OR=0.94, CI=0.93-0.95). Favorable results (declines in admissions) were also shown by Dorr et al. (2000), Levine et al. (2012), Littleford et al. (2010), and Zhang et al. (2008) [2-4, 7]. Several studies have demonstrated positive impact of early follow-up after hospitalization to reduce readmissions for HF [9-12].

The measure aims to incentivize effective and coordinated care for patients with HF to reduce the rates of these admissions. In designing this measure, CMS took into consideration the types of acute hospital admissions that ambulatory providers caring for patients with heart failure could be held accountable for and excluded those that do not reflect the quality of ambulatory care. Because ambulatory providers may not be able to control all the factors that drive CV-related acute hospital admissions among patients with heart failure, the measure is carefully risk adjusted for comorbid conditions, severity of heart failure, frailty and disability, as well as for the AHRQ SES Index, a marker of socioeconomic disadvantage. We note that the target rate of admissions is not “capped” nor is it zero since disease progression often necessitates hospital

admission to stabilize and treat CV complications; rather, the measure assesses whether the admission rate for providers' patients is higher than expected given their risk factors.

We agree that some process measures, e.g., those focused on adoption of guideline-directed medical therapy in patients with heart failure or those focused on achievement of blood pressure or glycemic control targets, can be used to incentivize quality improvement for patients with heart failure. However, they do not capture all the actions that clinicians can take to influence favorable outcomes.

Moreover, patients are interested in surviving, avoiding hospital admissions, minimizing symptoms, achieving optimal functioning, and optimizing their quality of life. No set of process measures can be comprehensive enough to serve as a surrogate for these patient outcomes. Thus, CMS prioritizes the use of outcome measures to evaluate quality in MIPS.

CMS will continue to monitor for any unintended consequences of the measure. CMS notes that although thresholds to admit a patient with HF from the emergency department (ED) to the hospital can be variable, they are unlikely to be unduly influenced by ambulatory MIPS clinicians. When patients present with an acute illness to the ED, the decision to admit or discharge a patient is generally made by the ED physician. Therefore, it is unlikely that the measure would incentivize changes in thresholds to admit a HF patient or create caps on the number of patients admitted. In addition, the measure uses claims codes that are subject to auditing in order to minimize fraudulent coding.

References:

1. Brown RS, Peikes D, Peterson G, Schore J, Razafindrakoto CM. Six Features of Medicare Coordinated Care Demonstration Programs That Cut Hospital Admissions of High-Risk Patients. Health Affairs. 2012;31(6):1156-1166.

2. Dorr DA, Wilcox AB, Brunker CP, Burdon RE, Donnelly SM. The Effect of Technology-Supported, Multidisease Care Management on the Mortality and Hospitalization of Seniors. Journal of the American Geriatrics Society. 2008;56(12):2195-2202.

3. Levine S, Steinman BA, Attaway K, Jung T, Enguidanos S. Home care program for patients at high risk of hospitalization. The American journal of managed care. 2012;18(8): e269-e276.

4. Littleford A, Kralik D. Making a difference through integrated community care for older people. Journal of Nursing and Healthcare of Chronic Illness. 2010;2(3):178-186.

5. Sommers LS, Marton KI, Barbaccia JC, Randolph J. Physician, Nurse, and Social Worker Collaboration in Primary Care for Chronically Ill Seniors. Archives of Internal Medicine. 2000;160(12):1825-1833.

6. Van Loenen T, Faber MJ, Westert GP, Van den Berg MJ. The impact of primary care organization on avoidable hospital admissions for diabetes in 23 countries. Scandinavian journal of primary health care. 2016;34(1):5-12.

7. Zhang NJ, Wan TTH, Rossiter LF, Murawski MM, Patel UB. Evaluation of chronic disease management on outcomes and cost of care for Medicaid beneficiaries. Health Policy. 2008;86(2):345-354.

8. Hussey PS, Schneider EC, Rudin RS, Fox DS, Lai J, Pollack CE. Continuity and the Costs of Care for Chronic Disease Care Continuity and Costs for Chronic Disease Care Continuity and Costs for Chronic Disease. JAMA Internal Medicine. 2014;174(5):742-748.

9. Donaho EK, Hall AC, Gass JA, et al. Protocol-Driven Allied Health Post-Discharge Transition Clinic to Reduce Hospital Readmissions in Heart Failure. Journal of the American Heart Association. 2015;4(12): e002296.

10. Lee KK, Yang J, Hernandez AF, Steimle AE, Go AS. Post-discharge Follow-up Characteristics Associated With 30-Day Readmission After Heart Failure Hospitalization. Medical Care. 2016;54(4):365-372.

11. Murtaugh CM, Deb P, Zhu C, et al. Reducing Readmissions among Heart Failure Patients Discharged to Home Health Care: Effectiveness of Early and Intensive Nursing Services and Early Physician Follow- Up. Health Services Research. 2017;52(4):1445-1472.

12. Ryan J, Kang S, Dolacky S, Ingrassia J, Ganeshan R. Change in Readmissions and Follow-up Visits as Part of a Heart Failure Readmission Quality Improvement Initiative. The American Journal of Medicine. 2013;126(11):989-994.e981.

**HSFA Comment**: We also remind the NQF that every major heart failure trial looking at hospitalizations as an adverse event does so accounting for the competing risk of death (i.e., if the patient dies, he/she will not be hospitalized). This measure does not seem to account for the competing risk of death and it is unclear if CMS would simultaneously evaluate excess number of deaths per capita.

**Yale/CORE Response**: Yale-CORE appreciates the concerns about mortality as a competing outcome; this concern was taken into account during development of the measure since patients with HF are at high risk of both hospital admissions and mortality. The measure does not favor providers with higher mortality rates for two reasons. First, patients who die in the measurement year tend to be admitted more often in that year. Second, when a patient dies, he/she no longer contributes time to the measure denominator (person-years). A better score on the measure is achieved by helping patients stay alive and contribute to the denominator while avoiding hospitalization.

**HSFA Comment**: Finally, we remind the NQF that heart failure patients have multiple comorbidities. In fact, more than half of hospitalizations among these patients are unrelated to worsening heart failure. As we previously expressed to the Measures Application Partnership (MAP), the risk adjustment methodology associated with this measure is inadequate in that it relies exclusively on claims data and on generally rigid variables that do not fully account for severity of illness, medical complexity, and social determinants of health, all of which are critical drivers of heart failure admissions. Similarly, this measure does not adequately adjust for social determinants and other risk factors. Many patients make appointments and just do not show for follow-up. It is also not uncommon that they do not fill medications— often these patients are underprivileged or underinsured and cannot afford medications (especially in January of each year when copays start over). Thus, if a patient does not own a car and does not have a smart phone or internet access for e-visits, the clinician is limited in his/her ability to prevent readmissions.

**Yale/CORE Response**: Yale-CORE appreciates this input. The measure accounts for patients with more complicated or severe heart failure in several ways: 1) by excluding patients at advanced

stages of heart failure, such as those with implanted left ventricular assist device (LVAD), those who receive home inotropic therapy, or those with prior heart transplant or with end stage renal disease; 2) by risk adjustment for AICDs (defibrillators); 3) by risk adjustment for systolic heart failure; 4) by risk adjustment for comorbidities including chronic kidney disease, and for frailty/disability; and 5) by not including advanced heart failure/transplant specialists for attribution. Four residential and community context variables were evaluated for possible inclusion in the risk-adjustment model: 1) the AHRQ SES Index, 2) rural residence, 3) PCP density, and 4) cardiologist density, and one individual level variable: Medicare-Medicaid dual eligibility. Given the measure conceptual model, empiric findings, and feedback received from the national TEP and Clinician Committee during measure development, CMS decided to adjust the measure for the AHRQ SES Index. The AHRQ SES Index variable captures multiple aspects of social deprivation that can impact patients' health and health outcomes, including poverty and median household income; unemployment; education; and housing value and quality. These factors are deeply rooted in societal disparities, and MIPS providers may have little ability to influence their effect.

However, ambulatory providers can work with patients to improve on their continuity of care, adherence to prescribed medications, and access to appointments.

## Member Expression of Support

Throughout the 16-week continuous public commenting period, NQF members had the opportunity to express their support ('support' or 'do not support') for each measure submitted for endorsement consideration to inform the Committee's recommendations. Two NQF members provided their expression of non-support in pre-evaluation comments. No expressions of support were provided in pre-evaluation comments. No NQF members provided expressions of support ('support' or 'do not support') after the measure evaluation meeting. Appendix C details the expressions of support.

## Appendix A: CSAC Checklist

The table below lists the key considerations to inform the CSAC's review of the measures submitted for endorsement review.

| Key Consideration | Yes/No | Notes |
|---|---|---|
| Were there any process concerns raised during the CDP project? If so, briefly explain. | No | * |
| Did the Standing Committee receive requests for reconsideration? If so, briefly explain. | No | * |
| Did the Standing Committee overturn any of the Scientific Methods Panel's ratings of Scientific Acceptability? If so, state the measure and why the measure was overturned. | No | * |
| If a recommended measure is a related and/or competing measure, was a rationale provided for the Standing Committee's recommendation? If not, briefly explain. | N/A | * |
| Were any measurement gap areas addressed? If so, identify the areas. | No | * |
| Are there additional concerns that require CSAC discussion? If so, briefly explain. | No | * |

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## Appendix B: Measures Not Recommended for Endorsement

The All-Cause Admissions and Readmissions Standing Committee recommended all candidate measures for endorsement.

## Appendix C: NQF Member Expression of Support Results

Two NQF members provided their expression of non-support for one measure under review, #3612. No other expressions of support were provided. The results are provided below.

**#3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure Under the Merit-Based Incentive Payment System Measure (CMS/Yale CORE) (New)**

| Member Council | Support | Do Not Support | Total |
|---|---|---|---|
| Health Professional | 0 | 1 | 1 |
| Provider Organization | 0 | 1 | 1 |

# Appendix D: Details of Measure Evaluation

**Rating Scale: H**=High; **M**=Moderate; **L**=Low; **I**=Insufficient; **NA**=Not Applicable; **Y**=Yes; **N**=No

Vote totals may differ between measure criteria and between measures as Standing Committee members often must join calls late or leave calls early. NQF ensures that quorum is maintained for all live voting. All voting outcomes are calculated using the number of Standing Committee members present during the meeting for that vote as the denominator. Denominator vote counts may vary throughout the criteria due to intermittent Standing Committee attendance fluctuation. The vote totals reflect members present and eligible to vote at the time of the vote. Quorum (a minimum of 15 out of 21 active Standing Committee members present) was reached and maintained for the duration of all measure evaluation meetings on July 6, 2021.

## Measures Recommended

### NQF #2860 Thirty-day All-Cause Unplanned Readmission Following Psychiatric Hospitalization in an Inpatient Psychiatric Facility (IPF) (CMS/MPR)

Measure Worksheet

**Description**: This facility-level measure estimates an all-cause, unplanned, 30-day, risk-standardized readmission rate for adult Medicare Fee-for-Service (FFS) patients with a principal discharge diagnosis of a psychiatric disorder or dementia/Alzheimer's disease.

The performance period for the measure is 24 months.

**Numerator Statement**: The measure estimates the incidence of unplanned, all-cause readmissions to IPFs or short-stay acute care hospitals following discharge from an eligible IPF index admission. A readmission is defined as any admission that occurs within 3-30 days after the discharge date from an eligible index admission to an IPF, except those considered planned.

**Denominator Statement**: The target population for this measure is Medicare FFS beneficiaries discharged from an IPF with a principal diagnosis of a psychiatric disorder. A readmission within 30 days is eligible as an index admission, if it meets all other eligibility criteria.

**Exclusions**: The measure excludes admissions for patients:

- Discharged against medical advice (AMA)
- With unreliable demographic and vital status data defined as the following:
    - Age greater than 115 years
    - Missing gender
    - Discharge status of "dead" but with subsequent admissions
    - Death date prior to admission date
    - Death date within the admission and discharge dates but the discharge status was not "dead"
- With readmissions on the day of discharge or day following discharge because those readmissions are likely transfers to another inpatient facility. The hospital that discharges the patient to home or a non-acute care setting is accountable for subsequent readmissions.
- With readmissions two days following discharge because readmissions to the same IPF within two days of discharge are combined into the same claim, as the index admission does not appear as readmissions due to the interrupted stay billing policy. Therefore, complete data on readmissions within two days of discharge are not available.

**Adjustment/Stratification**: Statistical risk model. The measure is not stratified.

**Level of Analysis:** Facility

**Setting of Care:** Inpatient/Hospital

**Type of Measure**: Outcome

**Data Source**: Claims

**Measure Steward**: Centers for Medicare & Medicaid Services

**STANDING COMMITTEE MEETING 07/06/2021**

**1. Importance to Measure and Report: The measure meets the Importance criteria.**

(1a. Evidence, 1b. Performance Gap)

1a. Evidence: **Total Votes = 15**; **Pass-15; No Pass-0**; 1b. Performance Gap: **Total Votes = 14**; **H-1**; **M-11**; **L-2**; **I-0**

**Rationale**

- The Standing Committee discussed the developer's inclusion of new evidence for this measure, which demonstrated an association of various hospital and facility-led interventions that can be implemented to improve this outcome.
- A Standing Committee member noted the importance of considering other evidence that may be more patient-centric, such as lifestyle changes and non-medicinal interventions.
- The same Standing Committee member recognized the vital role of medications in psychiatric medicine, but further stated that there are good reasons to study alternative therapies.
- The Standing Committee did not have any additional commentary or concerns with the evidence, and it passed the measure unanimously on this criterion.
- The Standing Committee considered the performance gap of the measure, noting that during the first performance period of July 1, 2015–June 30, 2017, the national unplanned readmission rate among IPFs that met the minimum case count (>=25 discharges) was 20.1 percent. For the performance period July 1, 2017-June 20, 2019, this rate was 18.5 percent.
- The Standing Committee also acknowledged the measure rates clearly show the existence of disparities.
- The Standing Committee expressed no additional concerns and passed the measure on the performance gap criterion.

**2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria**

2a. Reliability precise specifications, testing; 2b. Validity testing, threats to validity)

2a. Reliability**: Total Votes = 14; Yes-14; No-0 (Accept SMP moderate rating)**

2b. Validity: **Total Votes = 14; Yes-14; No-0 (Accept SMP moderate rating)**

**Rationale**

- This measure was assessed by SMP, which passed the measure on reliability, (Total votes: 9; H-0; M-8; L-1; I-0), and validity (Total votes-9; H-1; M-6; L-1; I-1).
- The Standing Committee reviewed the measure testing information and noted that the developer used two techniques to demonstrate measure score reliability, namely split sampling and bootstrapping.
- The Standing Committee considered the split sample intra-class correlation coefficient (ICC) value of 0.559 and the bootstrapping method's ICC value of 0.752.
- The Standing Committee acknowledged that the NQF Scientific Methods Panel (SMP) reviewed and passed the measure on reliability.
- The Standing Committee did not express concern and agreed to uphold the SMP's rating of moderate on the reliability criterion.
- Moving to validity, the Standing Committee noted both approaches that the developer used to conduct validity testing, which were the Spearman rank correlation and discriminate validity testing.
- Discriminant validity was tested against six patient characteristics hypothesized to be associated with higher readmissions rates: male patients, patients with a substance use disorder, patients with schizophrenia, non-White patients, patients with shorter length of stay at the IPF, and patients with socioeconomic characteristics associated with worse health outcomes.
- The results ranged from 0.012 to 0.457 and 0.05 to 0.473 for predicted and expected rates, respectively. For the observed rates, the results were smaller, ranging from 0.003 to 0.109.
- The Standing Committee further noted that the SMP also passed this measure on validity.
- The Standing Committee noted the small range of the discriminant validity testing results, but it recognized that validity is still demonstrated and agreed to uphold the SMP's rating of moderate on the validity criterion.

**3. Feasibility: Total Votes = 14; H-6; M-8; L-0; I-0**

*(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/ unintended consequences identified 3d. Data collection strategy can be implemented)*

**Rationale**

- The Standing Committee noted the claims-based nature of the measure and did not express any concern with respect to the feasibility of the measure.

- The Standing Committee voted to pass the measure on feasibility.

**4. Use and Usability: The maintenance measure meets the Use subcriterion.**

*(4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)*

4a. Use: **Total Votes = 14; Pass-14; No Pass-0** 4b. Usability: **Total Votes = 15; H-1; M-14; L-0; I-0**

**Rationale**

- The Standing Committee recognized that this measure is used in CMS' Inpatient Psychiatric Facilities Quality Reporting (IPFQR) program.
- The Standing Committee also acknowledged that the developer collects feedback as measured entities submit questions on the IPF-specific reports.
- The developer stated that IPFs have asked an average of two or three questions per year for the past three years, all of which have been clarifying questions on the measure specifications.
- As a result, they did not modify the measure based on feedback from IPFs because no feedback was provided, thus indicating that modifications were required.
- The Standing Committee referenced the coinciding national IPF readmission rate decrease from 20.1 percent to 18.5 percent between 2017-2019. One Standing Committee member offered a patient-centric observation of the usefulness of the hospital rating system, noting that patients are appreciative and find it useful.
- The Standing Committee did not raise any major concerns and passed the measure on the use and usability criteria.

**5. Related and Competing Measures**

- The Standing Committee noted several related measures to this metric, but it did not consider these measures to be competing.
- The developer identified the following related measures:
    - #1768: Plan All-Cause Readmissions (PCR)
    - #1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
    - #2502: All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Inpatient Rehabilitation Facilities (IRFs)
    - #2504: 30-day Rehospitalizations per 1000 Medicare Fee-for-Service (FFS) Beneficiaries
    - #2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)
    - Hospital, Thirty Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Ischemic Stroke Hospitalization.

**6. Standing Committee Recommendation for Endorsement**: **Total Votes = 15; Y-15**; **N-0**

**7. Public and Member Comment**

- No NQF-member or public comments were received for the measure prior to or after the evaluation meeting.

- 8. Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X

**9. Appeals**

## NQF #2880 Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

Measure Worksheet

**Description**: The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for heart failure (HF) to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had an HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare

& Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-for-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**Numerator Statement**: The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**Denominator Statement**: The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-federal and Veterans Affairs (VA) acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**Exclusions**: The measure excludes index hospitalizations that meet any of the following exclusion criteria:

- Without at least 30 days of post-discharge enrollment in Medicare FFS
- Discharged against medical advice
- HF admissions within 30 days of discharge from a prior HF index admission
- With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**Adjustment/Stratification**: Statistical risk model; N/A; this measure is not stratified.

**Level of Analysis:** Facility

**Setting of Care:** Emergency Department and Services, Inpatient/Hospital

**Type of Measure**: Outcome

**Data Source**: Claims, Other

**Measure Steward**: Centers for Medicare & Medicaid Services

**STANDING COMMITTEE MEETING 07/06/2021**

**1. Importance to Measure and Report: The measure meets the Importance criteria.**

(1a. Evidence, 1b. Performance Gap)

1a. Evidence: **Total Votes = 15; Pass-14**; **No Pass-1** 1b. Performance Gap: **Total Votes = 15; H-4; M-7**; **L-4**; **I-0**

**Rationale**

- The Standing Committee reviewed and discussed the evidence, noting that the developer cited several studies supporting various care processes that can influence post-discharge acute care utilization after a hospitalization for HF.
- Further the developer provided evidence suggesting that hospitals and health plans have been able to reduce readmission rates through more generalizable quality improvement initiatives, such as communication between providers, patient education, patient safety, and coordinated transitions to the outpatient environment.
- One Standing Committee member had a question as to whether the current readmission measures for conditions such as HF and pneumonia would be retired, as the EDAC measures have a more wholistic capture of utilization.
- CMS replied that the readmission measures are required by statute within the Hospital Readmissions Reduction Program; therefore, the current intent is to use both EDAC and readmission measures in parallel until there is a change in statute.
- The Standing Committee also asked whether the developer has any evidence to show that the number of days, rather than readmissions, can be influenced by the behavior in the initial acute hospitalization. In response, the developer stated that they have anecdotal evidence showing that this measure has an impact on the number of days.
- The Standing Committee did not raise any other questions or concerns and passed the measure on the evidence criterion.

- The Standing Committee considered the range of performance across hospitals with at least 25 admissions during the reporting period of 2016 to 2019, in which the rates ranged from -59.7 to 154.4 EDAC per 100 admissions with a median EDAC of 2.3 per 100 admissions.
- The Standing Committee also acknowledged that this measure was able to identify disparities, namely for dual eligible patients and by the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) Index.
- The Standing Committee did not raise any major concerns and passed the measure on performance gap.

**2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.**

(2a. Reliability precise specifications, testing; 2b. Validity testing, threats to validity)

2a. Reliability: **Total votes = 15; Yes-15; No-0 (accept SMP moderate rating)**

2b. Validity: **Total votes = 15; Yes-11; No-4 (accept SMP moderate rating)**

**Rationale**

- The Standing Committee reviewed the scientific acceptability of the measure on reliability Total votes= 9; H-0**;** M-8**;** L-1**;** I-0) and validity (Total votes = 8; H-0**;** M-7**;** L-0**;** I-1).
- The Standing Committee reviewed the scientific acceptability of the measure (i.e., reliability and validity).
- For reliability, the Standing Committee acknowledged that the SMP reviewed and passed the measure on reliability with a moderate rating.
- The Standing Committee noted that the developer conducted testing at the measure score-level and calculated an ICC using a split-sample approach. The developer reported ICC ranges from 0.456 for hospitals with at least two admissions to 0.698 for hospitals with at least 300 admissions. For hospitals with at least 25 admissions, the ICC was 0.527.
- The Standing Committee did not raise any questions or concerns and upheld the SMP's rating for reliability.
- For validity, the Standing Committee acknowledged that the SMP passed the measure on validity with a moderate rating.
- The Standing Committee considered the validity testing for this measure, noting that the developer conducted face validity testing, via a Technical Expert Panel (TEP), and empirical validity testing. The developer reported that 11 of 12 (91.7%) TEP members convened by the developer strongly, moderately, or somewhat agreed with the following statement: "The risk-standardized acute care days obtained from the measures as specified can be used to distinguish between better and worse quality hospitals."
- The developer also conducted construct validity testing to determine the relationships between the HF EDAC measure score and the risk standardized readmission rate group scores, the overall hospital rating scores, and the HF readmission measure. The developer reported statistically significant correlations for all measures, in the direction hypothesized. For the risk adjustment model, the Standing Committee noted that two social risk factors were tested and found to be statistically significant (i.e., dual-eligible status and AHRQ SES index).
- The developer also performed a decomposition analysis. In this analysis, the clinical risk factors have a larger patient-level effect compared with their hospital-level effects. In contrast, both the low AHRQ SES variable and the dual eligible variable have a larger hospital-level effect compared with the patient-level effect. Based on these analyses, the developer did not adjust this measure for either dual eligibility or the AHRQ SES Index.
- One Standing Committee member raised concern with the low r-squared value of 0.027. The developer replied that when looking at count models, such as the number of days, the goal is to adjust for the case-mix, rather than to predict an outcome. As a result, the deviance r-squared value does not have the same interpretation as a prediction, and the results are what would be expected with this type of model and for this type of data.
- The Standing Committee asked for more explanation regarding their rationale for not including the social risk factors in the final model, namely the decomposition analysis. The developer replied that the decomposition analysis evaluates the variation that can be attributed to the hospital and the variation that can be attributed to the patient. In this analysis, the clinical risk factors have a larger patient-level effect compared with their hospital-level effects. In contrast, both the low AHRQ SES variable and the dual-eligible variable have larger hospital-level effects compared with the patient-level effect. Based on these analyses, the developer did not adjust this measure for either dual eligibility or the AHRQ SES Index.
- CMS also commented that it does not adjust for social risk factors, such as dual eligibility, at the measure-level. Rather, the Hospital Readmissions Reduction Program, in which most of the measures are currently

used, stratifies its payment calculations in accordance with statutory guidance based on dual eligibility. One Standing Committee member commented that having the decomposition analysis was helpful in better understanding why the social risk factors were not included. Another Standing Committee member commented that these factors should be included, regardless of the magnitude of their effect, such that there are unbiased assignments and reporting of accountability.

- Co-chair, John Bulger, asked NQF whether there is any current work being done at NQF to address the concerns regarding social risk factor adjustment within quality measurement. In response, Dr. Matt Pickering stated that NQF is currently developing technical guidance, which is out for public comment. This guidance is intended to provide a step-by-step approach for social and functional status-related risk adjustment within quality measurement. This guidance will help to evolve NQF's current criteria, which will occur after 2022. Therefore, measures under review of the spring 2021 cycle must be evaluated under NQF's current criteria.
- The Standing Committee raised no other questions/concerns and upheld the SMP's validity rating.

**3. Feasibility: Total Votes = 15; H-5; M-10; L-0; I-0**

*(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/ unintended consequences identified 3d. Data collection strategy can be implemented)*

Rationale:

- The Standing Committee acknowledged that this measure uses administrative claims and enrollment data and as such, it offers no data collection burden to hospitals or providers.
- The Standing Committee did not raise any questions or concerns and passed the measure on the feasibility criterion.

**4. Use and Usability: The maintenance measure meets the Use sub criterion.**

*4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)*

4a. Use: **Total Votes = 15; Pass-15; No Pass-0** 4b. Usability: **Total Votes = 15; H-2; M-9; L-3; I-1**

**Rationale**

- The Standing Committee evaluated the use criterion and noted that the measure is currently used within the Hospital Inpatient Quality Reporting (IQR) Program and Care Compare.
- The Standing Committee also noted that the developer routinely scans the literature for articles describing research related to this measure and solicits feedback from stakeholders.
- The Standing Committee did not have any questions or concerns and passed the measure on the use criterion.
- For usability, the Standing Committee recognized that the developer reported improvement over the past three reporting periods (2014-2017, 2015-2018, and 2016-2019) in measure scores across most of the distribution, specifically from the 30th percentile through the 80th percentile.
- One Standing Committee member questioned whether this measure is contributing valuable information for hospitals or whether it is simply just adding noise to the system, considering there are various readmission measures currently used within Care Compare. The Standing Committee member also questioned which of the measures should hospitals target, namely whether hospitals should target the number of excess days or whether a readmission occurred.
- The developer replied that when the readmission measures were first developed, various stakeholders and members of the public expressed concern that hospitals may game the system with these measures (i.e., increased observation stays). Therefore, CMS, in response to these concerns, developed the EDAC measures. CMS has implemented the EDAC measures as balancing measures, and hospitals that continue to use these measures have expressed value in them.
- Another Standing Committee member added that they do see the value in this measure but would also like to see an excess days measure that was cross-cutting, and not just condition-specific.
- One Standing Committee member agreed that this measure has increased usability due to the value of monitoring excess days in acute care, such as looking at observations stays.
- The Standing Committee also recognized the developer continues to monitor unintended consequences. There were no other questions or concerns raised and the Standing Committee passed the measure on usability.

**5. Related and Competing Measures**

- The Standing Committee observed that there are several related measures to this metric, but it did not consider these measures to be competing.
- The developer identified the following related measures:
    - #0229 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization
    - #0230 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Acute Myocardial Infarction (AMI) Hospitalization
    - #0330 Hospital 30 Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization
    - #0505 Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization.
    - #0506: Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
    - #1551: Hospital-Level 30-Day Risk-Standardized Readmission Rate (RSRR) Following Elective Primary Total Hip Arthroplasty (THA) and/or Total Knee Arthroplasty (TKA)
    - #1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
    - #1891: Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization
    - #2515: Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery
    - #2881: Excess Days in Acute Care (EDAC) After Hospitalization for Acute Myocardial Infarction (AMI)
    - #2882: Excess Days in Acute Care (EDAC) After Hospitalization for Pneumonia.

**6. Standing Committee Recommendation for Endorsement**: **Total Votes = 15; Y-15**; **N-0**

**7. Public and Member Comment**

- No NQF-member or public comments were received prior to the evaluation meeting.
- One public comment was received for the measure after the evaluation meeting expressing concern for the measure, and recommended the measure not be endorsed. Specifically, that patients diagnosed with heart failure are often discharged with unstable blood pressure and unresolved fluid overload, which may create additional financial burden for hospitals.
- The developers provided feedback to the comment, stating the measure supports clinically appropriate length of stays (LOS) that should assist in reducing deter readmissions, emergency department (ED), and observation stays, and incentivize care transitions, adequate follow-up, and post-discharge ambulatory care.
- No further action or response was required from the Standing Committee or developer.
- The content of this comment was discussed at the post-evaluation comment meeting on October 15, 2021. The Standing Committee had no further concerns with the developer's response and accepted NQF's proposed response to the commenter. No further action was taken by the Standing Committee.

**8. Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X**

**9. Appeals**

## NQF #2882 Excess days in acute care (EDAC) after hospitalization for pneumonia

Measure Worksheet

**Description**: This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and

unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years of age or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**Numerator Statement**: The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia (PN), including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

**Denominator Statement**: The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months of Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years of age and older who are Medicare FFS or VA beneficiaries admitted to non-federal or Veterans Affairs (VA) hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**Exclusions**: The measure excludes index hospitalizations that meet any of the following exclusion criteria:

- Without at least 30 days of post-discharge enrollment in Medicare FFS
- Discharged against medical advice
- Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

**Adjustment/Stratification**: Statistical risk model: This measure is not stratified.

**Level of Analysis:** Facility

**Setting of Care:** Inpatient/Hospital

**Type of Measure**: Outcome

**Data Source**: Claims, Enrollment Data

**Measure Steward**: Centers for Medicare & Medicaid Services

**STANDING COMMITTEE MEETING 07/06/2021**

**1. Importance to Measure and Report: The measure meets the Importance criteria.**

(1a. Evidence, 1b. Performance Gap)

1a. Evidence: **Total Votes = 15; Pass-15**; **No Pass-0** 1b. Performance Gap: **Total Votes = 15; H-1**; **M-14**; **L-0**; **I-0**

**Rationale**

- The Standing Committee reviewed and discussed the evidence, noting that the developer cited new evidence indicating that pneumonia leads to more than 1 million hospitalizations per year, incurring billions of dollars in healthcare costs.
- The developer provided a logic model with additional supportive evidence suggesting that hospitals can influence EDAC through a broad range of clinical activities including communication between providers, patient education, prevention of, and response to complications, patient safety, medication reconciliation, better disease management strategies, and coordinated transitions to the outpatient environment.
- The Standing Committee acknowledged that the same concerns and discussion points raised for NQF #2880 also apply to NQF #2882 and proceeded to pass the measure on the evidence criterion.
- The Standing Committee reviewed the performance gap criterion and recognized that the developer reported EDAC scores for the most recent reporting period (2016-2019), which were -65.7 to 146 EDAC per 100 admissions; the mean was 5.0 EDAC per 100 admissions and the median was 2.9 EDAC per 100 admissions. The 10th percentile was -23.8, the 50th percentile was 2.9, and the 90th percentile was 36.7 EDAC per 100 admissions.
- The Standing Committee did not raise any major concerns and passed the measure on performance gap.

**2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.**

(2a. Reliability precise specifications, testing; 2b. Validity testing, threats to validity)

2a. Reliability: **Total Votes = 15; Yes-14; No-1 (accept SMP moderate rating)**

2b. Validity: **Standing Committee Vote: Total Votes = 15; Yes-14; No-1 (accept SMP moderate rating)**

**Rationale**

- The Standing Committee acknowledged that the SMP reviewed and passed this measure on both reliability (total votes = 9; H-1**;** M-8**;** L-0**;** I-0) and validity (total votes = 8**;** H-0**;** M-7**;** L-0**;** I-1).
- The Standing Committee considered that the developer reported an intra-class correlation coefficient (ICC) range of 0.541 for hospitals with at least two admissions to 0.709 for hospitals with at least 300 admissions. For hospitals with at least 25 admissions, the ICC was 0.576.
- The Standing Committee did not raise any questions and agreed to uphold the SMP's rating for reliability.
- For validity, the Standing Committee reviewed the validity testing, and recognized that the face validity and empirical testing were similar to NQF #2880; thus, the concerns and discussion points raised for NQF #2880 also apply to NQF #2882.
- Therefore, the Standing Committee agreed to accept the SMP's rating for validity.

**3. Feasibility: Total Votes = 15; H-7; M-8; L-0; I-0**

*(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/ unintended consequences identified 3d. Data collection strategy can be implemented)*

**Rationale**

- The Standing Committee acknowledged that this measure uses administrative claims and enrollment data and as such, it offers no data collection burden to hospitals or providers.
- The Standing Committee did not raise any concerns with respect to feasibility and passed the measure on this criterion.

**4. Use and Usability: The maintenance measure meets the Use subcriterion.**

*(4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)*

4a. Use: **Total Votes = 15; Pass-15; No Pass-0** 4b. Usability: **Total Votes = 15; H-0; M-11; L-2; I-2**

**Rationale**

- The Standing Committee recognized that the measure is currently used within the Hospital Inpatient Quality Reporting (IQR) Program and Care Compare.
- The Standing Committee also noted that the developer routinely scans the literature for articles describing research related to this measure and solicits feedback from stakeholders.
- The Standing Committee did not have any questions or concerns and passed the measure on the use criterion.
- For usability, the Standing Committee noted the minimum improvement in the pneumonia EDAC measure across the three performance periods.
- The Standing Committee acknowledged that a contributing factor to the limited improvement could be the severe 2017-2018 influenza season, which would have impacted the 2015-2018 and 2016-2019 reporting periods.
- The Standing Committee also agreed that some of the concerns and discussion points raised during NQF #2880 also apply to NQF #2882. One Standing Committee member mentioned that they would like to see some empirical evidence supporting the value of the use of these EDAC measures compared with the readmission measures, namely whether excess days are meaningful to patients, whether there are correlations to risk-standardized mortality, and how are hospitals are using this information of excess days to implement change.
- Moving to a vote, the Standing Committee passed the measure on usability.

**5. Related and Competing Measures**

- The Standing Committee observed that there are several related measures to this metric, but it did not consider these measures to be competing.
- The developer identified the following related measures:
    - #0229 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

- #0230 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Acute Myocardial Infarction (AMI) Hospitalization
- #0330 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization
- #0505 Hospital 30-Aay All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization
- #0506 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
- #1551 Hospital-Level 30-Day Risk-Standardized Readmission Rate (RSRR) Following Elective Primary Total Hip Arthroplasty (THA) and/or Total Knee Arthroplasty (TKA)
- #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
- #1891 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization
- #2515 Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery
- #2880 Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF)
- #2881 Excess Days in Acute Care (EDAC) After Hospitalization for Acute Myocardial Infarction (AMI)

**6. Standing Committee Recommendation for Endorsement**: **Total Votes = 15; Y-13**; **N-2**

**7. Public and Member Comment**

- No NQF-member or public comments were received for the measure prior to or after the evaluation meeting.

**8. Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X**

**9. Appeals**

## NQF #3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure under the Merit-based Incentive Payment System

Measure Worksheet

**Description**: This measure estimates the risk-standardized rate of acute, unplanned, and cardiovascular-related hospital admissions among Medicare Fee-for-Service (FFS) patients ages 65 years and older with heart failure (HF) or cardiomyopathy.

**Numerator Statement**: The outcome for this measure is the number of acute cardiovascular-related admissions per 100 person-years at risk for admission during the measurement year.

**Denominator Statement**: This measure assesses the care provided to patients with HF by primary care providers and cardiologists.

Patients included in the measure (target patient population)

The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with heart failure or cardiomyopathy.

Provider types included for measurement:

- Primary care providers (PCPs): CMS designates PCPs as physicians who practice internal medicine, family medicine, general medicine, or geriatric medicine, as well as non-physician providers, including nurse practitioners, certified clinical nurse specialists, and physician assistants.
- Cardiologists: Cardiologists are covered by the measure because they provide the overall coordination of care for patients with HF and manage the conditions that put HF patients at risk for admission due to acute cardiovascular-related conditions.

Outcome attribution

The measure begins by assigning each patient to the clinician most responsible for the patient's care, based on the pattern of outpatient visits with PCPs and relevant specialists. The patient can be assigned to a PCP, a cardiologist,

or can be left unassigned. Patients who have had no Evaluation and Management (E&M) visits with a Merit-Based Payment System (MIPS)-eligible clinician are excluded.

Step 1: A patient who is eligible for attribution is assigned to a cardiologist only if the cardiologist has been identified as "dominant." A cardiologist is considered "dominant" if they have two or more visits with the patient, regardless of how many visits that patient has with a PCP.

- There are two scenarios in which a patient can be assigned to a PCP. First, if the patient has seen the PCP at least once but has no visits with a cardiologist, the patient is assigned to the PCP. The patient will then be assigned to the PCP with the highest number of visits, as long as there are no relevant specialists who are considered "dominant." Second, if the patient has seen the PCP more than two or more times and has only one visit with a cardiologist, the patient is assigned to the PCP.
- If the patient has one visit each with a cardiologist and a PCP, the patient is assigned to the cardiologist.
- If the patient has one visit with a cardiologist and no visit with a PCP, the patient is assigned to the cardiologist.
- Finally, the patient will be unassigned if they only saw non-relevant specialists, if the patient has not seen a PCP and no "dominant" specialist can be identified, or if the patient has not had more than one visit with any individual PCP.

Step 2: Patients are then assigned at the Taxpayer Identification Number (TIN) level, which includes solo clinicians and groups of clinicians who have chosen to report their quality under a common TIN.

At the TIN level, patients are first assigned to the clinician (NPI/TIN) most responsible for their care (using the algorithm for individual clinician-level attribution above). Then, patients "follow" their attributed clinician to the TIN of that clinician. Patients unassigned at the individual clinician level continue to be unassigned at the TIN level.

**Exclusions**: The measure excludes:

- Patients without continuous enrollment in Medicare Part A and B for the duration of the measurement period.
- Patients in hospice during the year prior to the measurement year or in hospice at the start of the measurement year.
- Patients who have had a heart transplant, been on home inotropic therapy, or who have had a left ventricular assist device (LVAD) placed.
- Patients with end stage renal disease (ESRD), defined as chronic kidney disease stage 5 or on dialysis.
- Patients who had no E&M visits with MIPS eligible clinician.

**Adjustment/Stratification**: Statistical risk model: N/A - This measure is not stratified.

**Level of Analysis:** Clinician : Group/Practice, Clinician : Individual

**Setting of Care:** Outpatient Services

**Type of Measure**: Outcome

**Data Source**: Claims, Other

**Measure Steward**: Centers for Medicare & Medicaid Services (CMS)

**STANDING COMMITTEE MEETING 07/06/2021**

**1. Importance to Measure and Report: The measure meets the Importance criteria.**

(1a. Evidence, 1b. Performance Gap)

1a. Evidence: **Total Votes = 14; Pass-14; No Pass-0**; 1b. Performance Gap: **Total Votes = 14; H-1; M-13**; **L-0**; **I-0**

**Rationale**

- The Standing Committee reviewed and discussed the evidence, noting that the developer outlined a logic model depicting rates of admissions for patients with HF, which can be decreased through care coordination and continuity of care from outpatient providers.
- The developer also cited evidence suggesting that outpatient clinicians can improve HF patients' risk of hospitalizations in a variety of ways, including but not limited to accessible primary care, coordination across providers and care settings, early attention to changes in clinical status, adoption of guideline-directed medical therapy, careful prescribing in patients with comorbidities, patient education, and support for self-management.
- Considering this information, the Standing Committee passed the measure on the evidence criterion.

- In reviewing performance gap for the measure, the Standing Committee recognized that across all TINs, the risk-standardized acute cardiovascular-related admission rate (RSCAR) measure scores ranged from 9.6 to 62.4 per 100 person-years, with a median of 24.8 and an interquartile range of 24.0 to 25.9.
- The mean RSCAR and standard deviation were 25.1 ± 2.4 admissions per 100 person-years.
- The Standing Committee also acknowledged that the distributions of RSCARs were generally similar with respect to the proportion of Medicare-Medicaid dual-eligible beneficiaries across TINs.

**2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.**

(2a. Reliability precise specifications, testing; 2b. Validity testing, threats to validity)

2a. Reliability: **Total Votes = 14; Yes-13; No-1** (accept SMP moderate rating)

2b. Validity: **Total Votes = 15; Yes-14; No-1** (accept SMP moderate rating)

**Rationale**

- The Standing Committee recognized that the SMP reviewed and passed this measure on both reliability (total votes = 8; H-0**;** M-5**;** L-3**;** I-0) and validity (total votes = 8; H-0**;** M-6**;** L-2**;** I-0).
- For reliability, the Standing Committee reviewed the testing data, from which the developer noted that a minimum reliability of 0.4 was achieved for TINs with at least 21 HF patients. At this threshold, reliability scores for TINs ranged from 0.40 to nearly 1.0, with a median value of 0.600 (IQR 0.481-0.778).
- The SMP members agreed the approach is appropriate; however, they raised several concerns, including clarity on the unit of analysis: clinician versus clinician group. One Standing Committee member raised concern with the low reliability results at a patient volume of 21 HF patients.
- The developer provided responses to the SMP concerns, noting that under MIPS, clinicians annually select whether to report as individuals, as part of a group, or as both. The group includes both solo clinicians (i.e., clinicians opting not to report with other clinicians under MIPS) and groups of clinicians who have chosen to report their quality under a common TIN. Therefore, testing results include both individual clinicians and clinician groups, which is consistent with how the MIPS program evaluates quality.
- Regarding the reliability results, the 21 minimum case volume was established to reach the reliability threshold of 0.4, which is acceptable for CMS; the MIPS program will set the minimum case volume during rulemaking.
- Considering this information, the Standing Committee agreed to uphold the SMP's rating on reliability.
- For validity, the Standing Committee reviewed the validity testing for the measure.
- The developer conducted face validity of the measure score, which is the minimum acceptable testing for new measures. Of the 17 TEP members who were active through the end of the project, 12 responded. The majority of the respondents, 10/12 or 83 percent, moderately or somewhat agreed that the MIPS HF measure can be used to distinguish good from poor quality of care. Of the 13 Clinician Committee members who responded to the survey, 11/13 or 85 percent, strongly, moderately, or somewhat agreed that the MIPS HF measure can be used to distinguish good from poor quality of care.
- The developer also adjusted for 30 risk variables, including the AHRQ SES Index. The r-squared value for the model with demographic and clinical risk factors was 0.073. The r-squared value after adding the AHRQ SES Index to the model was unchanged (0.073).
- The Standing Committee agreed that the concerns and discussions related the r-squared value for NQF #2880 also apply to this measure. One Standing Committee member also mentioned that the more homogeneous the patient population is, such as HF patients, the less variation is seen within the model.
- Considering this information, the Standing Committee proceeded to vote to uphold the SMP's rating for validity.

**3. Feasibility: Total Votes = 14**; **H-5; M-9; L-0; I-0**

*(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/ unintended consequences identified 3d. Data collection strategy can be implemented)*

**Rationale**

- The Standing Committee acknowledged that this measure uses administrative claims and enrollment data and as such, it offers no data collection burden to hospitals or providers.
- The Standing Committee did not raise any concerns with respect to feasibility and passed the measure on this criterion.

**4. Use and Usability**

*(4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)*

4a. Use: **Total Votes = 14; Pass-14; No Pass-0** 4b. Usability: **Total Votes = 14; H-0; M-13; L-1; I-0**

**Rationale**

- The Standing Committee recognized that the measure is not currently publicly reported or used in an accountability application. However, CMS may propose this measure for use under MIPS.
- The Measure Applications Partnership (MAP) reviewed this measure for the 2020-2021 cycle.
- MAP did not recommend the measure for rulemaking with potential for mitigation. The mitigation points were as follows: 1) NQF endorsement and 2) an analysis of the appropriateness of the risk adjustment for clinicians with higher caseloads of patients with more complicated or severe HF.
- MAP noted that while the measure raises concerns that the risk adjustment may not adequately account for advanced HF stages, the measure also centers on an important need. As MAP discussed further, these points will be addressed by the NQF endorsement process.
- The developer noted that it will continue to evaluate the risk model during regular measure maintenance; notably, the model performs well as currently specified.
- The Standing Committee did not raise any major concerns and passed the measure on use and usability.

**5. Related and Competing Measures**

- The Standing Committee noted several related measures to this metric, but it did not consider these measures to be competing.
- The developer identified the following related measure:
    - #2886 Risk-Standardized Acute Admission Rates for Patients With Heart Failure

**6. Standing Committee Recommendation for Endorsement**: **Total Votes = 14; Y-13**; **N-1**

**7. Public and Member Comment**

- Pre-evaluation comments
    - Two comments were received prior to the evaluation meeting, both from NQF members. One commenter expressed concerns related to the lack of evidence to attribute accountability of the performance to the individual physician/cardiologist. The commenter stated that heart failure care is team based, that cardiologist practice in both inpatient and outpatient settings, and large organizations have sub-specialists (including advanced practice practitioners and electrophysiologists) that may lead to unclear attribution.
    - Another commenter questioned whether strong evidence exists to demonstrate the meaningful influence of clinical groups on unplanned admissions in this population.
    - Both commenters expressed concern with the low reliability results and testing sample thresholds for accountability use and the identified social risk factors used in the adjustment model.
    - The contents of the pre-evaluation comments were discussed during the measure evaluation meeting.
- Post-evaluation comments
    - One post-evaluation public comment was received for the measure and includes multiple rounds of dialogue by the commenter and developer. This comment recommended against endorsement and required follow up by the Standing Committee and developer.
    - The commenter expressed significant concern related to the attribution of per capita hospitalizations to individual or group clinicians in an era of increasing team-based care delivery. They also emphasize a “pure” utilization performance focus disregards quality and provides “perverse” incentivizes by rewarding “up code” billing, encourages not treating high-risk or complex patients, and does not count patients who expire outside the hospital setting. They state that in use, the measure may create unintended

consequences, such as encouraging providers to "cap" hospitalization and needed life-saving care. Instead, the commenter recommended that a favorable measure outcome would combine both hospitalizations and mortality, including risk of death.

- The developer provided feedback and evidence demonstrating the measure's focus of acute unplanned cardiovascular related admissions represents actionable admission for primary care providers and cardiologists. They also refute the concept of "capped" admissions. Rather, the developer states the measure assesses whether the admission rates are higher than expected given their risk factors. In relation to unintended consequences, the developer states they will be monitored, and other clinical processes may eliminate those concerns.
- The commenter provided additional feedback noting that hospitalization as a per capita negative outcome should also account for risk of death (including death not in the hospital setting), and the measure may not incorporate this concept. The developer clarified the measure does not favor providers as patients who are admitted are more likely to die within the year, and expired patients do not contribute to the person-years in the denominator.
- The developer further stated that patients with heart failure have multiple comorbidities, and more than 50 percent die due to non-heart failure related causes. They also state that exclusive use of claims data is unable to capture severity of illness, medical complexity, and social risks, which are critical drivers of heart failure admissions. Further, they stated the measure does not include patient considerations, such as appointment "no-shows", financial considerations of medication access, transportation, and broadband.
- The developer stated the measure excludes patients with advanced heart failure, risk adjusts for defibrillators, systolic heart failure, comorbidities, and AHRQ SES Index variables, and does not include advanced heart failure/transplant specialists for attribution.
- The content of this comment was discussed at the post-evaluation comment meeting on October 15, 2021. The Standing Committee had no further concerns with the developer's response and accepted NQF's proposed response to the commenter. No further action was taken by the Standing Committee.

**8. Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X**

**9. Appeals**

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# All-Cause Admissions and Readmissions Spring 2021 Review Cycle

## CSAC Review

*November 30 – December 1, 2021*

*Funded by the Centers for Medicare & Medicaid Services under contract HHSM-500-2017-00060I Task Order HHSM-500-T0001*

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# All-Cause Admissions and Readmissions Standing Committee Recommendations

- **Four measures reviewed for Spring 2021**
  - All four measures reviewed by the Scientific Methods Panel and passed.
- **All four measures recommended for endorsement:**
  - **#2860** Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF) (CMS/Mathematica Policy Research (MPR)) (Maintenance)
  - **#2880** Excess days in acute care (EDAC) after hospitalization for heart failure (HF) (CMS/Yale CORE) (Maintenance)
  - **#2882** Excess days in acute care (EDAC) after hospitalization for pneumonia (Yale New Haven Health Services Corporation – Center for Outcomes Research and Evaluation (CMS/Yale CORE) (Maintenance)
  - **#3612** Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure under the Merit-based Incentive Payment System (CMS/Yale CORE) (New)

# Overarching Issues for All-Cause Admissions and Readmissions Measures

- **Low R-squared**
  - The Standing Committee raised concern with the low r-squared values and the adequacy of the risk adjustment model due to the low r-squared results.
- **Social Risk Adjustment**
  - The developer tested certain social risk factors (SRFs) for the risk adjustment model, namely the Agency for Healthcare Research & Quality (AHRQ) Socioeconomic Status (SES) Index and dual eligibility; however, some of the measures under review did not include these SRFs in the final model. (#2880 and #2882)
  - The Standing Committee recognized the need to ensure that providers serving people with SRFs are not penalized unfairly by a lack of social risk adjustment.
  - CMS commented there is no adjustment for SRFs, such as dual eligibility, at the measure-level, and most of the measures currently used in the Hospital Readmissions Reduction Program (HRRP) stratify payment calculations in accordance with statutory guidance based on dual eligibility.

# All-Cause Admissions and Readmissions: Public and Member Comment and Member Expressions of Support

- Four comments were received from two commenters expressing concerns related to measures #2880 and #3612:
  - Reliability and minimum sample size
  - Lack of social risk factors within risk adjustment model
  - Attribution
  - Unintended Consequences (#3612 only)
    - » Early hospital discharge of heart failure patients (i.e., reducing length of stay and concerns with admission and readmission caps that potentially restrict life-saving care) may contribute to poor health outcomes and accountability burdens.
    - » The focus on utilization and claims data may deemphasize quality and create incentivizes to up code, avoiding high-risk patients, and increase out of hospital deaths for patients with heart failure.
- No NQF member(s) provided expressions of support or non-support for the measure(s) under review.

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# All-Cause Admissions and Readmissions, Spring 2021 Cycle: CDP Report

## DRAFT REPORT FOR CSAC REVIEW
## NOVEMBER 30, 2021

This report is funded by the Centers for Medicare & Medicaid Services under contract HHSM-500-2017-00060I Task Order HHSM-500-TO001.

https://www.qualityforum.org

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## Executive Summary

Quality improvement has a critical goal of reducing avoidable hospital admissions and readmissions. Avoidable admissions and readmissions affect patients' daily lives and contribute to unnecessary healthcare spending. However, concerns about the unintended consequences of using measures of admissions and readmissions in accountability programs have prompted important study and discussion to meet quality goals while protecting access to necessary and appropriate care.

The need to improve performance on this important quality issue while protecting patients from unintended consequences, such as limiting access to necessary care, requires quality measures recommended for National Quality Forum (NQF) endorsement to be scientifically sound and appropriately applied. Several federal quality improvement programs have adopted these measures to reduce unnecessary admissions and readmissions by fostering improved care coordination across the healthcare system. In addition, balancing measures that monitor for potential negative unintended consequences have also been developed and implemented within these federal programs.

For this project, the All-Cause Admissions and Readmissions Standing Committee evaluated one newly submitted measure and three measures undergoing maintenance review against NQF's standard evaluation criteria. The Standing Committee recommended all four measures for endorsement. The recommended measures are listed below:

- #2860 Thirty-day All-Cause Unplanned Readmission Following Psychiatric Hospitalization in an Inpatient Psychiatric Facility (IPF) (Centers for Medicare & Medicaid Services (CMS)/Mathematica Policy Research (MPR)) (Maintenance)
- #2880 Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF) (CMS/(Yale New Haven Health Services Corporation – Center for Outcomes Research and Evaluation (Yale CORE)) (Maintenance)
- #2882 Excess Days in Acute Care (EDAC) After Hospitalization for Pneumonia (CMS/Yale CORE) (Maintenance)
- #3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure Under the Merit-Based Incentive Payment System (CMS/Yale CORE) (New)

Summaries of the measures currently under review are included in the body of the report. Detailed summaries of the Standing Committee's discussion and ratings of the criteria for each measure are in Appendix A.

## Introduction

Avoidable admissions or readmissions can be described as hospitalizations that could have been potentially prevented with the appropriate care, or adequate discharge planning, and follow-up, and coordination of care between the inpatient and outpatient settings.[1] Avoidable admissions and readmissions take patients away from their daily lives, expose them to potential harms in an acute setting, and contribute to unnecessary healthcare spending. Therefore, reducing avoidable hospital admissions and readmissions remains a key focus of healthcare quality improvement. To incent reductions in unnecessary admissions and readmissions, measures of admission and readmission rates have become a focus of value-based purchasing programs, including alternative payment models.

During this project cycle, the All-Cause Admissions and Readmissions Standing Committee reviewed two measures focused on unplanned readmissions following psychiatric hospitalization and admission rates for patients with heart failure (HF). Literature identifies effective interventions that providers can employ to improve admission and readmission rates for these populations by connecting patients with other settings of care and ensuring appropriate care continues after discharge. Transitioning patients from the hospital to the community requires timely and effective communication between providers, patient education about post-discharge care and self-management, timely follow-up, and more. Suboptimal transitions can lead to a variety of adverse events post-discharge, including emergency department (ED) utilization, need for observation, and readmission.

However, while measures of admissions and readmissions exist, it is difficult for providers and consumers to gain a complete picture of post-discharge outcomes. Moreover, separately reporting each of these outcomes encourages "gaming," such as re-categorizing readmission stays as observation stays to avoid a readmission outcome.[2,3] Therefore, there is a perceived need for measures that capture ED and observation stay utilization. By capturing a range of acute care events, a more complete picture of post-discharge outcomes can be established, which can better inform consumers about care quality.

To address this need, the Centers for Medicare & Medicaid Services (CMS) has developed and implemented the excess days in acute care (EDAC) measures as balancing measures. During this cycle, the Standing Committee also reviewed two EDAC measures focused on patients with HF and pneumonia. The EDAC measures are intended to capture the quality-of-care transitions provided to discharged patients who had a hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge (e.g., ED utilization, observation stays).

## NQF Portfolio of Performance Measures for All-Cause Admissions and Readmissions Conditions

The All-Cause Admissions and Readmissions Standing Committee (Appendix C) oversees NQF's portfolio of All-Cause Admissions and Readmissions measures (Appendix B). This portfolio contains 37 measures: 28 all-cause measures, and nine condition-specific measures (see table below).

**Table 1. NQF All-Cause Admissions and Readmissions Portfolio of Measures**

| Measure Portfolio | All-Cause | Condition-Specific |
|---|---|---|
| Hospital | 16 | 5 |
| Hospital Outpatient / Ambulatory Surgery Center | 4 | 4 |
| Skilled Nursing Facility | 5 | 0 |
| Home Health | 2 | 0 |
| **Accountable Care Organizations** | 1 | 0 |
| **Total** | **28** | **9** |

Additional measures have been assigned to other portfolios. These include healthcare-associated infection measures (Patient Safety), care coordination measures (Geriatrics and Palliative Care), imaging efficiency measures (Cost and Efficiency), and a variety of condition- or procedure-specific outcome measures (Cardiovascular, Cancer, Renal, etc.).

## All-Cause Admissions and Readmissions Measure Evaluation

On July 6, 2021 the All-Cause Admissions and Readmissions Standing Committee evaluated one new measure and three measures undergoing maintenance review against NQF's standard measure evaluation criteria.

**Table 2. All-Cause Admissions and Readmissions Measure Evaluation Summary**

| Measure Summary | Maintenance | New | Total |
|---|---|---|---|
| Measures under consideration | 3 | 1 | 4 |
| Measures recommended for endorsement | 3 | 1 | 4 |

### Comments Received Prior to Committee Evaluation

NQF accepts comments on endorsed measures on an ongoing basis through the Quality Positioning System (QPS). In addition, NQF accepted comments for a continuous 16-week period during each evaluation cycle via an online tool located on the project webpage. For this evaluation cycle, the commenting period opened on April 29, 2021, and closed on June 10, 2021. As of June 10, two comments were submitted and shared with the Standing Committee prior to the measure evaluation meeting(s) (Appendix F).

## Comments Received After Standing Committee Evaluation

The continuous 16-week public commenting period with NQF member support closed on September 17, 2021. Following the Standing Committee's evaluation of the measures under review, NQF received two comments from one public organization and individual pertaining to the draft report and to the measures under review (Appendix G). No NQF-members provided comments after the measure evaluation meeting. All comments for each measure under review have been summarized in Appendix A.

Throughout the 16-week continuous public commenting period, NQF members will had the opportunity to express their support ('*Support*' or '*Do Not Support*') for each measure to inform the committee's recommendations during the commenting period. This expression of support (or not) during the commenting period replaces the member voting opportunity that was previously held subsequent to committee deliberations. Two NQF members expressed that they are not in support of NQF #3612. This information can be found in Appendix F.

## Overarching Issues

During the Standing Committee's discussion of the measures, several overarching issues emerged that were factored into the Standing Committee's ratings and recommendations for multiple measures.

### *Low R-squared*

During the Standing Committee's consideration of the measures this cycle, namely NQF #2880 and NQF #2882, the Standing Committee raised concern with the low r-squared values of 0.027 and 0.038 for NQF #2880 and NQF #2882, respectively. Within regression modeling, the r-squared value is a statistical measure of how close the data are to the fitted regression line. Therefore, the r-squared value is the percentage of the variation that is explained by a linear model. In general, the higher the r-squared value, the more variance is accounted for by the regression model and the closer the data points will fall to the fitted regression line. A low r-squared value can be problematic when attempting to produce predictions about the data. The Standing Committee questioned the adequacy of the risk adjustment model due to the low r-squared values. However, the developer explained that when looking at count models, such as the number of days for these EDAC measures, the goal is to adjust for the case-mix rather than to predict an outcome. As a result, the r-squared value does not have the same interpretation as a prediction. A model can have a low r-squared value and be a good model, or it can have a high r-squared value but not fit the data. Therefore, the low r-squared results for these measures are what would be expected with this type of model and for this type of data.

### *Social Risk Factor Adjustment*

Resource use measurement is influenced by the care received in a healthcare setting, clinical processes, and social risk factors (SARFs) (e.g., age, race, ethnicity, gender, social relationships, residential and community context). While the developer did test for SRFs for the risk adjustment model, namely the Agency for Healthcare Research & Quality (AHRQ) Socioeconomic Status (SES) Index and dual eligibility, some of the measures under review did not include these SRFs in the final model. The Standing Committee recognized the need to ensure providers serving people with SRFs are not penalized unfairly by a lack of social risk adjustment. CMS commented it does not adjust for SRFs, such as dual eligibility, at

the measure-level. Rather, for the Hospital Readmissions Reduction Program (HRRP), in which most of the measures are currently used, the program stratifies its payment calculations in accordance with statutory guidance based on dual eligibility. The HRRP groups the hospitals into five equal groups. Those quintiles are sorted based on the percentage of dual eligible patients. CMS further added it would take congressional action to be able to override the payment calculations.

To further inform the developer's decision to not include social risk factors within the final model, the developer conducted a decomposition analysis for NQF #2880 and NQF #2882. The developer explained the decomposition analysis evaluates the variation that can be attributed to the hospital and what variation can be attributed to the patient. In this analysis, the clinical risk factors have a larger patient-level effect compared with their hospital-level effects. In contrast, both the AHRQ SES variable and the dual-eligible variable have larger hospital-level effects compared with the patient-level effect. Based on these analyses, the developer stated it did not adjust this measure for either dual eligibility or the AHRQ SES Index. One Standing Committee member commented that these factors should be included regardless of the magnitude of their effect, such that there are unbiased assignments and reporting of accountability.

The Standing Committee asked NQF staff whether there is any current work being done at NQF to address the concerns regarding social risk factor adjustment within quality measurement. In response, Dr. Matt Pickering stated that NQF is currently developing technical guidance for social and/or functional status-related risk adjustment within quality measurement. This guidance will help to evolve NQF's current criteria, which will occur after 2022. Therefore, measures under review for the spring 2021 cycle must be evaluated under NQF's current criteria.

### *Meaningful Measurement*

Two measures under review for this cycle focused on EDAC, namely NQF #2880 and NQF #2882. These EDAC measures target ED and observation stay utilization. The intent is to measure the days spent in acute care within 30 days of discharge from an inpatient hospitalization. During the measure evaluation meeting, the Standing Committee discussed whether these measures are contributing valuable information for hospitals, considering there are various readmission measures currently used within Care Compare. The developer replied that when the readmission measures were developed, various stakeholders and members of the public expressed concern that hospitals may game the system with the readmission measures (i.e., increased observation stays). Therefore, CMS, in response to these concerns, developed the EDAC measures. CMS has implemented the EDAC measures as balancing measures, and hospitals continue to use these measures have expressed value in monitoring EDAC, such as looking at observations stays.

## Summary of Measure Evaluation

The following summaries of the measure evaluation highlight the major issues the Standing Committee considered. Details of the Standing Committee's discussion and ratings of the criteria for each measure are included in Appendix A.

### #2860 30-Day All-Cause Unplanned Readmission Following Psychiatric Hospitalization in an Inpatient Psychiatric Facility (IPF) (CMS/MPR): Recommended

**Description**: This facility-level measure estimates an all-cause, unplanned, 30-day, risk-standardized readmission rate for adult Medicare Fee-for-Service (FFS) patients with a principal discharge diagnosis of a psychiatric disorder or dementia/Alzheimer's disease. The performance period for the measure is 24 months.; **Measure Type**: Outcome; **Level of Analysis**: Facility; **Setting of Care**: Inpatient/Hospital; **Data Source**: Claims

The Standing Committee recommended this outcome measure for continued endorsement. The Standing Committee discussed the developer's inclusion of new evidence for this measure, which demonstrated an association of various hospital and facility-led interventions that can be implemented to improve this outcome. The Standing Committee did not have any major concerns with the evidence, and it passed the measure unanimously on this criterion.

The Standing Committee reflected on the interpretation of the performance gap, noting the margins of improvement are low, and the decreased unplanned readmission rate is not statistically significant. Nonetheless, change is evident, improvement is observable, and the continuation of the measure is important. The Standing Committee also acknowledged that the data clearly show the existence of disparities. Therefore, the Standing Committee passed the measure on the performance gap criterion.

Moving to scientific acceptability (i.e., reliability and validity), the Standing Committee reviewed the testing information. The Standing Committee acknowledged that the NQF Scientific Methods Panel (SMP) reviewed and passed this measure on reliability and validity. The Standing Committee did not express concerns for reliability and agreed to uphold the SMP's rating of moderate on the reliability. With respect to validity, the Standing Committee noted that the developer conducted discriminate validity testing against six patient characteristics hypothesized to be associated with higher readmissions rates: male patients, patients with a substance use disorder, patients with schizophrenia, non-White patients, patients with shorter length of stay at the inpatient psychiatric facility (IPF), and patients with socioeconomic characteristics associated with worse health outcomes. The results ranged from 0.012 to 0.457 and 0.05 to 0.473 for predicted and expected rates, respectively. For the observed rates, the results were smaller, ranging from 0.003 to 0.109. The Standing Committee noted the small range of the discriminant validity testing results, but it recognized that validity is still demonstrated and agreed to uphold the SMP's rating of moderate on the validity criterion.

The Standing Committee noted the claims-based nature of the measure and did not express any concern with respect to the feasibility of the measure. Therefore, the Standing Committee voted to pass the measure on feasibility. Moving to use and usability, the Standing Committee recognized that this measure is used in CMS' Inpatient Psychiatric Facilities Prospective Payment System (IPFQR) program. The Standing Committee referenced the coinciding national IPF readmission rate decrease from 20.1 percent to 18.5 percent between the years 2017 and 2019. The Standing Committee did not raise any major concerns and passed the measure on the use and usability criteria. The Standing Committee then voted to recommend the measure for continued endorsement. The Standing Committee noted several related measures to this metric, but it did not consider these measures to be competing.

No public or member comments were received during the commenting period.

### #2880 Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF) (CMS/Yale CORE): Recommended

**Description**: The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for heart failure (HF) to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality-of-care transitions provided to discharged patients who had an HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-for-Service (FFS) and are hospitalized in non-federal short-term acute care hospitals. **Measure Type**: Outcome; **Level of Analysis**: Facility; **Setting of Care**: Emergency Department and Services, Inpatient/Hospital; **Data Source**: Claims, Other

The Standing Committee recommended this outcome measure for continued endorsement. The Standing Committee reviewed and discussed the evidence, noting the developer cited several studies supporting various care processes that can influence post-discharge acute care utilization after a hospitalization for HF. Further, the developer provided evidence suggesting that hospitals and health plans have been able to reduce readmission rates through more generalizable quality improvement initiatives, such as communication between providers, patient education, patient safety, and coordinated transitions to the outpatient environment. The Standing Committee did not raise any major concerns and passed the measure on the evidence criterion. The Standing Committee also recognized that a performance gap still exists for this measure and passed the measure on the performance gap criterion.

The Standing Committee then reviewed the scientific acceptability of the measure. For reliability, the Standing Committee acknowledged that the SMP reviewed and passed the measure with a moderate rating. The Standing Committee did not raise any questions or concerns and upheld the SMP's rating for reliability. For validity, the Standing Committee also acknowledged that the SMP passed the measure with a moderate rating. The Standing Committee considered the validity testing for this measure, noting the developer conducted face validity testing, via a Technical Expert Panel (TEP) and empirical validity testing. The developer also conducted construct validity testing to determine the relationships between the HF EDAC measure score and the risk-standardized readmission rate group scores, the overall hospital rating scores, and the HF readmission measure. The developer reported statistically significant correlations for all measures, in the direction hypothesized. For the risk adjustment model, the Standing Committee noted that two social risk factors were tested and found to be statistically significant (i.e., dual-eligible status and AHRQ SES index). The developer also performed a decomposition analysis. In this analysis, the clinical risk factors have a larger patient-level effect compared with their hospital-level effects. In contrast, both the low AHRQ SES variable and the dual eligible variable have a larger hospital-level effect compared with the patient-level effect. Based on these analyses, the developer did not adjust this measure for either dual eligibility or the AHRQ SES Index. One Standing Committee member raised concern with the low r-squared value of 0.027. The developer replied that when looking at count

models, such as the number of days, the goal is to adjust for the case-mix rather than to predict an outcome. As a result, the deviance r-squared value does not have the same interpretation as a prediction, and the results are what would be expected with this type of model and for this type of data. Moving to a vote, the Standing Committee voted to uphold the SMP's rating for validity.

The Standing Committee acknowledged that this measure uses administrative claims and offers no data collection burden to hospitals or providers. Therefore, the Standing Committee passed the measure on the feasibility criterion. The Standing Committee then evaluated the use criterion and noted the measure is currently used within the Hospital Inpatient Quality Reporting (IQR) Program and Care Compare. The Standing Committee did not have any questions or concerns and passed the measure on the use criterion.

For usability, the Standing Committee asked whether this measure is contributing valuable information for hospitals or whether it is simply adding noise to the system, as there are various readmission measures currently used within Care Compare. One Standing Committee member questioned which of the measures should hospitals target, namely whether hospitals should target the number of excess days or whether a readmission occurred. The developer replied that when the readmission measures were first developed, various stakeholders and members of the public expressed concern that hospitals may game the system with these measures (i.e., increased observation stays). Therefore, CMS, in response to these concerns, developed the EDAC measures. CMS has implemented the EDAC measures as balancing measures, and hospitals that continue to use these measures have expressed value in them. There were no other questions or concerns raised, and the Standing Committee passed the measure on usability.

The Standing Committee then voted to recommend the measure for continued endorsement. The Standing Committee noted several related measures to this metric, but it did not consider these measures to be competing.

During the public comment period, one commenter expressed concern with unintended consequences, specifically, that patients diagnosed with heart failure are often discharged with unstable blood pressure and unresolved fluid overload, which may create additional financial burden for hospitals. The developers provided feedback to the comment, stating the measure supports clinically appropriate length of stays (LOS) that should assist in reducing deter readmissions, emergency department (ED), and observation stays, and incentivize care transitions, adequate follow-up, and post-discharge ambulatory care. No further action or response was required from the Standing Committee or developer. The content of this comment was discussed at the post-evaluation comment meeting on October 15, 2021. The Standing Committee had no further concerns with the developer's response and accepted NQF's proposed response to the commenter. No further action was taken by the Standing Committee.

### #2882 Excess Days in Acute Care (EDAC) After Hospitalization for Pneumonia (CMS/Yale CORE): Recommended

**Description**: This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis)

with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality-of-care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-for-Service (FFS) and are hospitalized in non-federal, short-term acute care hospitals. **Measure Type**: Outcome; **Level of Analysis**: Facility; **Setting of Care**: Inpatient/Hospital; **Data Source**: Claims, Enrollment Data

The Standing Committee recommended this outcome measure for continued endorsement. The Standing Committee reviewed and discussed the evidence, noting the developer cited new evidence indicating that pneumonia leads to more than one million hospitalizations per year, incurring billions of dollars in healthcare costs. Furthermore, the developer provided a logic model with additional supportive evidence suggesting that hospitals can influence EDAC through a broad range of clinical activities including communication between providers, patient education, prevention of, and response to complications, patient safety, medication reconciliation, better disease management strategies, and coordinated transitions to the outpatient environment. The Standing Committee acknowledged that the same concerns and discussion points raised for NQF #2880 also apply to NQF #2882 and proceeded to pass the measure on the evidence criterion. The Standing Committee noted that a performance gap exists and proceeded to pass the measure on this criterion.

Moving to scientific acceptability, the Standing Committee acknowledged that the SMP reviewed and passed the measure on both reliability and validity. The Standing Committee did not raise any questions and agreed to uphold the SMP's rating for reliability. For validity, the Standing Committee reviewed the validity testing, and recognized that the face validity and empirical testing were similar to NQF #2880; thus, the concerns and discussion points raised for NQF #2880 also apply to NQF #2882. Therefore, the Standing Committee agreed to accept the SMP's rating for validity.

The Standing Committee did not raise any concerns with respect to feasibility and passed the measure on this criterion. The Standing Committee recognized the measure is currently used within the Hospital IQR Program and Care Compare and passed the measure on the use criterion. For usability, the Standing Committee noted the minimum improvement in the pneumonia EDAC measure across the three performance periods. The Standing Committee acknowledged that a contributing factor to the limited improvement could be the severe 2017-2018 influenza season, which would have affected the 2015-2018 and 2016-2019 reporting periods. The Standing Committee also agreed that some of the concerns and discussion points raised during NQF #2880 apply to NQF #2882 as well. Moving to a vote, the Standing Committee passed the measure on usability.

The Standing Committee then voted to recommend the measure for continued endorsement. The Standing Committee noted several related measures to this metric, but it did not consider these measures to be competing.

No public or member comments were received during the commenting period.

### #3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients With Heart Failure Under the Merit-Based Incentive Payment System (CMS/Yale CORE): Recommended

**Description**: This measure estimates the risk-standardized rate of acute, unplanned cardiovascular-related hospital admissions among Medicare Fee-for-Service (FFS) patients ages 65 years and older with heart failure (HF) or cardiomyopathy. **Measure Type**: Outcome; **Level of Analysis**: Clinician : Group/Practice, Clinician : Individual; **Setting of Care**: Outpatient Services; **Data Source**: Claims, Other

The Standing Committee recommended this outcome measure for endorsement. The Standing Committee reviewed and discussed the evidence; It noted that the developer outlined a logic model depicting rates of admissions for patients with HF, which can be decreased through care coordination and continuity of care from outpatient providers. The developer also cited evidence suggesting that outpatient clinicians can improve HF patients' risk of hospitalizations in a variety of ways, including but not limited to accessible primary care, coordination across providers and care settings, early attention to changes in clinical status, adoption of guideline-directed medical therapy, careful prescribing in patients with comorbidities, patient education, and support for self-management. Considering this information, the Standing Committee passed the measure on the evidence criterion. In reviewing performance gap for the measure, the Standing Committee recognized a gap exists and passed the measure on this criterion.

Moving to scientific acceptability, the Standing Committee recognized the SMP reviewed and passed this measure on both reliability and validity. The SMP members agreed that the testing approach was appropriate; however, they raised several concerns, including clarity on the unit of analysis, clinician versus clinician group. One Standing Committee member raised concern with the low reliability results at a patient volume of 21 HF patients. The developer provided responses to the SMP concerns, noting that under the Merit-Based Incentive Payment System (MIPS), clinicians annually select whether to report as individuals, as part of a group, or both. The group includes both solo clinicians (i.e., clinicians opting not to report with other clinicians under MIPS) and groups of clinicians who have chosen to report their quality under a common Taxpayer Identification Number (TIN). Therefore, testing results include both individual clinicians and clinician groups, which is consistent with how the MIPS program evaluates quality. Regarding the reliability results, the 21 minimum case volume was established to reach the reliability threshold of 0.4, which is acceptable for CMS, and MIPS program will set the minimum case volume during rulemaking. Considering this information, the Standing Committee agreed to uphold the SMP's rating on reliability.

The Standing Committee did not raise any concerns with validity testing for the measure. The developer adjusted for 30 risk variables, including the AHRQ SES Index. The r-squared value for the model with demographic and clinical risk factors was 0.073. The r-squared value after adding the AHRQ SES Index to the model was unchanged (0.073). The Standing Committee agreed the concerns and discussions related to the r-squared value for NQF #2880 also apply to this measure. The Standing Committee proceeded to vote to uphold the SMP's rating for validity.

The Standing Committee did not raise any concerns with respect to feasibility and passed the measure on this criterion. The Standing Committee recognized the measure is not currently publicly reported or used in an accountability application. However, CMS may propose this measure for use under MIPS. The Standing Committee did not raise any major concerns and passed the measure on use and usability. The Standing Committee then voted to recommend the measure for continued endorsement. The Standing Committee noted a related measure to this metric, but it did not consider this measure to be competing.

Two comments were received prior to the evaluation meeting, both from NQF members. One commenter expressed concerns related to the lack of evidence to attribute accountability of the performance to the individual physician/cardiologist. The commenter stated that heart failure care is team based, that cardiologist practice in both inpatient and outpatient settings, and large organizations have sub-specialists (including advanced practice practitioners and electrophysiologists) that may lead to unclear attribution. Another commenter questioned whether strong evidence exists to demonstrate the meaningfully influence of clinical groups on unplanned admissions in this population. Both commenters expressed concern with the low reliability results and testing sample thresholds for accountability use and the identified social risk factors used in the adjustment model. The contents of these comments were discussed during the measure evaluation discussion.

One post-evaluation public comment was received for the measure. The commenter raised concerns with respect to assigning hospitalization rates per capita to a single clinician (or clinician groups), particularly when the current healthcare system is increasingly team-based. The commenter argues that this measure is not appropriate for physician-level accountability programs, like the Merit-based Incentive Payments System (MIPS) and believes that metrics that count hospitalizations are misguided in that they focus purely on utilization, without regard to quality, and create perverse incentives by rewarding clinicians who up-code, avoid certain high-risk patients, or whose patients die without being admitted to the hospital. The commenter also recognizes that this measure does not seem to account for the competing risk of death and posits that every major heart failure trial looking at hospitalizations as an adverse event does so accounting for the competing risk of death. Lastly, the commenter raised concern with the risk adjustment methodology associated with this measure, arguing that it is inadequate in that it relies exclusively on claims data and on generally rigid variables that do not fully account for severity of illness, medical complexity, and social determinants of health, all of which are critical drivers of heart failure admissions. Similarly, the commenter expressed concern that this measure does not adjust for social determinants and other risk factors. The content of this comment was discussed at the post-evaluation comment meeting on October 15, 2021. The Standing Committee had no further concerns with the developer's response and accepted NQF's proposed response to the commenter. No further action was taken by the Standing Committee.

## References

1 Patterson W, Lindsey M. *Statistical Brief #6: Potentially Avoidable Hospitalizations: New York State Medicaid Program, 2009.* https://www.health.ny.gov/health_care/managed_care/reports/statistics_data/6potentially_avoidable_hospitalizations.pdf. Last accessed July 2021.

2 AK Sabbatini, Wright B. Excluding Observation Stays from Readmission Rates — What Quality Measures Are Missing. *N Engl J Med*. 2018;378:2062-2065.

3 Gupta A, Fonarow G. The Hospital Readmissions Reduction Program-learning from failure of a healthcare policy. *Eur J Heart Fail*. 2018;20(8):1169-1174.

# Appendix A: Details of Measure Evaluation

**Rating Scale: H**=High; **M**=Moderate; **L**=Low; **I**=Insufficient; **NA**=Not Applicable; **Y**=Yes; **N**=No

Vote totals may differ between measure criteria and between measures as Standing Committee members often have to join calls late or leave calls early. NQF ensures that quorum is maintained for all live voting. All voting outcomes are calculated using the number of Standing Committee members present during the meeting for that vote as the denominator. Denominator vote counts may vary throughout the criteria due to intermittent Standing Committee attendance fluctuation. The vote totals reflect members present and eligible to vote at the time of the vote. Quorum (a minimum of 15 out of 22 active Standing Committee members present) was reached and maintained for the duration of all measure evaluation meetings on July 6, 2021.

## Measures Recommended

### #2860 30 Day All-Cause Unplanned Readmission Following Psychiatric Hospitalization in an Inpatient Psychiatric Facility (IPF)

Measure Worksheet | Specifications

**Description**: This facility-level measure estimates an all-cause, unplanned, 30-day, risk-standardized readmission rate for adult Medicare Fee-for-Service (FFS) patients with a principal discharge diagnosis of a psychiatric disorder or dementia/Alzheimer's disease.

The performance period for the measure is 24 months.

**Numerator Statement**: The measure estimates the incidence of unplanned, all-cause readmissions to IPFs or short-stay acute care hospitals following discharge from an eligible IPF index admission. A readmission is defined as any admission that occurs within 3-30 days after the discharge date from an eligible index admission to an IPF, except those considered planned.

**Denominator Statement**: The target population for this measure is Medicare FFS beneficiaries discharged from an IPF with a principal diagnosis of a psychiatric disorder. A readmission within 30 days is eligible as an index admission, if it meets all other eligibility criteria.

**Exclusions**: The measure excludes admissions for patients:

- Discharged against medical advice (AMA)
- With unreliable demographic and vital status data defined as the following:
    - Age greater than 115 years
    - Missing gender
    - Discharge status of "dead" but with subsequent admissions
    - Death date prior to admission date
    - Death date within the admission and discharge dates but the discharge status was not "dead"
- With readmissions on the day of discharge or day following discharge because those readmissions are likely transfers to another inpatient facility. The hospital that discharges the patient to home or a non-acute care setting is accountable for subsequent readmissions.
- With readmissions two days following discharge because readmissions to the same IPF within two days of discharge are combined into the same claim, as the index admission does not appear as readmissions due to the interrupted stay billing policy. Therefore, complete data on readmissions within two days of discharge are not available.

**Adjustment/Stratification**: Statistical risk model. The measure is not stratified.

**Level of Analysis:** Facility

**Setting of Care:** Inpatient/Hospital

**Type of Measure**: Outcome

**Data Source**: Claims

**Measure Steward**: Centers for Medicare & Medicaid Services

**STANDING COMMITTEE MEETING 07/06/2021**

**1. Importance to Measure and Report: <u>The measure meets the Importance criteria.</u>**

(1a. Evidence, 1b. Performance Gap)

1a. Evidence: **Total Votes = 15**; **Pass-15; No Pass-0**; 1b. Performance Gap: **Total Votes = 14**; **H-1**; **M-11**; **L-2**; **I-0**

**Rationale**

- The Standing Committee discussed the developer's inclusion of new evidence for this measure, which demonstrated an association of various hospital and facility-led interventions that can be implemented to improve this outcome.
- A Standing Committee member noted the importance of considering other evidence that may be more patient-centric, such as lifestyle changes and non-medicinal interventions.
- The same Standing Committee member recognized the vital role of medications in psychiatric medicine, but further stated that there are good reasons to study alternative therapies.
- The Standing Committee did not have any additional commentary or concerns with the evidence, and it passed the measure unanimously on this criterion.
- The Standing Committee considered the performance gap of the measure, noting that during the first performance period of July 1, 2015–June 30, 2017, the national unplanned readmission rate among IPFs that met the minimum case count (>=25 discharges) was 20.1 percent. For the performance period July 1, 2017-June 20, 2019, this rate was 18.5 percent.
- The Standing Committee also acknowledged the measure rates clearly show the existence of disparities.
- The Standing Committee expressed no additional concerns and passed the measure on the performance gap criterion.

**2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria**

2a. Reliability precise specifications, testing; 2b. Validity testing, threats to validity)

2a. Reliability**: Total Votes = 14; Yes-14; No-0 (Accept SMP moderate rating)**

2b. Validity: **Total Votes = 14; Yes-14; No-0 (Accept SMP moderate rating)**

**Rationale**

- This measure was assessed by SMP, which passed the measure on reliability, (Total votes: 9; H-0; M-8; L-1; I-0), and validity (Total votes-9; H-1; M-6; L-1; I-1).
- The Standing Committee reviewed the measure testing information and noted that the developer used two techniques to demonstrate measure score reliability, namely split sampling and bootstrapping.
- The Standing Committee considered the split sample intra-class correlation coefficient (ICC) value of 0.559 and the bootstrapping method's ICC value of 0.752.
- The Standing Committee acknowledged that the NQF Scientific Methods Panel (SMP) reviewed and passed the measure on reliability.
- The Standing Committee did not express concern and agreed to uphold the SMP's rating of moderate on the reliability criterion.
- Moving to validity, the Standing Committee noted both approaches that the developer used to conduct validity testing, which were the Spearman rank correlation and discriminate validity testing.
- Discriminant validity was tested against six patient characteristics hypothesized to be associated with higher readmissions rates: male patients, patients with a substance use disorder, patients with schizophrenia, non-White patients, patients with shorter length of stay at the IPF, and patients with socioeconomic characteristics associated with worse health outcomes.

- The results ranged from 0.012 to 0.457 and 0.05 to 0.473 for predicted and expected rates, respectively. For the observed rates, the results were smaller, ranging from 0.003 to 0.109.
- The Standing Committee further noted that the SMP also passed this measure on validity.
- The Standing Committee noted the small range of the discriminant validity testing results, but it recognized that validity is still demonstrated and agreed to uphold the SMP's rating of moderate on the validity criterion.

**3. Feasibility: Total Votes = 14; H-6; M-8; L-0; I-0**

*(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/ unintended consequences identified 3d. Data collection strategy can be implemented)*

**Rationale**

- The Standing Committee noted the claims-based nature of the measure and did not express any concern with respect to the feasibility of the measure.
- The Standing Committee voted to pass the measure on feasibility.

**4. Use and Usability: <u>The maintenance measure meets the Use subcriterion.</u>**

*(4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)*

4a. Use: **Total Votes = 14; Pass-14; No Pass-0** *4b. Usability:* **Total Votes = 15; H-1; M-14; L-0; I-0**

**Rationale**

- The Standing Committee recognized that this measure is used in CMS' Inpatient Psychiatric Facilities Quality Reporting (IPFQR) program.
- The Standing Committee also acknowledged that the developer collects feedback as measured entities submit questions on the IPF-specific reports.
- The developer stated that IPFs have asked an average of two or three questions per year for the past three years, all of which have been clarifying questions on the measure specifications.
- As a result, they did not modify the measure based on feedback from IPFs because no feedback was provided, thus indicating that modifications were required.
- The Standing Committee referenced the coinciding national IPF readmission rate decrease from 20.1 percent to 18.5 percent between 2017-2019. One Standing Committee member offered a patient-centric observation of the usefulness of the hospital rating system, noting that patients are appreciative and find it useful.
- The Standing Committee did not raise any major concerns and passed the measure on the use and usability criteria.

**5. Related and Competing Measures**

- The Standing Committee noted several related measures to this metric, but it did not consider these measures to be competing.
- The developer identified the following related measures:
    - #1768: Plan All-Cause Readmissions (PCR)
    - #1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
    - #2502: All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Inpatient Rehabilitation Facilities (IRFs)
    - #2504: 30-day Rehospitalizations per 1000 Medicare Fee-for-Service (FFS) Beneficiaries
    - #2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)
    - Hospital, Thirty Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Ischemic Stroke Hospitalization.

**6. Standing Committee Recommendation for Endorsement**: **Total Votes = 15; Y-15**; **N-0**

**7. Public and Member Comment**

- No NQF-member or public comments were received for the measure prior to or after the evaluation meeting.

- **8. Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X**
- **9. Appeals**

### #2880 Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF)

Measure Worksheet | Specifications

**Description**: The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for heart failure (HF) to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had an HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-for-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**Numerator Statement**: The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**Denominator Statement**: The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-federal and Veterans Affairs (VA) acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**Exclusions**: The measure excludes index hospitalizations that meet any of the following exclusion criteria:

- Without at least 30 days of post-discharge enrollment in Medicare FFS
- Discharged against medical advice
- HF admissions within 30 days of discharge from a prior HF index admission
- With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**Adjustment/Stratification**: Statistical risk model; N/A; this measure is not stratified.

**Level of Analysis:** Facility

**Setting of Care:** Emergency Department and Services, Inpatient/Hospital

**Type of Measure**: Outcome

**Data Source**: Claims, Other

**Measure Steward**: Centers for Medicare & Medicaid Services

**STANDING COMMITTEE MEETING 07/06/2021**

**1. Importance to Measure and Report: <u>The measure meets the Importance criteria.</u>**

(1a. Evidence, 1b. Performance Gap)

1a. Evidence: **Total Votes = 15; Pass-14**; **No Pass-1** 1b. Performance Gap: **Total Votes = 15; H-4; M-7**; **L-4**; **I-0**

**Rationale**

- The Standing Committee reviewed and discussed the evidence, noting that the developer cited several studies supporting various care processes that can influence post-discharge acute care utilization after a hospitalization for HF.

- Further the developer provided evidence suggesting that hospitals and health plans have been able to reduce readmission rates through more generalizable quality improvement initiatives, such as communication between providers, patient education, patient safety, and coordinated transitions to the outpatient environment.
- One Standing Committee member had a question as to whether the current readmission measures for conditions such as HF and pneumonia would be retired, as the EDAC measures have a more wholistic capture of utilization.
- CMS replied that the readmission measures are required by statute within the Hospital Readmissions Reduction Program; therefore, the current intent is to use both EDAC and readmission measures in parallel until there is a change in statute.
- The Standing Committee also asked whether the developer has any evidence to show that the number of days, rather than readmissions, can be influenced by the behavior in the initial acute hospitalization. In response, the developer stated that they have anecdotal evidence showing that this measure has an impact on the number of days.
- The Standing Committee did not raise any other questions or concerns and passed the measure on the evidence criterion.
- The Standing Committee considered the range of performance across hospitals with at least 25 admissions during the reporting period of 2016 to 2019, in which the rates ranged from -59.7 to 154.4 EDAC per 100 admissions with a median EDAC of 2.3 per 100 admissions.
- The Standing Committee also acknowledged that this measure was able to identify disparities, namely for dual eligible patients and by the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) Index.
- The Standing Committee did not raise any major concerns and passed the measure on performance gap.

**2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.**

(2a. Reliability precise specifications, testing; 2b. Validity testing, threats to validity)

2a. Reliability: **Total votes = 15; Yes-15; No-0 (accept SMP moderate rating)**

2b. Validity: **Total votes = 15; Yes-11; No-4 (accept SMP moderate rating)**

**Rationale**

- The Standing Committee reviewed the scientific acceptability of the measure on reliability Total votes= 9; H-0**;** M-8**;** L-1**;** I-0) and validity (Total votes = 8; H-0**;** M-7**;** L-0**;** I-1).
- For reliability, the Standing Committee acknowledged that the SMP reviewed and passed the measure on reliability with a moderate rating.
- The Standing Committee noted that the developer conducted testing at the measure score-level and calculated an ICC using a split-sample approach. The developer reported ICC ranges from 0.456 for hospitals with at least two admissions to 0.698 for hospitals with at least 300 admissions. For hospitals with at least 25 admissions, the ICC was 0.527.
- The Standing Committee did not raise any questions or concerns and upheld the SMP's rating for reliability.
- For validity, the Standing Committee acknowledged that the SMP passed the measure on validity with a moderate rating.
- The Standing Committee considered the validity testing for this measure, noting that the developer conducted face validity testing, via a Technical Expert Panel (TEP), and empirical validity testing. The developer reported that 11 of 12 (91.7%) TEP members convened by the developer strongly, moderately, or somewhat agreed with the following statement: "The risk-standardized acute care days obtained from the measures as specified can be used to distinguish between better and worse quality hospitals."
- The developer also conducted construct validity testing to determine the relationships between the HF EDAC measure score and the risk standardized readmission rate group scores, the overall hospital rating scores, and the HF readmission measure. The developer reported statistically significant correlations for all measures, in the direction hypothesized. For the risk adjustment model, the Standing Committee noted that two social risk factors were tested and found to be statistically significant (i.e., dual-eligible status and AHRQ SES index).

- The developer also performed a decomposition analysis. In this analysis, the clinical risk factors have a larger patient-level effect compared with their hospital-level effects. In contrast, both the low AHRQ SES variable and the dual eligible variable have a larger hospital-level effect compared with the patient-level effect. Based on these analyses, the developer did not adjust this measure for either dual eligibility or the AHRQ SES Index.
- One Standing Committee member raised concern with the low r-squared value of 0.027. The developer replied that when looking at count models, such as the number of days, the goal is to adjust for the case-mix, rather than to predict an outcome. As a result, the deviance r-squared value does not have the same interpretation as a prediction, and the results are what would be expected with this type of model and for this type of data.
- The Standing Committee asked for more explanation regarding their rationale for not including the social risk factors in the final model, namely the decomposition analysis. The developer replied that the decomposition analysis evaluates the variation that can be attributed to the hospital and the variation that can be attributed to the patient. In this analysis, the clinical risk factors have a larger patient-level effect compared with their hospital-level effects. In contrast, both the low AHRQ SES variable and the dual-eligible variable have larger hospital-level effects compared with the patient-level effect. Based on these analyses, the developer did not adjust this measure for either dual eligibility or the AHRQ SES Index.
- CMS also commented that it does not adjust for social risk factors, such as dual eligibility, at the measure-level. Rather, the Hospital Readmissions Reduction Program, in which most of the measures are currently used, stratifies its payment calculations in accordance with statutory guidance based on dual eligibility. One Standing Committee member commented that having the decomposition analysis was helpful in better understanding why the social risk factors were not included. Another Standing Committee member commented that these factors should be included, regardless of the magnitude of their effect, such that there are unbiased assignments and reporting of accountability.
- Co-chair, John Bulger, asked NQF whether there is any current work being done at NQF to address the concerns regarding social risk factor adjustment within quality measurement. In response, Dr. Matt Pickering stated that NQF is currently developing technical guidance, which is out for public comment. This guidance is intended to provide a step-by-step approach for social and functional status-related risk adjustment within quality measurement. This guidance will help to evolve NQF's current criteria, which will occur after 2022. Therefore, measures under review of the spring 2021 cycle must be evaluated under NQF's current criteria.
- The Standing Committee raised no other questions/concerns and upheld the SMP's validity rating.

**3. Feasibility: Total Votes = 15; H-5; M-10; L-0; I-0**

*(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/ unintended consequences identified 3d. Data collection strategy can be implemented)*

**Rationale**

- The Standing Committee acknowledged that this measure uses administrative claims and enrollment data and as such, it offers no data collection burden to hospitals or providers.
- The Standing Committee did not raise any questions or concerns and passed the measure on the feasibility criterion.

**4. Use and Usability: <u>The maintenance measure meets the Use sub criterion.</u>**

*4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)*

4a. Use: **Total Votes = 15; Pass-15; No Pass-0** *4b. Usability:* **Total Votes = 15; H-2; M-9; L-3; I-1**

**Rationale**

- The Standing Committee evaluated the use criterion and noted that the measure is currently used within the Hospital Inpatient Quality Reporting (IQR) Program and Care Compare.
- The Standing Committee also noted that the developer routinely scans the literature for articles describing research related to this measure and solicits feedback from stakeholders.

- The Standing Committee did not have any questions or concerns and passed the measure on the use criterion.
- For usability, the Standing Committee recognized that the developer reported improvement over the past three reporting periods (2014-2017, 2015-2018, and 2016-2019) in measure scores across most of the distribution, specifically from the 30th percentile through the 80th percentile.
- One Standing Committee member questioned whether this measure is contributing valuable information for hospitals or whether it is simply just adding noise to the system, considering there are various readmission measures currently used within Care Compare. The Standing Committee member also questioned which of the measures should hospitals target, namely whether hospitals should target the number of excess days or whether a readmission occurred.
- The developer replied that when the readmission measures were first developed, various stakeholders and members of the public expressed concern that hospitals may game the system with these measures (i.e., increased observation stays). Therefore, CMS, in response to these concerns, developed the EDAC measures. CMS has implemented the EDAC measures as balancing measures, and hospitals that continue to use these measures have expressed value in them.
- Another Standing Committee member added that they do see the value in this measure but would also like to see an excess days measure that was cross-cutting, and not just condition-specific.
- One Standing Committee member agreed that this measure has increased usability due to the value of monitoring excess days in acute care, such as looking at observations stays.
- The Standing Committee also recognized the developer continues to monitor unintended consequences. There were no other questions or concerns raised and the Standing Committee passed the measure on usability.

**5. Related and Competing Measures**

- The Standing Committee observed that there are several related measures to this metric, but it did not consider these measures to be competing.
- The developer identified the following related measures:
    - #0229 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization
    - #0230 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Acute Myocardial Infarction (AMI) Hospitalization
    - #0330 Hospital 30 Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization
    - #0505 Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization.
    - #0506: Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
    - #1551: Hospital-Level 30-Day Risk-Standardized Readmission Rate (RSRR) Following Elective Primary Total Hip Arthroplasty (THA) and/or Total Knee Arthroplasty (TKA)
    - #1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)
    - #1891: Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization
    - #2515: Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery
    - #2881: Excess Days in Acute Care (EDAC) After Hospitalization for Acute Myocardial Infarction (AMI)
    - #2882: Excess Days in Acute Care (EDAC) After Hospitalization for Pneumonia.

**6. Standing Committee Recommendation for Endorsement**: **Total Votes = 15; Y-15**; **N-0**

**7. Public and Member Comment**

- No NQF-member or public comments were received prior to the evaluation meeting.
- One public comment was received for the measure after the evaluation meeting expressing concern for the measure, and recommended the measure not be endorsed. Specifically, that patients diagnosed with heart failure are often discharged with unstable blood pressure and unresolved fluid overload, which may create additional financial burden for hospitals.
- The developers provided feedback to the comment, stating the measure supports clinically appropriate length of stays (LOS) that should assist in reducing deter readmissions, emergency department (ED), and observation stays, and incentivize care transitions, adequate follow-up, and post-discharge ambulatory care.
- No further action or response was required from the Standing Committee or developer.
- The content of this comment was discussed at the post-evaluation comment meeting on October 15, 2021. The Standing Committee had no further concerns with the developer's response and accepted NQF's proposed response to the commenter. No further action was taken by the Standing Committee.

**8. Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X**

**9. Appeals**

## #2882 Excess Days in Acute Care (EDAC) After Hospitalization for Pneumonia

Measure Worksheet | Specifications

**Description**: This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years of age or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**Numerator Statement**: The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia (PN), including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

**Denominator Statement**: The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months of Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years of age and older who are Medicare FFS or VA beneficiaries admitted to non-federal or Veterans Affairs (VA) hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**Exclusions**: The measure excludes index hospitalizations that meet any of the following exclusion criteria:

- Without at least 30 days of post-discharge enrollment in Medicare FFS
- Discharged against medical advice
- Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

**Adjustment/Stratification**: Statistical risk model: This measure is not stratified.

**Level of Analysis:** Facility

**Setting of Care:** Inpatient/Hospital

**Type of Measure**: Outcome

**Data Source**: Claims, Enrollment Data

**Measure Steward**: Centers for Medicare & Medicaid Services

**STANDING COMMITTEE MEETING 07/06/2021**

**1. Importance to Measure and Report: <u>The measure meets the Importance criteria.</u>**

(1a. Evidence, 1b. Performance Gap)

1a. Evidence: **Total Votes = 15; Pass-15**; **No Pass-0** 1b. Performance Gap: **Total Votes = 15; H-1**; **M-14**; **L-0**; **I-0**

**Rationale**

- The Standing Committee reviewed and discussed the evidence, noting that the developer cited new evidence indicating that pneumonia leads to more than 1 million hospitalizations per year, incurring billions of dollars in healthcare costs.
- The developer provided a logic model with additional supportive evidence suggesting that hospitals can influence EDAC through a broad range of clinical activities including communication between providers, patient education, prevention of, and response to complications, patient safety, medication reconciliation, better disease management strategies, and coordinated transitions to the outpatient environment.
- The Standing Committee acknowledged that the same concerns and discussion points raised for NQF #2880 also apply to NQF #2882 and proceeded to pass the measure on the evidence criterion.
- The Standing Committee reviewed the performance gap criterion and recognized that the developer reported EDAC scores for the most recent reporting period (2016-2019), which were -65.7 to 146 EDAC per 100 admissions; the mean was 5.0 EDAC per 100 admissions and the median was 2.9 EDAC per 100 admissions. The 10th percentile was -23.8, the 50th percentile was 2.9, and the 90th percentile was 36.7 EDAC per 100 admissions.
- The Standing Committee did not raise any major concerns and passed the measure on performance gap.

**2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.**

(2a. Reliability precise specifications, testing; 2b. Validity testing, threats to validity)

2a. Reliability: **Total Votes = 15; Yes-14; No-1 (accept SMP moderate rating)**

2b. Validity: **Total Votes = 15; Yes-14; No-1 (accept SMP moderate rating)**

**Rationale**

- The Standing Committee acknowledged that the SMP reviewed and passed this measure on both reliability (total votes = 9; H-1**;** M-8**;** L-0**;** I-0) and validity (total votes = 8**;** H-0**;** M-7**;** L-0**;** I-1).
- The Standing Committee considered that the developer reported an intra-class correlation coefficient (ICC) range of 0.541 for hospitals with at least two admissions to 0.709 for hospitals with at least 300 admissions. For hospitals with at least 25 admissions, the ICC was 0.576.
- The Standing Committee did not raise any questions and agreed to uphold the SMP's rating for reliability.
- For validity, the Standing Committee reviewed the validity testing, and recognized that the face validity and empirical testing were similar to NQF #2880; thus, the concerns and discussion points raised for NQF #2880 also apply to NQF #2882.
- Therefore, the Standing Committee agreed to accept the SMP's rating for validity.

**3. Feasibility: Total Votes = 15; H-7; M-8; L-0; I-0**

*(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/ unintended consequences identified 3d. Data collection strategy can be implemented)*

**Rationale**

- The Standing Committee acknowledged that this measure uses administrative claims and enrollment data and as such, it offers no data collection burden to hospitals or providers.
- The Standing Committee did not raise any concerns with respect to feasibility and passed the measure on this criterion.

**4. Use and Usability: <u>The maintenance measure meets the Use subcriterion.</u>**

*(4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)*

4a. Use: **Total Votes = 15; Pass-15; No Pass-0** *4b. Usability:* **Total Votes = 15; H-0; M-11; L-2; I-2**

**Rationale**

- The Standing Committee recognized that the measure is currently used within the Hospital Inpatient Quality Reporting (IQR) Program and Care Compare.
- The Standing Committee also noted that the developer routinely scans the literature for articles describing research related to this measure and solicits feedback from stakeholders.
- The Standing Committee did not have any questions or concerns and passed the measure on the use criterion.
- For usability, the Standing Committee noted the minimum improvement in the pneumonia EDAC measure across the three performance periods.
- The Standing Committee acknowledged that a contributing factor to the limited improvement could be the severe 2017-2018 influenza season, which would have impacted the 2015-2018 and 2016-2019 reporting periods.
- The Standing Committee also agreed that some of the concerns and discussion points raised during NQF #2880 also apply to NQF #2882. One Standing Committee member mentioned that they would like to see some empirical evidence supporting the value of the use of these EDAC measures compared with the readmission measures, namely whether excess days are meaningful to patients, whether there are correlations to risk-standardized mortality, and how are hospitals are using this information of excess days to implement change.
- Moving to a vote, the Standing Committee passed the measure on usability.

**5. Related and Competing Measures**

- The Standing Committee observed that there are several related measures to this metric, but it did not consider these measures to be competing.
- The developer identified the following related measures:
    - #0229 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization
    - #0230 Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Acute Myocardial Infarction (AMI) Hospitalization
    - #0330 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Heart Failure (HF) Hospitalization
    - #0505 Hospital 30-Aay All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization
    - #0506 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization
    - #1551 Hospital-Level 30-Day Risk-Standardized Readmission Rate (RSRR) Following Elective Primary Total Hip Arthroplasty (THA) and/or Total Knee Arthroplasty (TKA)
    - #1789 Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

- #1891 Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization
- #2515 Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery
- #2880 Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF)
- #2881 Excess Days in Acute Care (EDAC) After Hospitalization for Acute Myocardial Infarction (AMI)

**6. Standing Committee Recommendation for Endorsement**: **Total Votes = 15; Y-13**; **N-2**

**7. Public and Member Comment**

- No NQF-member or public comments were received for the measure prior to or after the evaluation meeting.

**8. Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X**

**9. Appeals**

## #3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure under the Merit-based Incentive Payment System

Measure Worksheet | Specifications

**Description**: This measure estimates the risk-standardized rate of acute, unplanned, and cardiovascular-related hospital admissions among Medicare Fee-for-Service (FFS) patients ages 65 years and older with heart failure (HF) or cardiomyopathy.

**Numerator Statement**: The outcome for this measure is the number of acute cardiovascular-related admissions per 100 person-years at risk for admission during the measurement year.

**Denominator Statement**: This measure assesses the care provided to patients with HF by primary care providers and cardiologists.

Patients included in the measure (target patient population)

The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with heart failure or cardiomyopathy.

Provider types included for measurement:

- Primary care providers (PCPs): CMS designates PCPs as physicians who practice internal medicine, family medicine, general medicine, or geriatric medicine, as well as non-physician providers, including nurse practitioners, certified clinical nurse specialists, and physician assistants.
- Cardiologists: Cardiologists are covered by the measure because they provide the overall coordination of care for patients with HF and manage the conditions that put HF patients at risk for admission due to acute cardiovascular-related conditions.

Outcome attribution

The measure begins by assigning each patient to the clinician most responsible for the patient's care, based on the pattern of outpatient visits with PCPs and relevant specialists. The patient can be assigned to a PCP, a cardiologist, or can be left unassigned. Patients who have had no Evaluation and Management (E&M) visits with a Merit-Based Payment System (MIPS)-eligible clinician are excluded.

Step 1: A patient who is eligible for attribution is assigned to a cardiologist only if the cardiologist has been identified as "dominant." A cardiologist is considered "dominant" if they have two or more visits with the patient, regardless of how many visits that patient has with a PCP.

- There are two scenarios in which a patient can be assigned to a PCP. First, if the patient has seen the PCP at least once but has no visits with a cardiologist, the patient is assigned to the PCP. The patient will then be assigned to the PCP with the highest number of visits, as long as there are no relevant specialists who

are considered “dominant.” Second, if the patient has seen the PCP more than two or more times and has only one visit with a cardiologist, the patient is assigned to the PCP.

- If the patient has one visit each with a cardiologist and a PCP, the patient is assigned to the cardiologist.
- If the patient has one visit with a cardiologist and no visit with a PCP, the patient is assigned to the cardiologist.
- Finally, the patient will be unassigned if they only saw non-relevant specialists, if the patient has not seen a PCP and no “dominant” specialist can be identified, or if the patient has not had more than one visit with any individual PCP.

Step 2: Patients are then assigned at the Taxpayer Identification Number (TIN) level, which includes solo clinicians and groups of clinicians who have chosen to report their quality under a common TIN.

At the TIN level, patients are first assigned to the clinician (NPI/TIN) most responsible for their care (using the algorithm for individual clinician-level attribution above). Then, patients “follow” their attributed clinician to the TIN of that clinician. Patients unassigned at the individual clinician level continue to be unassigned at the TIN level.

**Exclusions**: The measure excludes:

- Patients without continuous enrollment in Medicare Part A and B for the duration of the measurement period.
- Patients in hospice during the year prior to the measurement year or in hospice at the start of the measurement year.
- Patients who have had a heart transplant, been on home inotropic therapy, or who have had a left ventricular assist device (LVAD) placed.
- Patients with end stage renal disease (ESRD), defined as chronic kidney disease stage 5 or on dialysis.
- Patients who had no E&M visits with MIPS eligible clinician.

**Adjustment/Stratification**: Statistical risk model: N/A - This measure is not stratified.

**Level of Analysis:** Clinician : Group/Practice, Clinician : Individual

**Setting of Care:** Outpatient Services

**Type of Measure**: Outcome

**Data Source**: Claims, Other

**Measure Steward**: Centers for Medicare & Medicaid Services (CMS)

**STANDING COMMITTEE MEETING 07/06/2021**

**1. Importance to Measure and Report: <u>The measure meets the Importance criteria.</u>**

(1a. Evidence, 1b. Performance Gap)

1a. Evidence: **Total Votes = 14; Pass-14; No Pass-0**; 1b. Performance Gap: **Total Votes = 14; H-1; M-13**; **L-0**; **I-0**

**Rationale**

- The Standing Committee reviewed and discussed the evidence, noting that the developer outlined a logic model depicting rates of admissions for patients with HF, which can be decreased through care coordination and continuity of care from outpatient providers.
- The developer also cited evidence suggesting that outpatient clinicians can improve HF patients’ risk of hospitalizations in a variety of ways, including but not limited to accessible primary care, coordination across providers and care settings, early attention to changes in clinical status, adoption of guideline-directed medical therapy, careful prescribing in patients with comorbidities, patient education, and support for self-management.
- Considering this information, the Standing Committee passed the measure on the evidence criterion.
- In reviewing performance gap for the measure, the Standing Committee recognized that across all TINs, the risk-standardized acute cardiovascular-related admission rate (RSCAR) measure scores ranged from 9.6 to 62.4 per 100 person-years, with a median of 24.8 and an interquartile range of 24.0 to 25.9.
- The mean RSCAR and standard deviation were 25.1 ± 2.4 admissions per 100 person-years.
- The Standing Committee also acknowledged that the distributions of RSCARs were generally similar with respect to the proportion of Medicare-Medicaid dual-eligible beneficiaries across TINs.

**2. Scientific Acceptability of Measure Properties: The measure meets the Scientific Acceptability criteria.**

(2a. Reliability precise specifications, testing; 2b. Validity testing, threats to validity)

2a. Reliability: **Total Votes = 14; Yes-13; No-1 (accept SMP moderate rating)**

2b. Validity: **Total Votes = 15; Yes-14; No-1 (accept SMP moderate rating)**

**Rationale**

- The Standing Committee recognized that the SMP reviewed and passed this measure on both reliability (total votes = 8; H-0**;** M-5**;** L-3**;** I-0) and validity (total votes = 8; H-0**;** M-6**;** L-2**;** I-0).
- For reliability, the Standing Committee reviewed the testing data, from which the developer noted that a minimum reliability of 0.4 was achieved for TINs with at least 21 HF patients. At this threshold, reliability scores for TINs ranged from 0.40 to nearly 1.0, with a median value of 0.600 (IQR 0.481-0.778).
- The SMP members agreed the approach is appropriate; however, they raised several concerns, including clarity on the unit of analysis: clinician versus clinician group. One Standing Committee member raised concern with the low reliability results at a patient volume of 21 HF patients.
- The developer provided responses to the SMP concerns, noting that under MIPS, clinicians annually select whether to report as individuals, as part of a group, or as both. The group includes both solo clinicians (i.e., clinicians opting not to report with other clinicians under MIPS) and groups of clinicians who have chosen to report their quality under a common TIN. Therefore, testing results include both individual clinicians and clinician groups, which is consistent with how the MIPS program evaluates quality.
- Regarding the reliability results, the 21 minimum case volume was established to reach the reliability threshold of 0.4, which is acceptable for CMS; the MIPS program will set the minimum case volume during rulemaking.
- Considering this information, the Standing Committee agreed to uphold the SMP's rating on reliability.
- For validity, the Standing Committee reviewed the validity testing for the measure.
- The developer conducted face validity of the measure score, which is the minimum acceptable testing for new measures. Of the 17 TEP members who were active through the end of the project, 12 responded. The majority of the respondents, 10/12 or 83 percent, moderately or somewhat agreed that the MIPS HF measure can be used to distinguish good from poor quality of care. Of the 13 Clinician Committee members who responded to the survey, 11/13 or 85 percent, strongly, moderately, or somewhat agreed that the MIPS HF measure can be used to distinguish good from poor quality of care.
- The developer also adjusted for 30 risk variables, including the AHRQ SES Index. The r-squared value for the model with demographic and clinical risk factors was 0.073. The r-squared value after adding the AHRQ SES Index to the model was unchanged (0.073).
- The Standing Committee agreed that the concerns and discussions related the r-squared value for NQF #2880 also apply to this measure. One Standing Committee member also mentioned that the more homogeneous the patient population is, such as HF patients, the less variation is seen within the model.
- Considering this information, the Standing Committee proceeded to vote to uphold the SMP's rating for validity.

**3. Feasibility: Total Votes = 14**; **H-5; M-9; L-0; I-0**

*(3a. Clinical data generated during care delivery; 3b. Electronic sources; 3c. Susceptibility to inaccuracies/ unintended consequences identified 3d. Data collection strategy can be implemented)*

**Rationale**

- The Standing Committee acknowledged that this measure uses administrative claims and enrollment data and as such, it offers no data collection burden to hospitals or providers.
- The Standing Committee did not raise any concerns with respect to feasibility and passed the measure on this criterion.

**4. Use and Usability**

*(4a. Use; 4a1. Accountability and transparency; 4a2. Feedback on the measure by those being measured and others; 4b. Usability; 4b1. Improvement; 4b2. The benefits to patients outweigh evidence of unintended negative consequences to patients)*

4a. Use: **Total Votes = 14; Pass-14; No Pass-0** *4b. Usability:* **Total Votes = 14; H-0; M-13; L-1; I-0**

**Rationale**

- The Standing Committee recognized that the measure is not currently publicly reported or used in an accountability application. However, CMS may propose this measure for use under MIPS.
- The Measure Applications Partnership (MAP) reviewed this measure for the 2020-2021 cycle.
- MAP did not recommend the measure for rulemaking with potential for mitigation. The mitigation points were as follows: 1) NQF endorsement and 2) an analysis of the appropriateness of the risk adjustment for clinicians with higher caseloads of patients with more complicated or severe HF.
- MAP noted that while the measure raises concerns that the risk adjustment may not adequately account for advanced HF stages, the measure also centers on an important need. As MAP discussed further, these points will be addressed by the NQF endorsement process.
- The developer noted that it will continue to evaluate the risk model during regular measure maintenance; notably, the model performs well as currently specified.
- The Standing Committee did not raise any major concerns and passed the measure on use and usability.

**5. Related and Competing Measures**

- The Standing Committee noted several related measures to this metric, but it did not consider these measures to be competing.
- The developer identified the following related measure:
    - #2886 Risk-Standardized Acute Admission Rates for Patients With Heart Failure

**6. Standing Committee Recommendation for Endorsement**: **Total Votes = 14; Y-13**; **N-1**

**7. Public and Member Comment**

- Pre-evaluation comments
    - Two comments were received prior to the evaluation meeting, both from NQF members. One commenter expressed concerns related to the lack of evidence to attribute accountability of the performance to the individual physician/cardiologist. The commenter stated that heart failure care is team based, that cardiologist practice in both inpatient and outpatient settings, and large organizations have sub-specialists (including advanced practice practitioners and electrophysiologists) that may lead to unclear attribution.
    - Another commenter questioned whether strong evidence exists to demonstrate the meaningful influence of clinical groups on unplanned admissions in this population.
    - Both commenters expressed concern with the low reliability results and testing sample thresholds for accountability use and the identified social risk factors used in the adjustment model.
    - The contents of the pre-evaluation comments were discussed during the measure evaluation meeting.
- Post-evaluation comments
    - One post-evaluation public comment was received for the measure and includes multiple rounds of dialogue by the commenter and developer. This comment recommended against endorsement and required follow up by the Standing Committee and developer.
    - The commenter expressed significant concern related to the attribution of per capita hospitalizations to individual or group clinicians in an era of increasing team-based care delivery. They also emphasize a “pure” utilization performance focus disregards quality

and provides “perverse” incentivizes by rewarding “up code” billing, encourages not treating high-risk or complex patients, and does not count patients who expire outside the hospital setting. They state that in use, the measure may create unintended consequences, such as encouraging providers to “cap” hospitalization and needed life-saving care. Instead, the commenter recommended that a favorable measure outcome would combine both hospitalizations and mortality, including risk of death.

- The developer provided feedback and evidence demonstrating the measure’s focus of acute unplanned cardiovascular related admissions represents actionable admission for primary care providers and cardiologists. They also refute the concept of “capped” admissions. Rather, the developer states the measure assesses whether the admission rates are higher than expected given their risk factors. In relation to unintended consequences, the developer states they will be monitored, and other clinical processes may eliminate those concerns.
- The commenter provided additional feedback noting that hospitalization as a per capita negative outcome should also account for risk of death (including death not in the hospital setting), and the measure may not incorporate this concept. The developer clarified the measure does not favor providers as patients who are admitted are more likely to die within the year, and expired patients do not contribute to the person-years in the denominator.
- The developer further stated that patients with heart failure have multiple comorbidities, and more than 50 percent die due to non-heart failure related causes. They also state that exclusive use of claims data is unable to capture severity of illness, medical complexity, and social risks, which are critical drivers of heart failure admissions. Further, they stated the measure does not include patient considerations, such as appointment “no-shows”, financial considerations of medication access, transportation, and broadband.
- The developer stated the measure excludes patients with advanced heart failure, risk adjusts for defibrillators, systolic heart failure, comorbidities, and AHRQ SES Index variables, and does not include advanced heart failure/transplant specialists for attribution.
- The content of this comment was discussed at the post-evaluation comment meeting on October 15, 2021. The Standing Committee had no further concerns with the developer’s response and accepted NQF’s proposed response to the commenter. No further action was taken by the Standing Committee.

**8. Consensus Standards Approval Committee (CSAC) Vote: Y-X; N-X**

**9. Appeals**

## Appendix B: All-Cause Admissions and Readmissions Portfolio—Use in Federal Programs[1]

| NQF # | Title | Federal Programs: Finalized or Implemented as of June 30, 2021 |
|---|---|---|
| 0171 | Acute Care Hospitalization During the First 60 Days of Home Health | Home Health Compare (Active)<br>Home Health Quality Reporting (Active)<br>Home Health Value Based Purchasing (Inactive) |
| 0173 | Emergency Department Use Without Hospitalization During the First 60 Days of Home Health | Home Health Compare (Active)<br>Home Health Quality Reporting (Active)<br>Home Health Value Based Purchasing (Inactive) |
| 0330 | Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization | Hospital Compare (Active)<br>Hospital Inpatient Quality Reporting (Inactive)<br>Hospital Readmissions Reduction Program (Active)<br>Medicare and Medicaid Electronic Health Record Incentive Program for Hospitals and Critical Access Hospitals (Inactive) |
| 505 | Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) Following Acute Myocardial Infarction (AMI) Hospitalization. | Hospital Compare (Active)<br>Hospital Inpatient Quality Reporting (Inactive)<br>Hospital Readmission Reduction Program (Active)<br>Medicare and Medicaid Electronic Health Record Incentive Program for Hospitals and Critical Access Hospitals (Inactive) |
| 506 | Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization | Hospital Compare (Active)<br>Hospital Inpatient Quality Reporting (Inactive)<br>Hospital Readmission Reduction Program (Active)<br>Medicare and Medicaid Electronic Health Record Incentive Program for Hospitals and Critical Access Hospitals (Inactive) |
| 695 | Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI) | N/A |
| 1463 | Standardized Hospitalization Ratio for Dialysis Facilities (SHR) | Dialysis Facility Compare (Active)<br>End-Stage Renal Disease Quality Incentive Program (Active) |

[1] Per CMS Measures Inventory Tool as of 8/19/2021

| NQF # | Title | Federal Programs: Finalized or Implemented as of June 30, 2021 |
|---|---|---|
| 1789 | Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) | Hospital Inpatient Quality Reporting (Active)<br>Physician Value-Based Payment Modifier (Inactive)<br>Merit-Based Incentive Payment System (MIPS) Program (Inactive) |
| 1789 | Hospital-Wide All-Cause Unplanned Readmission Measure (HWR) - ACO Level | N/A |
| 1891 | Hospital 30-Day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Chronic Obstructive Pulmonary Disease (COPD) Hospitalization | Hospital Compare (Active)<br>Hospital Inpatient Quality Reporting (Inactive)<br>Hospital Readmission Reduction Program (Active) |
| 2375 | PointRight ® Pro 30™ | N/A |
| 2393 | Pediatric All-Condition Readmission Measure | N/A |
| 2414 | Pediatric Lower Respiratory Infection Readmission Measure | N/A |
| 2503 | Hospitalizations per 1000 Medicare Fee-for-Service (FFS) Beneficiaries | N/A |
| 2504 | 30-day Rehospitalizations per 1000 Medicare Fee-for-Service (FFS) Beneficiaries | N/A |
| 2510 | Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM) | Skilled Nursing Facility Value Based Purchasing (Active)<br>Medicare Shared Savings Program (Inactive) |
| 2513 | Hospital 30-Day All-Cause Risk-Standardized Readmission Rate (RSRR) following Vascular Procedures | N/A |
| 2514 | Risk-Adjusted Coronary Artery Bypass Graft (CABG) Readmission Rate | N/A |

| NQF # | Title | Federal Programs: Finalized or Implemented as of June 30, 2021 |
|---|---|---|
| 2515 | Hospital 30-Day, All-Cause, Unplanned, Risk-Standardized Readmission Rate (RSRR) Following Coronary Artery Bypass Graft (CABG) Surgery | Hospital Compare (Active)<br>Hospital Inpatient Quality Reporting (Inactive)<br>Hospital Readmission Reduction Program (Active) |
| 2539 | Facility Seven-Day Risk-Standardized Hospital Visit Rate After Outpatient Colonoscopy | Ambulatory Surgical Center Quality Reporting (Active)<br>Hospital Compare (Active)<br>Hospital Outpatient Quality Reporting (Active) |
| 2827 | PointRight® Pro Long Stay (TM) Hospitalization Measure | N/A |
| 2858 | Discharge to Community | N/A |
| 2860 | 30-Day All-Cause Unplanned Readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF) | Hospital Compare (Active)<br>Inpatient Psychiatric Facility Quality Reporting (Active) |
| 2879 | Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data | Hospital Compare (Active)<br>Hospital Inpatient Quality Reporting (Active) |
| 2880 | Excess days in acute care (EDAC) after hospitalization for heart failure (HF) | Hospital Compare (Inactive)<br>Hospital Inpatient Quality Reporting (Active) |
| 2881 | Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI) | Hospital Compare (Active)<br>Hospital Inpatient Quality Reporting (Active) |
| 2882 | Excess days in acute care (EDAC) after hospitalization for pneumonia | Hospital Compare (Active)<br>Hospital Inpatient Quality Reporting (Active) |
| 2888 | Risk-Standardized Acute Admission Rates for Patients with Multiple Chronic Conditions | Medicare Shared Savings Program (Active) |
| 3188 | 30-Day Unplanned Readmissions for Cancer Patients | Prospective Payment System-Exempt Cancer Hospital Quality Reporting (Active) |
| 3366 | Hospital Visits after Urology Ambulatory Surgical Center Procedures | Ambulatory Surgical Center Quality Reporting (Active) |

| NQF # | Title | Federal Programs: Finalized or Implemented as of June 30, 2021 |
|---|---|---|
| 3449 | Hospitalization for Ambulatory Care Sensitive Conditions for Dual Eligible Beneficiaries | N/A |
| 3457 | Minimizing Institutional Length of Stay | Medicaid (Active) |
| 3470 | Hospital Visits after Orthopedic Ambulatory Surgical Center Procedures | Ambulatory Surgical Center Quality Reporting (Active) |
| 3495 | Hospital-Wide 30-Day, All-Cause, Unplanned Readmission Rate (HWR) for the Merit-Based Incentive Payment System (MIPS) Eligible Clinician Groups | N/A |
| 3565 | Standardized Emergency Department Encounter Ratio (SEDR) for Dialysis Facilities | N/A |
| 3566 | Standardized Ratio of Emergency Department Encounters Occurring Within 30 Days of Hospital Discharge (ED30) for Dialysis Facilities | N/A |
| 3597 | Clinician-Group Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions under the Merit-based Incentive Payment System | N/A |

# Appendix C: All-Cause Admissions and Readmissions Standing Committee and NQF Staff

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**Taroon Amin, PhD**
Consultant, Quality Measurement

# Appendix D: Measure Specifications

## NQF #2860 Thirty-Day All-Cause Unplanned Readmission Following Psychiatric Hospitalization in an Inpatient Psychiatric Facility (IPF)

### STEWARD

Centers for Medicare & Medicaid Services

### DESCRIPTION

This facility-level measure estimates an all-cause, unplanned, 30-day, risk-standardized readmission rate for adult Medicare fee-for-service (FFS) patients with a principal discharge diagnosis of a psychiatric disorder or dementia/Alzheimer's disease.

The performance period for the measure is 24 months.

### TYPE

Outcome

### DATA SOURCE

Claims For measure calculation, the following Medicare files are required:

• Medicare beneficiary and coverage files – Provides information on patient demographic, enrollment, and vital status information to identify the measure population and certain risk factors.

• Medicare fee-for-service (FFS) Part A records – Contains final action claims submitted by acute care and critical access hospitals, inpatient psychiatric facilities, home health agencies, and skilled nursing facilities to identify the measure population, readmissions, and certain risk factors.

• Medicare FFS Part B records – Contains final action claims submitted by physicians, physician assistants, clinical social workers, nurse practitioners, and other outpatient providers to identify certain risk factors. For this measure, claims for services such as laboratory tests, medical supplies, or other ambulatory services were not used. This ensures that diagnoses result from an encounter with a provider trained to establish diagnoses and not a claim for a diagnostic test.

Index admissions and readmissions are identified in the Medicare Part A data. Comorbid conditions for risk adjustment are identified in the Medicare Part A and Part B data in the 12 months prior to and including the index admission. Demographic and fee-for-service (FFS) enrollment information are identified in the Medicare beneficiary and coverage files.

No data collection instrument provided  Attachment IPFRead_codebook_2021.xlsx

### LEVEL

Facility

### SETTING

Inpatient/Hospital

### NUMERATOR STATEMENT

The measure estimates the incidence of unplanned, all-cause readmissions to IPFs or short-stay acute care hospitals following discharge from an eligible IPF index admission. A readmission is defined as any admission that occurs within 3-30 days after the discharge date from an eligible index admission to an IPF, except those considered planned.

### NUMERATOR DETAILS

The risk-adjusted outcome measure does not have a traditional numerator and denominator. This section describes the outcome being measured. A readmission is defined as any admission,

for any reason, to an IPF or a short-stay acute care hospital (including critical access hospitals) that occurs within 3-30 days after the discharge date from an eligible index admission to an IPF, except those considered planned.

Subsequent admissions on Days 0, 1, and 2 are not counted as readmissions due to transfers/interrupted stay policy. See denominator exclusions for details.

PLANNED READMISSION ALGORITHM (PRA)

The measure uses the CMS 30-day Hospital-Wide All-Cause Unplanned Readmission (HWR) Measure, PRA version 4.0.

Full information is in the "2020 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Wide Readmission (05/01/20)" and the "2020 HWR Readmission Measure Updates and Specifications Report: Supplemental ICD-10 Code List (05/01/20)" available for download at https://www.qualitynet.org/inpatient/measures/readmission/methodology.

The planned readmission algorithm follows two principles to identify planned readmissions:

- Select procedures and diagnoses such as transplant surgery, maintenance chemotherapy/radiotherapy/immunotherapy, rehabilitation, and forceps delivery are considered always planned (summarized in the Data Dictionary, Tables PR1 and PR2).
- Some procedures such as colorectal resection or aortic resection, are considered either planned or unplanned depending on the accompanying principal discharge diagnosis (Data Dictionary, Table PR3). Specifically, a procedure is considered planned if it does not coincide with a principal discharge diagnosis of an acute illness or complication (Data Dictionary, Table PR4).

### DENOMINATOR STATEMENT

The target population for this measure is Medicare FFS beneficiaries discharged from an IPF with a principal diagnosis of a psychiatric disorder. A readmission within 30 days is eligible as an index admission, if it meets all other eligibility criteria.

### DENOMINATOR DETAILS

The risk-adjusted outcome measure does not have a traditional numerator and denominator. This section describes the target population for measurement. The target population for this measure is adult Medicare FFS beneficiaries discharged from an IPF. The measure is based on all eligible index admissions from the target population.

An eligible index admission is defined as any IPF admission that meets the following criteria:

- Age 18 or older at admission
- Discharged alive
- Enrolled in Medicare FFS Parts A and B during the 12 months before the admission date, month of admission, and at least one month after the month of discharge from the index admission
- Discharged with a principal diagnosis that indicates psychiatric disorder (Data Dictionary, Table PsychCCS)

The measure uses the Clinical Classifications Software (CCS) developed by the Agency for Healthcare Research and Quality (AHRQ), available at https://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp, to group ICD-10-CM codes into clinically coherent groups.

Exclusions

The measure excludes admissions for patients:

- Discharged against medical advice (AMA)
- With unreliable demographic and vital status data defined as the following:
  - Age greater than 115 years

- Missing gender
- Discharge status of “dead” but with subsequent admissions
- Death date prior to admission date
- Death date within the admission and discharge dates but the discharge status was not “dead”

- With readmissions on the day of discharge or day following discharge because those readmissions are likely transfers to another inpatient facility. The hospital that discharges the patient to home or a non-acute care setting is accountable for subsequent readmissions.

- With readmissions two days following discharge because readmissions to the same IPF within two days of discharge are combined into the same claim as the index admission and do not appear as readmissions due to the interrupted stay billing policy. Therefore, complete data on readmissions within two days of discharge are not available.

EXCLUSION DETAILS

DISCHARGE AGAINST MEDICAL ADVICE

Index admissions where there is an indicator in the claims data that patients left against medical advice (AMA) are excluded because the facility may have limited opportunity to complete treatment and prepare for discharge.

UNRELIABLE DATA

Index admissions with unreliable demographic and death information are excluded from the denominator. Unreliable demographic information is defined as age greater than 115 years or missing gender. Unreliable death information is defined as:

- An admission with a discharge status of “dead” but the person has subsequent admissions;
- The death date is prior to the admission date; or
- The death date is within the admission and discharge dates for an admission but the discharge status is not “dead”.

TRANSFERS/INTERRUPTED STAYS

Index admissions that result in a transfer or interrupted stay are excluded because transfers and interrupted stays cannot always be distinguished from true readmissions in the claims data. This exclusion is defined as an index admission with a readmission on Days 0, 1, or 2 post-discharge.

RISK ADJUSTMENT

Statistical risk model

141015| 112831| 147129| 138817

141015| 112831| 147129| 138817

STRATIFICATION

The measure is not stratified.

TYPE SCORE

Rate/proportion  better quality = lower score

ALGORITHM

Key Algorithm Steps:

1. Identify all IPF admissions in the performance period.
2. Apply inclusion/exclusion criteria to identify index admissions.
3. Identify readmissions to IPF or short stay acute care hospitals within 30 days of discharge from each index admission.

4. Apply the planned readmission algorithm to identify unplanned readmissions and remove them from the outcome.

5. Identify risk factors in the 12 months prior to index admission and during the index admission.

6. Run hierarchical logistic regression to compute the risk-stratified readmission rate (RSRR) for each IPF.

Hierarchical logistic regression is used to model the log-odds of readmission. The two-level specification allows reliable estimates for small-volume hospitals while accepting a certain amount of shrinkage toward the mean. The model includes risk factors as fixed effects and a hospital-specific intercept as random effect. The estimate of hospital-specific intercept reflects the quality of care received at an IPF after adjusting for case mix.

A standardized risk ratio (SRR), which is the "predicted" number of readmissions over the "expected" number of readmissions, is calculated for each IPF. The "predicted" number of readmissions is the number of readmissions, given the IPF's performance and its observed case mix, which is calculated by taking the mean of the estimated probabilities of readmission for the index admissions at the IPF, based on the IPF-specific intercept and all other risk factors. The "expected" number of readmissions is the number of readmissions given the national performance and its observed case mix, which is calculated by taking the mean of the estimated probabilities of readmission for the index admissions contributing to the IPF, based on the average intercept and all other risk factors. The confidence interval of the SRR is calculated by bootstrapping to take into account uncertainty of the estimate. An SRR greater than 1 indicates worse quality of care compared to the national average. An SRR less than 1 indicates better quality of care. The risk-standardized readmission rate (RSRR) is be calculated by multiplying SRR with the overall national readmission rate for better interpretation. 141015| 112831| 147129| 138817

Submission items

5.1 Identified measures: 1768 : Plan All-Cause Readmissions (PCR)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

2502 : All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Inpatient Rehabilitation Facilities (IRFs)

2504 : 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries

2510 : Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: The IPF Readmission measure uses the planned readmission algorithm (PRA) from the NQF-endorsed HWR measure (1789) to identify and exclude planned follow-up visits from the measure. We did not identify harmonization opportunities with the other measures, which focus on other facility types. Because the IPF Readmission measure is calculated by CMS using Medicare claims data, there is no data collection burden.

5b.1 If competing, why superior or rationale for additive value: The related measures that we identified are not competing measures because the IPF Readmission measure is specific to IPFs.

## NQF #2880 Excess Days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF)

### STEWARD

Centers for Medicare & Medicaid Services

### DESCRIPTION

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

### TYPE

Outcome

### DATA SOURCE

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

### LEVEL

Facility

### SETTING

Emergency Department and Services, Inpatient/Hospital

### NUMERATOR STATEMENT

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

## NUMERATOR DETAILS

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure’s patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### DENOMINATOR STATEMENT

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

### DENOMINATOR DETAILS

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

### EXCLUSIONS

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

### EXCLUSION DETAILS

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

RISK ADJUSTMENT

Statistical risk model

STRATIFICATION

N/A; this measure is not stratified.

TYPE SCORE

Other (specify): Excess days in acute care (EDAC) per 100 discharges  better quality = lower score

ALGORITHM

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

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## NQF #2882 Excess Days in Acute Care (EDAC) After Hospitalization for Pneumonia

### STEWARD

Centers for Medicare & Medicaid Services

### DESCRIPTION

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

### TYPE

Outcome

### DATA SOURCE

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

### LEVEL

Facility

### SETTING

Inpatient/Hospital

### NUMERATOR STATEMENT

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

NUMERATOR DETAILS

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure’s patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled “Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0” posted in data field S.1 or at https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### DENOMINATOR STATEMENT

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

### DENOMINATOR DETAILS

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

### EXCLUSIONS

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

### EXCLUSION DETAILS

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

RISK ADJUSTMENT

Statistical risk model

STRATIFICATION

N/A. This measure is not stratified.

TYPE SCORE

Other (specify): Excess days in acute care (EDAC) per 100 discharges  better quality = lower score

ALGORITHM

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

# NQF #3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure Under the Merit-Based Incentive Payment System

## STEWARD

Centers for Medicare & Medicaid Services (CMS)

## DESCRIPTION

Risk-standardized rate of acute, unplanned cardiovascular-related hospital admissions among Medicare Fee-for-Service (FFS) patients aged 65 years and older with heart failure (HF) or cardiomyopathy.

## TYPE

Outcome

## DATA SOURCE

Claims, Other 2015-2018 Medicare administrative claims and enrollment data, 2013-2017 American Community Survey, 2016 Area Health Resource File

No data collection instrument provided  Attachment MIPSHFNQFDataDictionary_v1.0.XLSX

## LEVEL

Clinician : Group/Practice, Clinician : Individual

## SETTING

Outpatient Services

## NUMERATOR STATEMENT

The outcome for this measure is the number of acute cardiovascular-related admissions per 100 person-years at risk for admission during the measurement year.

## NUMERATOR DETAILS

Outcome Definition

The outcome for this measure is the number of acute unplanned cardiovascular-related admissions per 100 person-years at risk for admission during the measurement period. Acute cardiovascular-related admissions are defined using individual International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes and the Agency for Healthcare Research and Quality's (AHRQ) Clinical Classification Software (CCS) diagnosis categories, which group clinically similar codes together. See Tabs 3 and 4 of the data dictionary for a full list of CCSs and ICD-10-CM codes.

AHRQ CCS diagnosis categories used to define outcome:

55: Fluid and electrolyte disorders

96: Heart valve disorders

97: Peri-; endo-; and myocarditis; cardiomyopathy (except that caused by tuberculosis or sexually transmitted disease)

98: Essential hypertension

100: Acute myocardial infarction

102: Nonspecific chest pain

104: Other and ill-defined heart disease

105: Conduction disorders

106: Cardiac dysrhythmias

107: Cardiac arrest and ventricular fibrillation

108: Congestive heart failure; non-hypertensive

110: Occlusion or stenosis of precerebral arteries

112: Transient cerebral ischemia

115: Aortic; peripheral; and visceral artery aneurysms

116: Aortic and peripheral arterial embolism or thrombosis

157: Acute and unspecified renal failure

245: Syncope

Subsets of the following AHRQ CCS diagnosis categories used to define outcome:

99: Hypertension with complications and secondary hypertension

101: Coronary atherosclerosis and other heart disease

103: Pulmonary heart disease

109: Acute cerebrovascular disease

114: Peripheral and visceral atherosclerosis

117: Other circulatory disease

130: Pleurisy; pneumothorax; pulmonary collapse

131: Respiratory failure; insufficiency; arrest (adult)

133: Other lower respiratory disease

237: Complication of device; implant or graft

249: Cardiogenic shock

Time Period

The outcome includes inpatient admissions to an acute care hospital during the measurement year.

Excluded Admissions

This measure does not include the following types of admissions in the outcome because they do not reflect the quality of care provided by ambulatory care clinicians who are managing the care of HF patients:

1. Planned cardiovascular-related hospital admissions.

2. Admission that occur directly from a skilled nursing facility (SNF) or acute rehabilitation facility.

3. Admissions that occur within a 10-day “buffer period” of time after discharge from a hospital, SNF, or acute rehabilitation facility.

4. Admissions that occur after the patient has entered hospice.

5. Admissions before first visit to provider if no visit in year prior to measure period.

6. Admissions following LVAD implantation, start of home inotropic therapy, or heart transplant.

Clarification regarding the 10-day “buffer period”

The 10-day “buffer period” is a numerator (or outcome) exclusion but it also affects the denominator (person-time at risk); see below in Section S.6 and S.7. The 10-day buffer period (10 days following discharge from a hospital) is a period of transition back to community-based care, and other factors in addition to ambulatory care, including care received in the hospital and post-discharge planning, contribute to the risk of admission; therefore, the measure does not hold clinicians accountable for admissions in this timeframe. This buffer period allows time for patients to be seen within 7 days of discharge as recommended in CMS’s Transitional Care Management (TCM) service guidelines and for the ambulatory care provider’s care plan to take effect. CMS’s TCM service guidelines encourage providers to have a face-to-face visit within 7 days of discharge for Medicare patients with high medical decision complexity.

Identification of planned admissions

To identify planned cardiovascular-related admissions, the measure modified an algorithm CORE previously developed for CMS’s hospital readmission measures, CMS’s Planned Readmission Algorithm Version 4.0. [1,2]. In brief, the algorithm uses the procedure codes and principal discharge diagnosis code on each hospital claim to identify admissions that are typically planned. A few specific, limited types of care are always considered planned (for example, major organ transplant, rehabilitation, and maintenance chemotherapy). Otherwise, a planned admission is defined as a non-acute admission for a scheduled procedure (for example, total hip

replacement or cholecystectomy). Admissions for an acute illness are never considered planned. For specific codes included in the planned admissions algorithm modified for this measure, please see Tabs PAA1, PAA2, PAA3, and PAA4 of the accompanying data dictionary.

Identification of admissions that occur directly from an SNF or acute rehabilitation facility

Information on SNF and acute rehabilitation facility stays, which factor into the outcome definition, was obtained using CMS's Integrated Data Repository (IDR) and Medicare Provider Analysis and Review (MedPAR) files, respectively.

Identification of admissions that occur after the patient has entered hospice

The status of enrollment in Medicare Parts A and B and Medicare's hospice benefit for 2017-2018 were obtained from the CMS Medicare Enrollment Database (EDB).

Person-time at risk

Persons are considered at risk for hospital admission if they are alive, enrolled in FFS Medicare, and not in the hospital. In addition to time spent in the hospital, the measure also excludes from at-risk time: 1) time spent in a SNF or acute rehabilitation facility; 2) the time within 10 days following discharge from a hospital, SNF, or acute rehabilitation facility; and 3) time after entering hospice care.

References

1. Yale New Haven Health Services Corporation – Center for Outcomes Research & Evaluation (YNHHSC/CORE). 2018 All-Cause Hospital Wide Measure Updates and Specifications Report - Hospital-Level 30-Day Risk-Standardized Readmission Measure – Version 7.0. Centers for Medicare & Medicaid Services; March 2018, 2018.

2. Horwitz L, Grady J, Cohen D, et al. Development and validation of an algorithm to identify planned readmissions from claims data. Journal of Hospital Medicine. Oct 2015;10(10):670-677.

## DENOMINATOR STATEMENT

This measure assesses the care provided to patients with heart failure by primary care providers and cardiologists.

Patients included in the measure (target patient population)

The target patient population for the outcome includes Medicare FFS patients aged 65 years and older with heart failure or cardiomyopathy.

Provider types included for measurement

• Primary care providers (PCPs): CMS designates PCPs as physicians who practice internal medicine, family medicine, general medicine, or geriatric medicine, and non-physician providers, including nurse practitioners, certified clinical nurse specialists, and physician assistants.

• Cardiologists: Cardiologists are covered by the measure because they provide overall coordination of care for patients with HF and manage the conditions that put HF patients at risk for admission due to acute cardiovascular-related conditions.

Outcome attribution

The measure begins by assigning each patient to the clinician most responsible for the patient's care, based on the pattern of outpatient visits with PCPs and relevant specialists. The patient can be assigned to a PCP, a cardiologist, or can be left unassigned. Patients who have had no Evaluation and Management (E&M) visits with a MIPS eligible clinician are excluded.

Step 1: A patient who is eligible for attribution is assigned to a cardiologist only if the cardiologist has been identified as "dominant." A cardiologist is considered "dominant" if they have two or more visits with the patient, regardless of how many visits that patient has with a PCP.

• There are two scenarios where a patient can be assigned to a PCP. First, if the patient has seen the PCP at least once but has no visits with a cardiologist, the patient is assigned to the PCP. The patient will then be assigned to the PCP with the highest number of visits as long as there are no relevant specialists who are considered "dominant." Second, if the patient has seen the PCP more than two or more times and has only one visit with a cardiologist, the patient is assigned to the PCP.

• If the patient has one visit each with a cardiologist and a PCP, the patient is assigned to the cardiologist.

• If the patient has one visit with a cardiologist and no visit with a PCP, the patient is assigned to the cardiologist.

• Finally, the patient will be unassigned if they only saw non-relevant specialists, if the patient has not seen a PCP and no "dominant" specialist can be identified, or if the patient has not had more than one visit with any individual PCP.

Step 2: Patients are then assigned at the Taxpayer Identification Number (TIN) level, which includes solo clinicians and groups of clinicians who have chosen to report their quality under a common TIN.

At the TIN level, patients are first assigned to the clinician (NPI/TIN) most responsible for their care (using the algorithm for individual clinician-level attribution above). Then, patients "follow" their attributed clinician to the TIN of that clinician. Patients unassigned at the individual clinician level continue to be unassigned at the TIN level.

## DENOMINATOR DETAILS

Patients included in the measure (target patient population)

The cohort, or group of patients included in the measure, is comprised of patients with HF or cardiomyopathy who are at high risk of admission and whose admission rates could be lowered through better care.

The specific inclusion and exclusion criteria are as follows:

1. Patient has one primary HF/cardiomyopathy inpatient diagnoses or at least two outpatient or inpatient HF/cardiomyopathy diagnoses (if no primary inpatient HF/cardiomyopathy diagnoses) in any coding position (for example, primary or secondary position) within the two years prior to the measurement year.

Rationale: Cardiomyopathy codes were included based on feedback received from the TEP and Clinician Committee that these patients are similar to HF patients, though they may not have (yet) had the clinical syndrome of HF – potentially because of good ambulatory care. Since hospitalizations are an important quality outcome in this cohort, and care is often similar as in patients with established HF, providers could reasonably be held accountable for their outcomes. Patients with cardiomyopathy (and no co-occurring HF diagnoses) comprise about 11% of the cohort.

2. Patient is aged =65 years at the start of the year prior to the measurement period.

Rationale: Younger Medicare patients represent a distinct population with dissimilar characteristics and outcomes. Additionally, these patients tend to cluster among certain providers. These factors make risk adjustment difficult.

3. Patient is a Medicare FFS beneficiary with continuous enrollment in Medicare Parts A and B during the year prior to the measurement period.

Rationale: Enrollment is necessary to provide clinical information for cohort identification and risk adjustment.

Provider types included for measurement

Because the measure uses the outcome of acute cardiovascular-related admissions to assess quality, the measure limits the clinicians covered (those to whom CMS will attribute patients for measure score calculation) to two categories of providers for whom this outcome reflects care quality. This includes primary care providers (PCPs) and cardiologists.

Primary care providers (PCPs): CMS designates PCPs as physicians who practice internal medicine, family medicine, general medicine, or geriatric medicine, and non-physician providers, including nurse practitioners, certified clinical nurse specialists, and physician assistants.

Cardiologists: Cardiologists are covered by the measure because they provide overall coordination of care for patients with HF and manage the conditions that put HF patients at risk for admission due to acute cardiovascular-related conditions.

## EXCLUSIONS

The measure excludes:

1. Patients without continuous enrollment in Medicare Part A and B for the duration of the measurement period.

2. Patients in hospice during the year prior to the measurement year or in hospice at the start of the measurement year.

3. Patients who have had a heart transplant, been on home inotropic therapy, or who have had a left ventricular assist device (LVAD) placed.

4. Patients with end stage renal disease (ESRD), defined as chronic kidney disease stage 5 or on dialysis.

5. Patients who had no E&M visits with MIPS eligible clinician.

### EXCLUSION DETAILS

The measure excludes patients from the cohort for five reasons.

1) Patients without continuous enrollment in Medicare Part A or B during the measurement period.

Rationale: These patients are excluded to ensure full data availability for outcome assessment and attribution.

2) Patients who were in hospice at any time during the year prior to the measurement year or at the start of the measurement year.

Rationale: The measure excludes these patients even though once a patient enters hospice care, a goal of care is to prevent the need for hospital care. However, ambulatory care providers may have relatively little influence on end-of-life care once a patient is enrolled in hospice and served by a hospice team.

3) Patients who have had a heart transplant, been on home inotropic therapy, or who have had a left ventricular assist device (LVAD) placed.

Rationale: These patients have advanced HF and are at the end of life, often receiving palliative care; thus, the goals of care are typically different, with different levels of threshold for admitting patients. In the case of patients with LVADs, who are at high risk for hospitalization, the threshold for admission is low. Typically, these patients cluster among a few highly specialized providers, making risk adjustment challenging.

4) Patients with end stage renal disease (ESRD) or chronic kidney disease (CKD) Stage 5.

Rationale: These patients are primarily cared for by nephrologists. Additionally, managing their HF and related cardiovascular conditions can be complex and traditional medical prevention and therapy are not as effective.

5) Patients who had no E&M visits with a MIPS eligible clinician.

Rationale: These patients are excluded because they could not be attributed to a provider using the visit-based attribution algorithm.

### RISK ADJUSTMENT

Statistical risk model

121025

121025

### STRATIFICATION

N/A - this measure is not stratified.

### TYPE SCORE

Rate/proportion better quality = lower score

### ALGORITHM

The measure first identifies the cohort of HF patients by applying the inclusion/exclusion criteria. The measure then uses the attribution algorithm to assign patients to MIPS providers. Patients are assigned to the individual clinician (PCP or cardiologist) most responsible for their care, and then subsequently to the TIN designated by the clinician, using our visit-based attribution algorithm. Attribution is done in the measurement period and only patients assigned to a MIPS-eligible clinician will be included in the measure score calculation. The number of admissions and time at risk in the measurement period are then calculated for each patient based on our outcome definition. Factors to be used in risk adjustment are determined in the

risk-adjustment period. For the score calculation, the measure uses a hierarchical (two-level) statistical model that accounts for the clustering of patients within MIPS providers and accommodates the varying patient sample sizes of different providers. The measure uses a negative binomial with linear variance (NB-1) model since the measure's outcome is a count of the number of admissions for HF patients during the measurement period. The first level of the model adjusts for patient factors. The relationship between patient risk factors and the outcome of admissions is determined based on all patients attributed to MIPS-eligible clinicians. Therefore, the "expected" number of admissions (described below) for each provider is based on the performance of all eligible MIPS providers nationwide.

The second level of the model estimates a random-intercept term that reflects the provider's contribution to admission risk, based on their actual admission rate, the performance of other providers, their case mix, and their sample size.

The measure score is a risk-standardized acute unplanned cardiovascular-related admission rate (RSCAR), calculated as the ratio of the number of predicted admissions to the number of expected admissions multiplied by the crude national rate. The predicted to expected ratio of admissions is analogous to an observed over expected ratio, but the numerator accounts for clustering, sample-size variation, and provider-specific performance. The expected number of admissions is calculated based on the provider's case mix and average intercept among all MIPS providers. The predicted number of admissions is calculated based on the provider's case mix and the estimated provider-specific random intercept term. The algorithm multiplies the predicted to expected ratio for each provider by a constant – the crude rate of acute, unplanned cardiovascular-related admissions among all MIPS providers – for ease of interpretation. 121025

Submission items

5.1 Identified measures: 2886 : Risk-Standardized Acute Admission Rates for Patients with Heart Failure

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: The MIPS HF admission measure is adapted from the ACO HF admission measure, which was implemented in the Medicare Shared Savings Program in 2015. There are three main ways that the newly developed measure differs from its predecessor. • Cohort: Added cardiomyopathy as a cohort-qualifying condition. • Rationale: Cardiomyopathy codes were included based on feedback received from the TEP and Clinician Committee that these patients are similar to patients with HF, though they may not have (yet) the clinical syndrome for HF – potentially because of good ambulatory care. Since hospitalizations are an important quality outcome in this cohort, and guideline-based care is often similar as in patients with established HF, providers could reasonably be held accountable for their outcomes. Patients with cardiomyopathy (and no co-occurring HF diagnoses) comprise about 11% of the cohort. • Outcome: Narrowed the outcome to focus on admissions whose risk can be reduced by clinicians/groups providing high-quality ambulatory care, so that the measure can be used to assess ambulatory (rather than ACO-wide) care quality. As such, the outcome (acute cardiovascular-related admissions) is narrower and felt to be more in scope with individual and group providers; this is different than the ACO HF measure's outcome of all-cause acute unplanned admissions, which may be more feasible to address in an integrated health system. • Rationale: Although patients with HF and/or cardiomyopathy are vulnerable to a broad range of admission types, focusing on cardiovascular-related admissions reduces overlap with other MIPS measures. Furthermore, cardiologists and PCPs can influence cardiovascular outcomes for these patients. These providers are actively working to reduce volume overload, ischemia, and arrhythmias for this cohort and to improve cardiovascular risk factors like hypertension, diabetes, and lifestyle behaviors. • Risk-adjustment: Added a social risk factor to the risk-adjustment model – namely, the AHRQ SES Index. • Rationale: Unlike the ACO setting in which participation in ACOs is voluntary and ACOs have an explicit mission to optimize care for patients at risk through traditional and novel strategies, individual MIPS-eligible clinicians and groups of clinicians are less able to mitigate the risk of admission associated with social risk factors, particularly broader residential and

community factors. In addition, there are potential unintended consequences of not adjusting. In a mandatory program, such as MIPS, if these factors strongly influence the outcome, not adjusting for them could result in measure scores that translate into downward Medicare payment adjustments for providers serving patients with social risk factors. If the lower scores reflected case mix rather than quality, it would not advance MIPS policy goals. Further, not adjusting might reduce resources among the providers already facing the largest resource constraints. Moreover, if providers anticipate a poor score on the measure may further reduce their Medicare payments, the measure could create an incentive to reduce access to care for vulnerable patients.

5b.1 If competing, why superior or rationale for additive value: N/A. There are no competing measures.

# Appendix E: Related and Competing Measures

## Comparison of NQF #2860 and NQF #1789

2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)
1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

### *Steward*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Centers for Medicare & Medicaid Services

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Centers for Medicare & Medicaid Services

### *Description*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

This facility-level measure estimates an all-cause, unplanned, 30-day, risk-standardized readmission rate for adult Medicare fee-for-service (FFS) patients with a principal discharge diagnosis of a psychiatric disorder or dementia/Alzheimer's disease.

The performance period for the measure is 24 months.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

This measure estimates a hospital-level, risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission within 30 days of discharge from an index admission with an eligible condition or procedure. The measure reports a single summary RSRR, derived from the volume-weighted results of five different models, one for each of the following specialty cohorts based on groups of discharge condition categories or procedure categories: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. The measure also indicates the hospital-level standardized readmission ratios (SRR) for each of these five specialty cohorts. The outcome is defined as unplanned readmission for any cause within 30 days of the discharge date from the index admission (the admission included in the measure cohort). A specified set of readmissions are planned and do not count in the readmission outcome. CMS annually reports the measure for Medicare fee-for-service (FFS) patients who are 65 years or older and are hospitalized in non-federal short-term acute care hospitals.

For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP) beginning in 2017, the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition or procedure within 30 days of hospital discharge. The ACR measure is calculated using the same five specialty cohorts and estimates an ACO-level standardized risk ratio for each. CMS annually reports the measure for patients who are 65 years or older, are enrolled in Medicare FFS, and are ACO assigned beneficiaries.

The updates in this form reflect changes both to the original HWR measure and the ACS measure version. For instances where the two versions differ, we provide additional clarifications below the original description.

*Type*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Outcome

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Outcome

*Data Source*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Claims For measure calculation, the following Medicare files are required:

- Medicare beneficiary and coverage files – Provides information on patient demographic, enrollment, and vital status information to identify the measure population and certain risk factors.
- Medicare fee-for-service (FFS) Part A records – Contains final action claims submitted by acute care and critical access hospitals, inpatient psychiatric facilities, home health agencies, and skilled nursing facilities to identify the measure population, readmissions, and certain risk factors.
- Medicare FFS Part B records – Contains final action claims submitted by physicians, physician assistants, clinical social workers, nurse practitioners, and other outpatient providers to identify certain risk factors. For this measure, claims for services such as laboratory tests, medical supplies, or other ambulatory services were not used. This ensures that diagnoses result from an encounter with a provider trained to establish diagnoses and not a claim for a diagnostic test.

Index admissions and readmissions are identified in the Medicare Part A data. Comorbid conditions for risk adjustment are identified in the Medicare Part A and Part B data in the 12 months prior to and including the index admission. Demographic and fee-for-service (FFS) enrollment information are identified in the Medicare beneficiary and coverage files.

No data collection instrument provided Attachment IPFRead_codebook_2021.xlsx

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Claims Data sources for the Medicare FFS measure:

HWR

1. Medicare Part A claims data for calendar years 2007 and 2008 were combined and then randomly split into two equal subsets (development sample and validation sample). Risk variable selection was done using the development sample, the risk models for each of the five specialty cohorts in the measure were applied to the validation sample and the models' performance was compared. In addition we re-tested the models in Medicare Part A claims data from calendar year 2009 to look for temporal stability in the models' performance. The number of measured entities and index admissions are listed below by specialty cohort.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission and following discharge from index admission

ACR

1. Medicare Part A claims data for calendar years 2013, 2014, and 2015.

2. Medicare Enrollment Database (EDB).

Reference:

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

Available in attached appendix at A.1 Attachment DelAP_4-107f_NQF1789HWR_DataDictionary_Final082819-637263622402629808.xlsx

*Level*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Facility

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Facility

*Setting*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Inpatient/Hospital

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Inpatient/Hospital, Outpatient Services

*Numerator Statement*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The measure estimates the incidence of unplanned, all-cause readmissions to IPFs or short-stay acute care hospitals following discharge from an eligible IPF index admission. A readmission is defined as any admission that occurs within 3-30 days after the discharge date from an eligible index admission to an IPF, except those considered planned.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

The outcome for both the original HWR and ACR measures is 30-day readmission. We define readmission as an inpatient admission for any cause, except for certain planned readmissions, within 30 days from the date of discharge from an eligible index admission. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

*Numerator Details*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The risk-adjusted outcome measure does not have a traditional numerator and denominator. This section describes the outcome being measured. A readmission is defined as any admission, for any reason, to an IPF or a short-stay acute care hospital

(including critical access hospitals) that occurs within 3-30 days after the discharge date from an eligible index admission to an IPF, except those considered planned.

Subsequent admissions on Days 0, 1, and 2 are not counted as readmissions due to transfers/interrupted stay policy. See denominator exclusions for details.

PLANNED READMISSION ALGORITHM (PRA)

The measure uses the CMS 30-day Hospital-Wide All-Cause Unplanned Readmission (HWR) Measure, PRA version 4.0.

Full information is in the "2020 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Wide Readmission (05/01/20)" and the "2020 HWR Readmission Measure Updates and Specifications Report: Supplemental ICD-10 Code List (05/01/20)" available for download at https://www.qualitynet.org/inpatient/measures/readmission/methodology.

The planned readmission algorithm follows two principles to identify planned readmissions:

• Select procedures and diagnoses such as transplant surgery, maintenance chemotherapy/radiotherapy/immunotherapy, rehabilitation, and forceps delivery are considered always planned (summarized in the Data Dictionary, Tables PR1 and PR2).

• Some procedures such as colorectal resection or aortic resection, are considered either planned or unplanned depending on the accompanying principal discharge diagnosis (Data Dictionary, Table PR3). Specifically, a procedure is considered planned if it does not coincide with a principal discharge diagnosis of an acute illness or complication (Data Dictionary, Table PR4).

### 1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Outcome definition

The measure counts readmissions to any short-term acute care hospital for any cause within 30 days of the date of discharge from an eligible index admission, excluding planned readmissions as defined below.

Rationale

From a patient perspective, an unplanned readmission from any cause is an adverse event. Outcomes occurring within 30 days of discharge can be influenced by hospital care and the early transition to the non-acute care setting. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce readmissions. However, planned readmissions are generally not a signal of quality of care. Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge.

It is important to note that for the HWR measure, a readmission is included as an index admission if it meets all other eligibility criteria. This differs from the publicly reported condition-specific and procedure-specific readmission measures, which do not consider a readmission as a new index admission within the same measure.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (obstetric delivery, transplant surgery, maintenance chemotherapy/radiotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the HWR measure. In 2013, CMS applied the algorithm to its other readmission measures.

For more details on the Planned Readmission Algorithm, please see Appendix E of the report titled "2019 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Wide Readmission"

Wallace Lori, Grady J, Djordjevic Darinka, et al. 2019 All-Cause Hospital Wide Measure Updates and Specifications Report.

https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841

*Denominator Statement*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The target population for this measure is Medicare FFS beneficiaries discharged from an IPF with a principal diagnosis of a psychiatric disorder. A readmission within 30 days is eligible as an index admission, if it meets all other eligibility criteria.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

The measure includes admissions for Medicare beneficiaries who are 65 years and older and are discharged from all non-federal, acute care inpatient US hospitals (including territories) with a complete claims history for the 12 months prior to admission.

ACR-Specific: The measure at the ACO level includes all relevant admissions for ACO assigned beneficiaries who are 65 and older, and are discharged from all non-Federal short-stay acute care hospitals, including critical access hospitals.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The risk-adjusted outcome measure does not have a traditional numerator and denominator. This section describes the target population for measurement. The target population for this measure is adult Medicare FFS beneficiaries discharged from an IPF. The measure is based on all eligible index admissions from the target population.

An eligible index admission is defined as any IPF admission that meets the following criteria:

- Age 18 or older at admission
- Discharged alive
- Enrolled in Medicare FFS Parts A and B during the 12 months before the admission date, month of admission, and at least one month after the month of discharge from the index admission
- Discharged with a principal diagnosis that indicates psychiatric disorder (Data Dictionary, Table PsychCCS)

The measure uses the Clinical Classifications Software (CCS) developed by the Agency for Healthcare Research and Quality (AHRQ), available at https://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp, to group ICD-10-CM codes into clinically coherent groups.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

To be included in the measure cohort, patients must meet the following inclusion criteria:

1. Enrolled in Medicare FFS Part A for the 12 months prior to the date of admission and during the index admission;

2. Aged 65 or older;

3. Discharged alive from a non-federal short-term acute care hospital; and

4. Not transferred to another acute care facility.

ACR- Specific: An additional criterion for the ACO version of this measure is that only hospitalizations for ACO-assigned beneficiaries that meet all of the other criteria listed above are included. The cohort definition is otherwise identical to that of the HWR described below.

The measure first assigns admissions with qualifying Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) procedure categories to the Surgery/Gynecology Cohort. This cohort includes admissions likely cared for by surgical or gynecological teams.

The measure then sorts admissions into one of the four remaining specialty cohorts based on the AHRQ CCS diagnosis category of the principal discharge diagnosis:

The Cardiorespiratory Cohort includes several condition categories with very high readmission rates such as pneumonia, chronic obstructive pulmonary disease, and heart failure. These admissions are combined into a single cohort because they are often clinically indistinguishable, and patients are often simultaneously treated for several of these diagnoses.

The Cardiovascular Cohort includes condition categories such as acute myocardial infarction that in large hospitals might be cared for by a separate cardiac or cardiovascular team.

The Neurology Cohort includes neurologic condition categories such as stroke that in large hospitals might be cared for by a separate neurology team.

The Medicine Cohort includes all non-surgical patients who were not assigned to any of the other cohorts.

The full list of the specific diagnosis and procedure AHRQ CCS categories used to define the specialty cohorts can be found in the attached data dictionary.

*Exclusions*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The measure excludes admissions for patients:

- Discharged against medical advice (AMA)
- With unreliable demographic and vital status data defined as the following:
  - Age greater than 115 years
  - Missing gender
  - Discharge status of “dead” but with subsequent admissions
  - Death date prior to admission date

- Death date within the admission and discharge dates but the discharge status was not "dead"

- With readmissions on the day of discharge or day following discharge because those readmissions are likely transfers to another inpatient facility. The hospital that discharges the patient to home or a non-acute care setting is accountable for subsequent readmissions.

- With readmissions two days following discharge because readmissions to the same IPF within two days of discharge are combined into the same claim as the index admission and do not appear as readmissions due to the interrupted stay billing policy. Therefore, complete data on readmissions within two days of discharge are not available.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Both the original HWR and ACR versions of the measure exclude index admissions for patients:

1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals;
2. Without at least 30 days post-discharge enrollment in Medicare FFS;
3. Discharged against medical advice;
4. Admitted for primary psychiatric diagnoses;
5. Admitted for rehabilitation; or
6. Admitted for medical treatment of cancer.

*Exclusion Details*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

DISCHARGE AGAINST MEDICAL ADVICE

Index admissions where there is an indicator in the claims data that patients left against medical advice (AMA) are excluded because the facility may have limited opportunity to complete treatment and prepare for discharge.

UNRELIABLE DATA

Index admissions with unreliable demographic and death information are excluded from the denominator. Unreliable demographic information is defined as age greater than 115 years or missing gender. Unreliable death information is defined as:

• An admission with a discharge status of "dead" but the person has subsequent admissions;

• The death date is prior to the admission date; or

• The death date is within the admission and discharge dates for an admission but the discharge status is not "dead".

TRANSFERS/INTERRUPTED STAYS

Index admissions that result in a transfer or interrupted stay are excluded because transfers and interrupted stays cannot always be distinguished from true readmissions in the claims data. This exclusion is defined as an index admission with a readmission on Days 0, 1, or 2 post-discharge.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Both the original HWR and ACR versions of the measure exclude index admissions for patients:

1. Admitted to PPS-exempt cancer hospitals; identified by the Medicare provider ID

Rationale: These hospitals care for a unique population of patients that cannot reasonably be compared to patients admitted to other hospitals.

2. Without at least 30 days of post-discharge enrollment in Medicare FFS; determined using data captured in the Medicare Enrollment Database (EDB)

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

3. Discharged against medical advice; identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

4. Admitted for primary psychiatric diagnoses

Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to short-term acute care hospitals.

5. Admitted for rehabilitation

Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care.

6. Admitted for medical treatment of cancer

Rationale: These admissions have a different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions. Patients with cancer admitted for other diagnoses or for surgical treatment of their cancer remain in the measure.

*Risk Adjustment*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Statistical risk model

141015| 112831| 147129| 138817

141015| 112831| 147129| 138817

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Statistical risk model

112469| 118210| 135810| 141973| 146637| 146313

112469| 118210| 135810| 141973| 146637| 146313

*Stratification*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The measure is not stratified.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

N/A

*Type Score*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Rate/proportion better quality = lower score

### 1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Rate/proportion better quality = lower score

*Algorithm*

### 2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)

Key Algorithm Steps:

1. Identify all IPF admissions in the performance period.

2. Apply inclusion/exclusion criteria to identify index admissions.

3. Identify readmissions to IPF or short stay acute care hospitals within 30 days of discharge from each index admission.

4. Apply the planned readmission algorithm to identify unplanned readmissions and remove them from the outcome.

5. Identify risk factors in the 12 months prior to index admission and during the index admission.

6. Run hierarchical logistic regression to compute the risk-stratified readmission rate (RSRR) for each IPF.

Hierarchical logistic regression is used to model the log-odds of readmission. The two-level specification allows reliable estimates for small-volume hospitals while accepting a certain amount of shrinkage toward the mean. The model includes risk factors as fixed effects and a hospital-specific intercept as random effect. The estimate of hospital-specific intercept reflects the quality of care received at an IPF after adjusting for case mix.

A standardized risk ratio (SRR), which is the “predicted” number of readmissions over the “expected” number of readmissions, is calculated for each IPF. The “predicted” number of readmissions is the number of readmissions, given the IPF’s performance and its observed case mix, which is calculated by taking the mean of the estimated probabilities of readmission for the index admissions at the IPF, based on the IPF-specific intercept and all other risk factors. The “expected” number of readmissions is the number of readmissions given the national performance and its observed case mix, which is calculated by taking the mean of the estimated probabilities of readmission for the index admissions contributing to the IPF, based on the average intercept and all other risk factors. The confidence interval of the SRR is calculated by bootstrapping to take into account uncertainty of the estimate. An SRR greater than 1 indicates worse quality of care compared to the national average. An SRR less than 1 indicates better quality of care. The risk-standardized readmission rate (RSRR) is be calculated by multiplying SRR with the overall national readmission rate for better interpretation. 141015| 112831| 147129| 138817

### 1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

The measure estimates hospital-level 30-day all-cause RSRRs using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand et al., 2007). At the patient level, it models the log-odds of hospital readmission within 30 days of discharge using age, selected clinical covariates, and a hospital-specific effect. At the hospital level, the approach models the hospital-specific effects as arising from a normal distribution. The hospital effect represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific effects are given a distribution to account for the clustering (non-independence) of patients within the same hospital (Normand et al., 2007). If there were no differences among hospitals, then after adjusting for patient risk, the hospital effects should be identical across all hospitals.

Admissions are assigned to one of five mutually exclusive specialty cohort groups consisting of related conditions or procedures. For each specialty cohort group, the SRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions at a given hospital. For each hospital, the numerator of the ratio is the number of readmissions within 30 days, predicted based on the hospital's performance with its observed case mix and service mix, and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix and service mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows a particular hospital's performance, given its case mix and service mix, to be compared to an average hospital's performance with the same case mix and service mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, while a higher ratio indicates higher-than-expected readmission rates or worse quality.

For each specialty cohort, the "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific effect on the risk of readmission. The estimated hospital-specific effect for each cohort is added to the sum of the estimated regression coefficients multiplied by patient characteristics. The results are log-transformed and summed over all patients attributed to a hospital to calculate a predicted value. The "expected" number of readmissions (the denominator) is obtained in the same manner, but a common effect using all hospitals in our sample is added in place of the hospital-specific effect. The results are log-transformed and summed over all patients attributed to a hospital to calculate an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the data in that period.

The specialty cohort SRRs are then pooled for each hospital using a volume-weighted geometric mean to create a hospital-wide combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012).

ACR-specific: The ACR quality measure was adapted from the HWR quality measure. The unit of analysis was changed from the hospital to the ACO. This was possible because both the HWR and ACR measures assess readmission performance for a population that clusters patients together (either in hospitals or in ACOs). The goal is to isolate the effects of beneficiary characteristics on the probability that a patient will be readmitted from the effects of being in a specific hospital or ACO. In addition, planned readmissions are excluded for the ACR quality measure in the same way that they are excluded for the HWR measure. The ACR measure is calculated identically to what is described above for the HWR measure.

References:

Horwitz L, Partovian C, Lin Z, et al. Hospital-Wide All-Cause Unplanned Readmission Measure: Final Technical Report. 2012;

https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 112469| 118210| 135810| 141973| 146637| 146313

*Submission items*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

5.1 Identified measures: 1768 : Plan All-Cause Readmissions (PCR)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

2502 : All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Inpatient Rehabilitation Facilities (IRFs)

2504 : 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries

2510 : Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: The IPF Readmission measure uses the planned readmission algorithm (PRA) from the NQF-endorsed HWR measure (1789) to identify and exclude planned follow-up visits from the measure. We did not identify harmonization opportunities with the other measures, which focus on other facility types. Because the IPF Readmission measure is calculated by CMS using Medicare claims data, there is no data collection burden.

5b.1 If competing, why superior or rationale for additive value: The related measures that we identified are not competing measures because the IPF Readmission measure is specific to IPFs.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI)

0329 : Risk-Adjusted 30-Day All-Cause Readmission Rate

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1768 : Plan All-Cause Readmissions (PCR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: This measure and the National Committee for Quality Assurance (NCQA) Plan All-Cause Readmissions (PCR) Measure #1768 are related measures, but are not competing because they don't have the same measure focus and same target population. In addition, both have been previously harmonized to the extent possible under the guidance of the National Quality Forum Steering Committee in 2011. Each of these measures has different specifications. NCQA's Measure #1768 counts the number of inpatient stays for patients aged 18 and older during a measurement year that were followed by an acute readmission for any diagnosis to any hospital within 30 days. It contrasts this count with a calculation of the predicted probability of an acute readmission. NCQA's measure is intended for quality monitoring and accountability at the health plan level. This measure estimates the risk-standardized rate of unplanned, all-cause readmissions to a hospital or ACO for any eligible condition within 30 days of hospital discharge for patients aged 18 and older. The measure will result in a single summary risk-adjusted readmission rate for conditions or procedures that fall under five specialties: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. This measure is specified for evaluating hospital or ACO performance. However, despite these differences in cohort specifications, both measures under NQF guidance have been harmonized to the extent possible through modifications such as exclusion of planned readmissions. We did not include in our list of related

measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2860 and NQF #2504

2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)

2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries

### *Steward*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Centers for Medicare & Medicaid Services

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

Centers for Medicare & Medicaid Services

### *Description*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

This facility-level measure estimates an all-cause, unplanned, 30-day, risk-standardized readmission rate for adult Medicare fee-for-service (FFS) patients with a principal discharge diagnosis of a psychiatric disorder or dementia/Alzheimer's disease.

The performance period for the measure is 24 months.

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

Number of rehospitalizations occurring within 30 days of discharge from an acute care hospital (prospective payment system (PPS) or critical access hospital (CAH)) per 1000 FFS Medicare beneficiaries at the state and community level by quarter and year.

### *Type*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Outcome

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

Outcome

### *Data Source*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Claims For measure calculation, the following Medicare files are required:

- Medicare beneficiary and coverage files – Provides information on patient demographic, enrollment, and vital status information to identify the measure population and certain risk factors.
- Medicare fee-for-service (FFS) Part A records – Contains final action claims submitted by acute care and critical access hospitals, inpatient psychiatric facilities, home health agencies, and skilled nursing facilities to identify the measure population, readmissions, and certain risk factors.
- Medicare FFS Part B records – Contains final action claims submitted by physicians, physician assistants, clinical social workers, nurse practitioners, and other outpatient providers to identify certain risk factors. For this measure, claims for services such as laboratory tests, medical supplies, or other ambulatory services were not used. This ensures that diagnoses result from an encounter with a provider trained to establish diagnoses and not a claim for a diagnostic test.

Index admissions and readmissions are identified in the Medicare Part A data. Comorbid conditions for risk adjustment are identified in the Medicare Part A and Part B data in the 12 months prior to and including the index admission. Demographic and fee-for-service (FFS) enrollment information are identified in the Medicare beneficiary and coverage files.

No data collection instrument provided Attachment IPFRead_codebook_2021.xlsx

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

Claims, Other Medicare Part A claims and the denominator file (containing beneficiary enrollment data and death date).

No data collection instrument provided Attachment

*Level*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Facility

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

Population : Community, County or City, Population : Regional and State

*Setting*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Inpatient/Hospital

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

Other Not setting specific

*Numerator Statement*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The measure estimates the incidence of unplanned, all-cause readmissions to IPFs or short-stay acute care hospitals following discharge from an eligible IPF index admission. A readmission is defined as any admission that occurs within 3-30 days after the discharge date from an eligible index admission to an IPF, except those considered planned.

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

Number of rehospitalizations within 30 days of discharge from an acute care hospital (PPS or CAH).

*Numerator Details*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The risk-adjusted outcome measure does not have a traditional numerator and denominator. This section describes the outcome being measured. A readmission is defined as any admission, for any reason, to an IPF or a short-stay acute care hospital (including critical access hospitals) that occurs within 3-30 days after the discharge date from an eligible index admission to an IPF, except those considered planned.

Subsequent admissions on Days 0, 1, and 2 are not counted as readmissions due to transfers/interrupted stay policy. See denominator exclusions for details.

PLANNED READMISSION ALGORITHM (PRA)

The measure uses the CMS 30-day Hospital-Wide All-Cause Unplanned Readmission (HWR) Measure, PRA version 4.0.

Full information is in the "2020 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Wide Readmission (05/01/20)" and the "2020 HWR Readmission Measure Updates and Specifications Report: Supplemental ICD-10 Code List (05/01/20)" available for download at https://www.qualitynet.org/inpatient/measures/readmission/methodology.

The planned readmission algorithm follows two principles to identify planned readmissions:

• Select procedures and diagnoses such as transplant surgery, maintenance chemotherapy/radiotherapy/immunotherapy, rehabilitation, and forceps delivery are considered always planned (summarized in the Data Dictionary, Tables PR1 and PR2).

• Some procedures such as colorectal resection or aortic resection, are considered either planned or unplanned depending on the accompanying principal discharge diagnosis (Data Dictionary, Table PR3). Specifically, a procedure is considered planned if it does not coincide with a principal discharge diagnosis of an acute illness or complication (Data Dictionary, Table PR4).

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

Inclusions:

Any hospitalization to a PPS or CAH occurring within 30 days of the most recent prior hospitalization discharge from a PPS or CAH.

Exclusions:

Same-day hospital transfers; transfers are defined as any hospitalization, whether to the same hospital or not, where discharge date is the same as hospitalization date and are treated as one continuous long stay; the 30-day period starts at the end of the combined stay.

*Denominator Statement*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The target population for this measure is Medicare FFS beneficiaries discharged from an IPF with a principal diagnosis of a psychiatric disorder. A readmission within 30 days is eligible as an index admission, if it meets all other eligibility criteria.

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

Medicare FFS beneficiaries, prorated based on the number of days of FFS eligibility in the time period (quarter or year).

*Denominator Details*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The risk-adjusted outcome measure does not have a traditional numerator and denominator. This section describes the target population for measurement. The target population for this measure is adult Medicare FFS beneficiaries discharged from an IPF. The measure is based on all eligible index admissions from the target population.

An eligible index admission is defined as any IPF admission that meets the following criteria:

- Age 18 or older at admission
- Discharged alive
- Enrolled in Medicare FFS Parts A and B during the 12 months before the admission date, month of admission, and at least one month after the month of discharge from the index admission
- Discharged with a principal diagnosis that indicates psychiatric disorder (Data Dictionary, Table PsychCCS)

The measure uses the Clinical Classifications Software (CCS) developed by the Agency for Healthcare Research and Quality (AHRQ), available at https://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp, to group ICD-10-CM codes into clinically coherent groups.

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

To calculate the denominator, count the days each beneficiary was enrolled in FFS Medicare in the time period (quarter or year). For each beneficiary, number of days of FFS Medicare eligibility is determined by evaluating HMO enrollment (BENE_HMO_IND_XX) and time to death (BENE_DEATH_DT). Days enrolled in HMO and days after death are not counted. Eligible days for each beneficiary are summed over all beneficiaries. The total number of eligible days is then divided by the number of days in the time period to obtain the prorated number of beneficiaries. The denominator is the prorated number of beneficiaries divided by 1,000.

*Exclusions*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The measure excludes admissions for patients:

- Discharged against medical advice (AMA)
- With unreliable demographic and vital status data defined as the following:
  - Age greater than 115 years
  - Missing gender
  - Discharge status of “dead” but with subsequent admissions
  - Death date prior to admission date
  - Death date within the admission and discharge dates but the discharge status was not “dead”

- With readmissions on the day of discharge or day following discharge because those readmissions are likely transfers to another inpatient facility. The hospital that discharges the patient to home or a non-acute care setting is accountable for subsequent readmissions.
- With readmissions two days following discharge because readmissions to the same IPF within two days of discharge are combined into the same claim as the index admission and do not appear as readmissions due to the interrupted stay billing policy. Therefore, complete data on readmissions within two days of discharge are not available.

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

None

*Exclusion Details*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

DISCHARGE AGAINST MEDICAL ADVICE

Index admissions where there is an indicator in the claims data that patients left against medical advice (AMA) are excluded because the facility may have limited opportunity to complete treatment and prepare for discharge.

UNRELIABLE DATA

Index admissions with unreliable demographic and death information are excluded from the denominator. Unreliable demographic information is defined as age greater than 115 years or missing gender. Unreliable death information is defined as:

• An admission with a discharge status of “dead” but the person has subsequent admissions;

• The death date is prior to the admission date; or

• The death date is within the admission and discharge dates for an admission but the discharge status is not “dead”.

TRANSFERS/INTERRUPTED STAYS

Index admissions that result in a transfer or interrupted stay are excluded because transfers and interrupted stays cannot always be distinguished from true readmissions in the claims data. This exclusion is defined as an index admission with a readmission on Days 0, 1, or 2 post-discharge.

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

N/A

*Risk Adjustment*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Statistical risk model

141015| 112831| 147129| 138817

141015| 112831| 147129| 138817

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

Other Seasonal adjustment for quarterly measurement

127239| 135466

127239| 135466

*Stratification*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The measure is not stratified.

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

N/A. This measure could be easily stratified.

*Type Score*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Rate/proportion better quality = lower score

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

Rate/proportion better quality = lower score

*Algorithm*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Key Algorithm Steps:

1. Identify all IPF admissions in the performance period.

2. Apply inclusion/exclusion criteria to identify index admissions.

3. Identify readmissions to IPF or short stay acute care hospitals within 30 days of discharge from each index admission.

4. Apply the planned readmission algorithm to identify unplanned readmissions and remove them from the outcome.

5. Identify risk factors in the 12 months prior to index admission and during the index admission.

6. Run hierarchical logistic regression to compute the risk-stratified readmission rate (RSRR) for each IPF.

Hierarchical logistic regression is used to model the log-odds of readmission. The two-level specification allows reliable estimates for small-volume hospitals while accepting a certain amount of shrinkage toward the mean. The model includes risk factors as fixed effects and a hospital-specific intercept as random effect. The estimate of hospital-specific intercept reflects the quality of care received at an IPF after adjusting for case mix.

A standardized risk ratio (SRR), which is the “predicted” number of readmissions over the “expected” number of readmissions, is calculated for each IPF. The “predicted” number of readmissions is the number of readmissions, given the IPF’s performance and its observed case mix, which is calculated by taking the mean of the estimated probabilities of readmission for the index admissions at the IPF, based on the IPF-specific intercept and all other risk factors. The “expected” number of readmissions is the number of readmissions given the national performance and its observed case mix, which is calculated by taking the mean of the estimated probabilities of readmission for the index admissions contributing to the IPF, based on the average intercept and all other risk factors. The confidence interval of the SRR is calculated by bootstrapping to take into account uncertainty of the estimate. An SRR greater than 1 indicates worse quality of care compared to the national average. An SRR less than 1 indicates better quality of care. The risk-standardized readmission rate (RSRR) is be calculated by multiplying SRR with the overall national readmission rate for better interpretation. 141015| 112831| 147129| 138817

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

1. Calculate denominator

a. Beneficiary days = Number of days enrolled in Medicare FFS during the time period of interest.

i. Exclude days with HMO enrollment

ii. Exclude days after Death

b. Prorated number of beneficiaries = Sum of beneficiary days divided by number of days in time period of interest.

c. Denominator = Prorated number of beneficiaries divided by 1,000.

2. Calculate numerator

a. Identify discharges within time period of interest

i. Treat same day transfers as a single continuous hospitalization

ii. Combine interim claims into a single continuous hospitalization 127239| 135466

*Submission items*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

5.1 Identified measures: 1768 : Plan All-Cause Readmissions (PCR)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

2502 : All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Inpatient Rehabilitation Facilities (IRFs)

2504 : 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries

2510 : Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: The IPF Readmission measure uses the planned readmission algorithm (PRA) from the NQF-endorsed HWR measure (1789) to identify and exclude planned follow-up visits from the measure. We did not identify harmonization opportunities with the other measures, which focus on other facility types. Because the IPF Readmission measure is calculated by CMS using Medicare claims data, there is no data collection burden.

5b.1 If competing, why superior or rationale for additive value: The related measures that we identified are not competing measures because the IPF Readmission measure is specific to IPFs.

**2504: 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries**

5.1 Identified measures: 0329 : Risk-Adjusted 30-Day All-Cause Readmission Rate

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1768 : Plan All-Cause Readmissions (PCR)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: The proportionate measure and population-based measure are not comparable. They should not be interpreted as such. Proportionate measures can still be use to compare hospitals, but the population-based measure should be used to describe the health indicators for a community of providers working together to reduce Rehospitalizations.

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2860 and NQF #2510

2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)

2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)

### *Steward*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Centers for Medicare & Medicaid Services

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

Centers for Medicare & Medicaid Services

### *Description*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

This facility-level measure estimates an all-cause, unplanned, 30-day, risk-standardized readmission rate for adult Medicare fee-for-service (FFS) patients with a principal discharge diagnosis of a psychiatric disorder or dementia/Alzheimer's disease.

The performance period for the measure is 24 months.

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

The SNFRM estimates the risk-standardized rate of all-cause, unplanned hospital readmissions for Skilled Nursing Facility (SNF) Medicare fee-for-service (FFS) beneficiaries within 30 days of discharge from a prior proximal acute hospitalization. The prior proximal hospitalization is defined as an admission to an IPPS, CAH, psychiatric, or cancer hospital. The measure is risk-adjusted for patient demographics, principal diagnosis from the prior hospitalization, comorbidities, and other health status variables that affect the probability of a hospital readmission. The SNFRM includes Medicare FFS beneficiaries who were admitted to a SNF within 1 day of discharge from a hospital. The measure is calculated annually using a 12-month period.

### *Type*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Outcome

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

Outcome

*Data Source*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Claims For measure calculation, the following Medicare files are required:

- Medicare beneficiary and coverage files – Provides information on patient demographic, enrollment, and vital status information to identify the measure population and certain risk factors.
- Medicare fee-for-service (FFS) Part A records – Contains final action claims submitted by acute care and critical access hospitals, inpatient psychiatric facilities, home health agencies, and skilled nursing facilities to identify the measure population, readmissions, and certain risk factors.
- Medicare FFS Part B records – Contains final action claims submitted by physicians, physician assistants, clinical social workers, nurse practitioners, and other outpatient providers to identify certain risk factors. For this measure, claims for services such as laboratory tests, medical supplies, or other ambulatory services were not used. This ensures that diagnoses result from an encounter with a provider trained to establish diagnoses and not a claim for a diagnostic test.

Index admissions and readmissions are identified in the Medicare Part A data. Comorbid conditions for risk adjustment are identified in the Medicare Part A and Part B data in the 12 months prior to and including the index admission. Demographic and fee-for-service (FFS) enrollment information are identified in the Medicare beneficiary and coverage files.

No data collection instrument provided Attachment IPFRead_codebook_2021.xlsx

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

Claims, Enrollment Data This measure is for Medicare beneficiaries and uses the data in the Medicare eligibility files and inpatient claims data. The eligibility files provide information on date of birth, sex, reasons for Medicare eligibility, periods of Part A coverage and periods in the fee-for-service program. The data elements from the Medicare FFS claims are those basic to the operation of the Medicare payment systems and include date of admission, date of discharge, diagnoses, procedures, indicators for use of dialysis services and indicators of whether the Part A benefit is exhausted. The inpatient claims data files contain beneficiary-level SNF and other hospital records. No data beyond the bills submitted in the normal course of business are required from the providers for the calculation of this measure.

The measure uses one year of data to calculate the measure rate for the Skilled Nursing Facility Readmission Measure, which we believe is sufficient to calculate this measure in a statistically reliable manner. This is because the reliability of a SNF's measure rate is related to its sample size.

Following are the specific files and links to the documentation:

- Medicare Inpatient claims - standard analytical files (2007-2012), index SNF claims (2009-2011)

Documentation for the Medicare claims data is provided online by the CMS contractor, Research Data Assistance Center (ResDAC) at the University of Minnesota. The following web page includes data dictionaries for these files: Standard analytical files (Inpatient RIF): http://www.resdac.org/cms-data/files/ip-rif/data-documentation

- Medicare Enrollment Database

Information about the Enrollment Database may be found here:

http://aspe.hhs.gov/datacncl/datadir/cms.htm

- Medicare Denominator files (2009-2011)

Documentation available at:

http://www.cms.gov/Research-Statistics-Data-and-Systems/Files-for-Order/IdentifiableDataFiles/DenominatorFile.html

- AHRQ CCS groupings of ICD-9 codes

Documentation available at:

http://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp

- CMS-HCC mappings of ICD-9 codes

Mappings are included in the software at the following website: http://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Risk-Adjustors.html

No data collection instrument provided No data dictionary

*Level*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Facility

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

Facility

*Setting*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Inpatient/Hospital

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

Other, Post-Acute Care Skilled Nursing Facilities

*Numerator Statement*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The measure estimates the incidence of unplanned, all-cause readmissions to IPFs or short-stay acute care hospitals following discharge from an eligible IPF index admission. A readmission is defined as any admission that occurs within 3-30 days after the discharge date from an eligible index admission to an IPF, except those considered planned.

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

The outcome for this measure is 30-day unplanned all-cause hospital readmissions of SNF patients. We define readmission as an inpatient admission for any cause, with the exception of certain planned admissions, within 30 days from the date of discharge from the patient's prior proximal acute hospitalization. The prior proximal hospitalization is defined as an admission to an inpatient prospective payment system (IPPS) hospital, critical access hospital (CAH), or PPS-exempt psychiatric or cancer hospital. Because the measure denominator is based on SNF admissions, it is possible that Medicare beneficiaries with more than one eligible admission may be included in the measure multiple times within a given year.

*Numerator Details*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The risk-adjusted outcome measure does not have a traditional numerator and denominator. This section describes the outcome being measured. A readmission is defined as any admission, for any reason, to an IPF or a short-stay acute care hospital (including critical access hospitals) that occurs within 3-30 days after the discharge date from an eligible index admission to an IPF, except those considered planned.

Subsequent admissions on Days 0, 1, and 2 are not counted as readmissions due to transfers/interrupted stay policy. See denominator exclusions for details.

PLANNED READMISSION ALGORITHM (PRA)

The measure uses the CMS 30-day Hospital-Wide All-Cause Unplanned Readmission (HWR) Measure, PRA version 4.0.

Full information is in the "2020 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Wide Readmission (05/01/20)" and the "2020 HWR Readmission Measure Updates and Specifications Report: Supplemental ICD-10 Code List (05/01/20)" available for download at https://www.qualitynet.org/inpatient/measures/readmission/methodology.

The planned readmission algorithm follows two principles to identify planned readmissions:

• Select procedures and diagnoses such as transplant surgery, maintenance chemotherapy/radiotherapy/immunotherapy, rehabilitation, and forceps delivery are considered always planned (summarized in the Data Dictionary, Tables PR1 and PR2).

• Some procedures such as colorectal resection or aortic resection, are considered either planned or unplanned depending on the accompanying principal discharge diagnosis (Data Dictionary, Table PR3). Specifically, a procedure is considered planned if it does not coincide with a principal discharge diagnosis of an acute illness or complication (Data Dictionary, Table PR4).

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

Outcome definition

The measure counts unplanned hospital inpatient readmissions of SNF patients to any short-term acute care hospital for any cause within 30 days from the date of discharge from the patient's prior proximal acute hospitalization, excluding planned readmissions as defined below.

Observation stays: This measure does not include observation stays as a readmission.

Planned readmissions: Planned readmissions are not counted as readmissions. In order to define whether a readmission is planned or unplanned, the measure uses an RTI-modified version of the CMS Planned Readmission Algorithm (PRA), which includes additional procedures specific to post-acute care (PAC) settings (see https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/SNF-VBP/Downloads/SNF-Planned-Readmission-Algorithm-v30-.xlsx for the codes with this modified PRA). Planned readmissions should not be counted against facilities, because planned readmissions are not a signal of quality of care. More information about planned readmission can be found in section 2.5 of the April 2019 technical report.

*Denominator Statement*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The target population for this measure is Medicare FFS beneficiaries discharged from an IPF with a principal diagnosis of a psychiatric disorder. A readmission within 30 days is eligible as an index admission, if it meets all other eligibility criteria.

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

The measure includes admissions for SNF Medicare fee for service (FFS) beneficiaries who have been admitted to a SNF within 1 day of discharge from a prior proximal hospitalization.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The risk-adjusted outcome measure does not have a traditional numerator and denominator. This section describes the target population for measurement. The target population for this measure is adult Medicare FFS beneficiaries discharged from an IPF. The measure is based on all eligible index admissions from the target population.

An eligible index admission is defined as any IPF admission that meets the following criteria:

- Age 18 or older at admission
- Discharged alive
- Enrolled in Medicare FFS Parts A and B during the 12 months before the admission date, month of admission, and at least one month after the month of discharge from the index admission
- Discharged with a principal diagnosis that indicates psychiatric disorder (Data Dictionary, Table PsychCCS)

The measure uses the Clinical Classifications Software (CCS) developed by the Agency for Healthcare Research and Quality (AHRQ), available at https://www.hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp, to group ICD-10-CM codes into clinically coherent groups.

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

The denominator includes all patients who have been admitted to a SNF within 1 day of discharge from a prior proximal hospitalization, taking denominator exclusions into account (see Section S.8).

*Exclusions*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The measure excludes admissions for patients:

- Discharged against medical advice (AMA)
- With unreliable demographic and vital status data defined as the following:
  - Age greater than 115 years
  - Missing gender

- Discharge status of “dead” but with subsequent admissions
- Death date prior to admission date
- Death date within the admission and discharge dates but the discharge status was not “dead”

- With readmissions on the day of discharge or day following discharge because those readmissions are likely transfers to another inpatient facility. The hospital that discharges the patient to home or a non-acute care setting is accountable for subsequent readmissions.
- With readmissions two days following discharge because readmissions to the same IPF within two days of discharge are combined into the same claim as the index admission and do not appear as readmissions due to the interrupted stay billing policy. Therefore, complete data on readmissions within two days of discharge are not available.

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

The following are excluded from the denominator:

1. SNF stays where the patient had one or more intervening post-acute care (PAC) admissions (inpatient rehabilitation facility [IRF] or long-term care hospital [LTCH]) which occurred either between the prior proximal hospital discharge and SNF admission or after the SNF discharge, within the 30-day risk window. Also excluded are SNF admissions where the patient had multiple SNF

admissions after the prior proximal hospitalization, within the 30-day risk window.

Rationale: For patients who have IRF or LTCH admissions prior to their first SNF admission, these patients are starting their SNF admission later in the 30-day risk window and receiving other additional types of services as compared to patients admitted directly to the SNF from the prior proximal hospitalization and their risk for readmission is different than the rest of SNF admissions. Additionally, when patients have multiple PAC admissions, evaluating quality of care coordination is confounded and even controversial in terms of attributing responsibility for a readmission among multiple PAC providers. Similarly, assigning responsibility for a readmission for patients who have multiple SNF admissions subsequent to their prior proximal hospitalization is also controversial.

2. SNF stays with a gap of greater than 1 day between discharge from the prior proximal hospitalization and the SNF admission.

Rationale: These patients are starting their SNF admissions later in the 30-day risk window than patients admitted directly to the SNF from the prior proximal hospitalization. They are clinically different and their risk for readmission is different than the rest of SNF admissions.

3. SNF stays where the patient did not have at least 12 months of FFS Medicare enrollment prior to the proximal hospital discharge and throughout the entire risk period (measured as enrollment during the month of proximal hospital discharge, for 11 months prior to that discharge, and the month after the month of discharge).

Rationale: FFS Medicare claims are used to identify comorbidities during the 12-month period prior to the proximal hospital discharge for risk adjustment. Readmissions occurring within the 30-day risk window when the patient does not have FFS Medicare coverage cannot be detected using claims.

4. SNF stays where the patient was discharged from the SNF against medical advice.

Rationale: The SNF was not able to complete care as needed.

5. SNF stays in which the principal diagnosis for the prior proximal hospitalization was for the medical treatment of cancer. Patients with cancer whose principal diagnosis from the

prior proximal hospitalization was for other diagnoses or for surgical treatment of their cancer remain in the measure.

Rationale: Patients with a principal diagnosis of cancer for the prior hospitalization have a very different mortality and readmission risk than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions.

6. SNF stays in which the principal primary diagnosis for the prior proximal hospitalization was for "rehabilitation care; fitting of prostheses and for the adjustment of devices".

Rationale: Hospital admissions for these conditions are not for acute care.

7. SNF stays in which the prior proximal hospitalization was for pregnancy.

Rationale: While SNF stays in which the prior proximal hospitalization for pregnancy are very rare (for example, there were only 9 instances in FY2017) this measure is not intended to measure care related to pregnancy.

8. SNF stays in which data were missing or problematic on any covariate or variable used in the measure's constructions.

Rationale: The needed data are not available to reliably calculate the measure score for the SNF.

9. SNF stays that took place in a CAH swing bed.

Rationale: CAHs are not paid on the SNF Prospective Payment System (PPS), therefore they are not eligible for the SNF VBP Program.

*Exclusion Details*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

DISCHARGE AGAINST MEDICAL ADVICE

Index admissions where there is an indicator in the claims data that patients left against medical advice (AMA) are excluded because the facility may have limited opportunity to complete treatment and prepare for discharge.

UNRELIABLE DATA

Index admissions with unreliable demographic and death information are excluded from the denominator. Unreliable demographic information is defined as age greater than 115 years or missing gender. Unreliable death information is defined as:

• An admission with a discharge status of "dead" but the person has subsequent admissions;

• The death date is prior to the admission date; or

• The death date is within the admission and discharge dates for an admission but the discharge status is not "dead".

TRANSFERS/INTERRUPTED STAYS

Index admissions that result in a transfer or interrupted stay are excluded because transfers and interrupted stays cannot always be distinguished from true readmissions in the claims data. This exclusion is defined as an index admission with a readmission on Days 0, 1, or 2 post-discharge.

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

Denominator exclusions are based on data from the MedPAR and the Medicare Denominator files, specifically:

1. SNF stays where the patient had one or more intervening PAC admissions (IRF or LTCH), which occurred either between the prior proximal hospital discharge and SNF admission or after the SNF discharge, within the 30-day risk window or where the patient had multiple

SNF admissions after the prior proximal hospitalization were identified using the MedPAR files.

2. SNF stays with a gap of greater than 1 day between discharge from the prior proximal hospitalization and the SNF admission were identified using the MedPAR files.

3. Lack of 12 months of FFS Medicare enrollment prior to the proximal hospital discharge was identified by patient enrollment status in Part A FFS using the Medicare Denominator file. Enrollment must be indicated during the month of prior proximal hospital discharge and the 11 months preceding the prior proximal hospital discharge. Lack of FFS Medicare enrollment during the 30 days after discharge from the prior proximal hospitalization was identified by patient enrollment status in Part A FFS using the Medicare Denominator file. Enrollment must be indicated for the month(s) falling within 30 days of discharge from the prior proximal hospitalization.

4. Discharges from the SNF against medical advice were identified using the discharge disposition indicator on the corresponding SNF claim from the MedPAR files.

5. Cancer discharge condition categories excluded from the measure are identified using claims in the MedPAR files for prior proximal hospitalization.

6. “Rehabilitation care: fitting of prostheses and for the adjustment of devices” are identified by principal diagnosis codes (ICD-10 codes) included in CCS 254, using claims from the MedPAR files for prior proximal hospitalization.

7. SNF stays in which the prior proximal hospitalization was for pregnancy are identified based on the principal diagnosis from the prior proximal hospitalization mapping to CCS categories 176-196, using claims from the MedPAR files for prior proximal hospitalization.

8. SNF stays in which data were missing or problematic on any covariate or variable used in the measure’s constructions are identified in both the MedPAR and denominator files.

9. SNF stays that took place in a CAH swing bed are identified based on the CCN number (the 3rd position of the CCN=Z) which identifies a CAH swing bed, in the MedPAR file.

### *Risk Adjustment*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Statistical risk model

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141015| 112831| 147129| 138817

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

Statistical risk model

122630| 137873| 147152| 145665| 137929| 121025| 150289| 148770| 151550| 152377| 152015| 146313

122630| 137873| 147152| 145665| 137929| 121025| 150289| 148770| 151550| 152377| 152015| 146313

### *Stratification*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

The measure is not stratified.

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

Not applicable. This measure is not stratified.

*Type Score*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Rate/proportion better quality = lower score

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

Rate/proportion better quality = lower score

*Algorithm*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

Key Algorithm Steps:

1. Identify all IPF admissions in the performance period.

2. Apply inclusion/exclusion criteria to identify index admissions.

3. Identify readmissions to IPF or short stay acute care hospitals within 30 days of discharge from each index admission.

4. Apply the planned readmission algorithm to identify unplanned readmissions and remove them from the outcome.

5. Identify risk factors in the 12 months prior to index admission and during the index admission.

6. Run hierarchical logistic regression to compute the risk-stratified readmission rate (RSRR) for each IPF.

Hierarchical logistic regression is used to model the log-odds of readmission. The two-level specification allows reliable estimates for small-volume hospitals while accepting a certain amount of shrinkage toward the mean. The model includes risk factors as fixed effects and a hospital-specific intercept as random effect. The estimate of hospital-specific intercept reflects the quality of care received at an IPF after adjusting for case mix.

A standardized risk ratio (SRR), which is the “predicted” number of readmissions over the “expected” number of readmissions, is calculated for each IPF. The “predicted” number of readmissions is the number of readmissions, given the IPF’s performance and its observed case mix, which is calculated by taking the mean of the estimated probabilities of readmission for the index admissions at the IPF, based on the IPF-specific intercept and all other risk factors. The “expected” number of readmissions is the number of readmissions given the national performance and its observed case mix, which is calculated by taking the mean of the estimated probabilities of readmission for the index admissions contributing to the IPF, based on the average intercept and all other risk factors. The confidence interval of the SRR is calculated by bootstrapping to take into account uncertainty of the estimate. An SRR greater than 1 indicates worse quality of care compared to the national average. An SRR less than 1 indicates better quality of care. The risk-standardized readmission rate (RSRR) is be calculated by multiplying SRR with the overall national readmission rate for better interpretation. 141015| 112831| 147129| 138817

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

Figure 1 in section 2.4 of the April 2019 technical report depicts the SNF readmission measure 30-day risk window starting from the prior proximal hospitalization discharge date. If the readmission occurred during the SNF stay within the 30-day risk window or after the SNF stay but still within the 30-day risk window, it is counted in the numerator.

Step one: Identify patients meeting the denominator criteria.

Step two: Identify patients meeting the numerator criteria taking into account the planned readmission algorithm.

Step three: Identify presence or absence of risk adjustment variables for each patient.

Step four: Calculate the predicted and expected number of readmissions for each SNF using the hierarchical logistic regression model, and the SNF standardized risk ratio. These calculations are specified in more detail with equations in the Sections 2.8 and 2.9 of the April 2019 technical report.

Step five: Calculate the risk-standardized SNF 30-day readmission rate

To aid interpretation, the SNF standardized risk ratio, or SRR, which is calculated in Step four, is then multiplied by the overall national raw readmission rate for all SNF stays to produce the SNF risk-standardized readmission rate (RSRR). See Section 2.9 of the April 2019 technical report for details.

NOTE: Because the statistic described in step five is a complex function of parameter estimates, re-sampling and simulation techniques (e.g., bootstrapping) are necessary to derive a confidence interval estimate for the final risk-standardized rate, to characterize the uncertainty of the estimate. 122630| 137873| 147152| 145665| 137929| 121025| 150289| 148770| 151550| 152377| 152015| 146313

*Submission items*

**2860: Thirty-day all-cause unplanned readmission following psychiatric hospitalization in an inpatient psychiatric facility (IPF)**

5.1 Identified measures: 1768 : Plan All-Cause Readmissions (PCR)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

2502 : All-Cause Unplanned Readmission Measure for 30 Days Post Discharge from Inpatient Rehabilitation Facilities (IRFs)

2504 : 30-day Rehospitalizations per 1000 Medicare fee-for-service (FFS) Beneficiaries

2510 : Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: The IPF Readmission measure uses the planned readmission algorithm (PRA) from the NQF-endorsed HWR measure (1789) to identify and exclude planned follow-up visits from the measure. We did not identify harmonization opportunities with the other measures, which focus on other facility types. Because the IPF Readmission measure is calculated by CMS using Medicare claims data, there is no data collection burden.

5b.1 If competing, why superior or rationale for additive value: The related measures that we identified are not competing measures because the IPF Readmission measure is specific to IPFs.

**2510: Skilled Nursing Facility 30-Day All-Cause Readmission Measure (SNFRM)**

5.1 Identified measures: 0001 : Asthma assessment

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI)

1550 : Hospital-level risk-standardized complication rate (RSCR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1768 : Plan All-Cause Readmissions (PCR)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: The SNFRM is harmonized to the greatest extent possible with CMS' 30-day All-Cause Hospital-Wide Unplanned Readmission Measure (HWR), developed by Yale University. The SNFRM is harmonized to some extent with the several other measures (listed below) developed using the same modeling techniques and applied to disease specific patient populations. However, the HWR measure is the primary focus for harmonization, as it has the same general population approach (as opposed to a disease specific approach) as the SNFRM. As the HWR population is different from the SNFRM population, this necessitates different approaches to stratification, risk adjustment, and the exclusion of planned readmissions; however, the overall analytic approach is harmonized as much as possible. The risk adjustment method is similar in that hierarchical logistic regression is applied to account for SNFs as clusters, but the exact covariates used to adjust the model are different to account for the differences in patient population. The HWR measure has created different stratifications (i.e., cohorts), based on the principal diagnosis, which correspond to hospital care teams. The SNFRM tested the use of SNF cohorts and found that they did not improve the risk adjustment model, so SNF cohorts were not applied in the final model. Patient frailty over the previous 12 months was taken into account by including a count of the number of HCCs for each patient as well as a quadratic term to account for nonlinearity of the effect of additional comorbidities (i.e., that a patient's readmission risk increases exponentially as the number of HCCs increases.) Also, the list of planned readmissions excluded from the HWR measure was expanded for the SNFRM measure, to include procedures commonly seen in the SNF population that may not be seen in the general Medicare population (See Appendix A). The other measure specifications, with regard to other exclusions, numerator/denominator specifications, time windows, and others, are harmonized. Additionally, the American Health Care Association (AHCA) is developing a Re-Hospitalization Metric, AHCA's PointRight's OnPoint30 Re-Hospitalization Metric, which was examined for potential alignment and harmonization. The SNFRM and PointRight's OnPoint30 Re-Hospitalization Metric each provide different insights into the issue of hospital readmissions from Skilled Nursing Facilities (SNFs). Although both are all-cause hospital readmission measures, these two measures provide SNFs with two different perspectives on their hospital readmission rates. The SNFRM is designed more for quality reporting purposes by focusing on the readmissions most likely to be attributable to the facility, by reporting the rate of unplanned readmissions on a more selected set of patients. The SNFRM excludes certain types of hospitalizations, including planned readmissions, observation stays, and readmissions for medical cancer treatment, whereas PointRight's measure does not contain any such exclusions. The broader population captured by the PointRight metric, provides a more comprehensive general rate useful for quality improvement efforts. SNFs may even find it useful to compare the readmission rates, to determine what factors are driving their individual results. Additionally, the two measures rely on different data sources - the SNFRM uses Medicare fee-for-service claims (FFS), whereas PointRight uses the MDS. There are distinct advantages and disadvantages to each. The SNFRM was designed based on FFS claims, in order to be harmonized with CMS' current Hospital-Wide Readmission measure as well as other readmission measures being developed for other settings (i.e., inpatient rehabilitation facilities (IRFs), long-term care hospitals (LTCHs), home health agencies (HHAs), and end-stage renal (ESRD) facilities),

and to promote shared accountability for improving care transitions across all settings. One disadvantage to claims data however, is that there is a six month lag in the availability of claims, meaning that it is more difficult for SNFs to use claims to monitor the results of quality improvement efforts, whereas MDS data is available sooner. Therefore, the PointRight measure can provide facilities with information about their readmission rates on a faster and more frequent time scale. Facilities may find it useful to supplement their annual readmission rates as determine from the claims data with more real-time information from the MDS in order to evaluate rapid-cycle quality improvement activities, allowing for both measures to add value to the process.

5b.1 If competing, why superior or rationale for additive value: There are no measures with the same SNF target population and same measure focus.

## Comparison of NQF #2880 and NQF #0229

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

### *Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Centers for Medicare & Medicaid Services

### *Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

The measure estimates a hospital-level 30-day, all-cause, risk-standardized mortality rate for patients discharged from the hospital with a principal diagnosis of HF. Mortality is defined as death for any cause within 30 days after the date of admission for the index admission. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission.

Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): The American Community Survey data is collected annually and an aggregated 5-years data were used to calculate the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) composite index score.

References:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_HFmortality_Fall2020_final_7.22.20.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Facility

*Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Inpatient/Hospital

*Numerator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

The outcome for this measure is 30-day all-cause mortality. We define mortality as death from any cause within 30 days from the date of admission for patients 65 and older hospitalized with a principal diagnosis of HF.

*Numerator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the

index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure’s patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled “Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day

Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

The measure counts all deaths (including in-hospital deaths) for any cause within 30 days of the date of the index HF admission.

Identifying deaths in the FFS measure

As currently reported, we identify deaths for FFS Medicare patients 65 years and older in the Medicare Enrollment Database (EDB) and for VA patients in the VA data.

*Denominator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

This claims-based measure is used for a cohort of patients aged 65 years or older.

The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of HF and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal discharge diagnosis of heart failure

2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of the index admission and Part A during the index admission, or those who are VA beneficiaries

3. Aged 65 or over

4. Not transferred from another acute care facility

We have explicitly tested the measure for those aged 65+ years and those aged 65+ years (see Testing Attachment for details).

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

The mortality measures exclude index admissions for patients:

1. Discharged alive on the day of admission or the following day who were not transferred to another acute care facility;

2. With inconsistent or unknown vital status or other unreliable demographic (age and gender) data;

3. Enrolled in the Medicare hospice program or used VA hospice services any time in the 12 months prior to the index admission, including the first day of the index admission;

4. Discharged against medical advice (AMA); or

5. Patients undergoing left ventricular assist device (LVAD) implantation or heart transplantation during an index admission or who have a history of LVAD or heart transplant in the preceding year.

For patients with more than one admission for a given condition in a given year, only one index admission for that condition is randomly selected for inclusion in the cohort for each year.

*Exclusion Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

### 0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

1. The discharge disposition indicator is used to identify patients alive at discharge. Transfers are identified in the claims when a patient with a qualifying admission is discharged from an acute care hospital and admitted to another acute care hospital on the same day or next day. Patient length of stay and condition is identified from the admission claim.

Rationale: This exclusion prevents inclusion of patients who likely did not have clinically significant HF.

2. Inconsistent vital status or unreliable data are identified if any of the following conditions are met 1) the patient's age is greater than 115 years: 2) if the discharge date for a hospitalization is before the admission date; 3) if the patient has a sex other than 'male' or 'female'.

Rationale: Reliable and consistent data are necessary for valid calculation of the measure.

3. Hospice enrollment in the 12 months prior to or on the index admission is identified using hospice data and the Inpatient standard analytic file (SAF).

Rationale: These patients are likely continuing to seek comfort measures only; thus, mortality is not necessarily an adverse outcome or signal of poor quality care.

4. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

5. Patients with LVAD implantation or heart transplantation during an index admission or in the previous 12 months are identified by the corresponding codes for these procedures included in claims data.

Rationale: Patients undergoing implantation of an LVAD designed to offer intermediate to long-term support (weeks to years) as a bridge to heart transplant or destination therapy represent a clinically distinct, highly-selected group of patients cared for at highly specialized medical centers.

*Risk Adjustment*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Statistical risk model

118210| 112469| 146637| 141015| 150289

118210| 112469| 146637| 141015| 150289

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

N/A

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Rate/proportion better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI,

HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

The measure estimates hospital-level 30-day all-cause RSMRs following hospitalization for HF using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals [Normand and Shahian, 2007]. At the patient level, it models the log-odds of mortality within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a mortality at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSMR is calculated as the ratio of the number of “predicted” to the number of “expected” deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital’s performance with its observed case mix, and the denominator is the number of deaths expected based on the nation’s performance with that hospital’s case mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital’s performance given its case mix to an average hospital’s performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, and a higher ratio indicates higher-than-expected mortality rates or worse quality.

The “predicted” number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of mortality. The estimated hospital-specific intercept is added coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of deaths (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression

models are described fully in the original methodology report posted on QualityNet [https://qualitynet.org/inpatient/measures/mortality/methodology].

References:

1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 118210| 112469| 146637| 141015| 150289

*Submission items*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0358 : Heart Failure Mortality Rate (IQI 16)

0468 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia hospitalization

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization

3502 : Hybrid Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure

3504 : Claims-Only Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Our measure cohort was heavily vetted by clinical experts, a technical expert panel, and a public comment period. Additionally, the measure, with the specified cohort, has been publicly reported since 2008. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2880 and NQF #0230

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

### *Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Centers for Medicare & Medicaid Services

### *Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

The measure estimates a hospital-level 30-day risk-standardized mortality rate (RSMR) for patients discharged from the hospital with a principal diagnosis of AMI. Mortality is defined as death for any cause within 30 days after the date of admission for the index admission. CMS annually reports the measure for patients who are 65 years or older and are either Medicare fee-for-service (FFS) beneficiaries and hospitalized in non-federal hospitals or are hospitalized in Veterans Health Administration (VA) facilities.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to

obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): The American Community Survey data is collected annually and an aggregated 5-years data were used to calculate the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) composite index score.

References:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_AMImortality_Fall2020_final_7.22.20.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Facility

*Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Inpatient/Hospital

*Numerator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

The outcome for this measure is 30-day all-cause mortality. We define mortality as death from any cause within 30 days from the date of admission for patients hospitalized with a principal diagnosis of AMI.

*Numerator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

The measure counts all deaths (including in-hospital deaths) for any cause to any acute care hospital within 30 days of the date of the index AMI hospitalization.

Identifying deaths in the FFS measure

As currently reported, we identify deaths for FFS Medicare patients 65 years and older in the Medicare Enrollment Database (EDB) and for VA patients in the VA data.

*Denominator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

This claims-based measure is used for patients aged 65 years or older.

The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of AMI and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Having a principal discharge diagnosis of AMI;

2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of the index admission and Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over; and

4. Not transferred from another acute care facility.

We have explicitly tested the measure for those aged 65+ years (see Testing Attachment for details).

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

The mortality measures exclude index admissions for patients:

1. Discharged alive on the day of admission or the following day who were not transferred to another acute care facility;

2. With inconsistent or unknown vital status or other unreliable demographic (age and gender) data;

3. Enrolled in the Medicare hospice program or used VA hospice services any time in the 12 months prior to the index admission, including the first day of the index admission; or

4. Discharged against medical advice (AMA).

For patients with more than one admission for a given condition in a given year, only one index admission for that condition is randomly selected for inclusion in the cohort.

*Exclusion Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

1. The discharge disposition indicator is used to identify patients alive at discharge. Transfers are identified in the claims when a patient with a qualifying admission is discharged from an acute care hospital and admitted to another acute care hospital on the same day or next day. Patient length of stay and condition is identified from the admission claim.

Rationale: This exclusion prevents inclusion of patients who likely did not have clinically significant AMI.

2. Inconsistent vital status or unreliable data are identified if any of the following conditions are met 1) the patient's age is greater than 115 years; 2) if the discharge date for a hospitalization is before the admission date; and 3) if the patient has a sex other than 'male' or 'female'.

Rationale: Reliable and consistent data are necessary for valid calculation of the measure.

3. Hospice enrollment in the 12 months prior to or on the index admission is identified using hospice data. This exclusion applies when the measure is used in Medicare FFS patients only.

Rationale: These patients are likely continuing to seek comfort measures only; thus, mortality is not necessarily an adverse outcome or signal of poor quality care.

4. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

*Risk Adjustment*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Statistical risk model

118210| 112469| 146637| 150289

118210| 112469| 146637| 150289

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

N/A

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Rate/proportion better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is

appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

The measure estimates hospital-level 30-day all-cause RSMRs following hospitalization for AMI using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals [Normand and Shahian, 2007]. At the patient level, it models the log-odds of mortality within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a mortality at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSMR is calculated as the ratio of the number of “predicted” to the number of “expected” deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital’s performance with its observed case mix, and the denominator is the number of deaths expected based on the nation’s performance with that hospital’s case mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital’s performance given its case mix to an average hospital’s performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, and a higher ratio indicates higher-than-expected mortality rates or worse quality.

The “predicted” number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of mortality. The estimated hospital-specific intercept is added coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of deaths (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet [https://qualitynet.org/inpatient/measures/mortality/methodology].

References:

1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.

2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for AMI and HF 30-Day Mortality Methodology. 2005. 118210| 112469| 146637| 150289

*Submission items*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

5.1 Identified measures: 0730 : Acute Myocardial Infarction (AMI) Mortality Rate

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0468 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization

2431 : Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)

3502 : Hybrid Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure

3504 : Claims-Only Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Our measure cohort was heavily vetted by clinical experts, a technical expert panel, and a public comment period. Additionally, the measure, with the specified cohort, has been publicly reported since 2008. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2880 and NQF #0330

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)
0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

*Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Centers for Medicare & Medicaid Services

*Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

The measure estimates a hospital-level risk-standardized readmission rate (RSRR) for patients discharged from the hospital with a principal diagnosis of heart failure (HF). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. The target population is patients age 65 and over. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, and inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs.

References

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_HFreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Facility

*Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Inpatient/Hospital

*Numerator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

The outcome for this measure is 30-day readmissions. We define readmissions as any inpatient acute care admission, with the exception of certain planned readmissions, within 30 days from the date of discharge from an index admission with a principal discharge diagnosis of HF in patients 65and older. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission, because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

Additional details are provided in S.5 Numerator Details.

*Numerator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates "exposure time" (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### 0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index HF admission, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims and VA administrative data. The algorithm identifies

admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (obstetric delivery, transplant surgery, maintenance chemotherapy/radiotherapy/ immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the HF readmission measure, CMS used the Planned Readmission Algorithm without modifications.

The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

### *Denominator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

The cohort includes admissions for patients aged 65years and older discharged from the hospital with a principal discharge diagnosis of HF, and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details

### *Denominator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

To be included in the measure cohort used in public reporting, patients must meet the following additional inclusion criteria:

1. Principal discharge diagnosis of HF;

2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and,

5. Not transferred to another acute care facility.

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

The 30-day HF readmission measure excludes index admissions for patients:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);

2. Discharged against medical advice (AMA);

3. Admitted within 30 days of a prior index admission for HF; and

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

*Exclusion Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

The HF readmission measure excludes index admissions for patients:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database.

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a qualifying HF index admission are identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, which are identified by the corresponding codes included in claims data (codes can be found in attached Data Dictionary).

Rationale: Patients with these procedures are a clinically distinct group with a different risk of the readmission outcome.

*Risk Adjustment*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Statistical risk model

117446| 141973| 137977| 112469| 146637| 150289

117446| 141973| 137977| 112469| 146637| 150289

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

N/A

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Rate/proportion better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

The measure estimates hospital-level 30-day all-cause RSRRs following hospitalization for HF using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient- and hospital-levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient-level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission, or better quality, and a higher ratio indicates higher-than-expected readmission, or worse quality.

The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are log transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital specific intercept. The results are log transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005).

References:

1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.

2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for HF and HF 30-Day Readmission Methodology. 2005. 117446| 141973| 137977| 112469| 146637| 150289

## *Submission items*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

### 0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

5.1 Identified measures: 0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2886 : Risk-Standardized Acute Admission Rates for Patients with Heart Failure

2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2880 and NQF #0505

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)
0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

### *Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Centers for Medicare & Medicaid Services

### *Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with a principal diagnosis of acute myocardial infarction (AMI). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains administrative data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each

index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs.

References

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_AMIreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Facility

*Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Inpatient/Hospital

*Numerator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The outcome for this measure is 30-day all-cause readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index for patients 65 and older discharged from the hospital with a principal discharge diagnosis of AMI. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care

provided during the intervening planned readmission rather than during the index admission.

Additional details are provided in S.5 Numerator Details.

*Numerator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the

algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index AMI admission, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare and VA administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The planned readmission algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/ immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the AMI measure without modifications.

The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

*Denominator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months

Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal diagnosis of AMI; and with a complete claims history for the 12 months prior to admission.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal discharge diagnosis of AMI;

2. Enrolled in Medicare fee-for-service (FFS) Part A and B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and,

5. Not transferred to another acute care facility.

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The 30-day AMI readmission measure excludes index admissions for patients:

1) Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);

2) Discharged against medical advice (AMA);

3) Same-day discharges; or

4) Admitted within 30 days of a prior index admission for AMI.

*Exclusion Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The AMI readmission measure excludes index admissions for patients:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database.

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Same-day discharges. This information is identified in claims data.

Rationale: Patients admitted and then discharged on the same day are not included as an index admission because it is unlikely that these patients had clinically significant AMIs.

4. AMI admissions within 30 days of discharge from a qualifying AMI index admission are identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional AMI admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.

*Risk Adjustment*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Statistical risk model

118210| 112469| 146637

118210| 112469| 146637

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

N/A

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Rate/proportion better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference (“excess”) between a hospital’s predicted days and expected days per 100 discharges. “Predicted days” is the average number of days a hospital’s patients spent in acute care after adjusting for the risk

factors (included in the attached data dictionary). “Expected days” is the average number of risk-adjusted days in acute care a hospital’s patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for AMI using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of “predicted” to the number of “expected” readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital’s performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation’s performance with that hospital’s case mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital’s performance given its case mix to an average hospital’s performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality.

The “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the

hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully and in the original methodology reports posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology)

References

Normand S-LT, Shahian D, M,. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Statistical Science. 2007;22(2):206-226 118210| 112469| 146637

*Submission items*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

5.1 Identified measures: 0730 : Acute Myocardial Infarction (AMI) Mortality Rate

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

2431 : Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)

2473 : Hybrid hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI)

2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2880 and NQF #0506

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

### *Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Centers for Medicare & Medicaid Services

### *Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions

provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with either a principal discharge diagnosis of pneumonia (including aspiration pneumonia) or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as present on admission (POA). Readmission is defined as an unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs).

References

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_PNreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Facility

*Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Inpatient/Hospital

## *Numerator Statement*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

### 0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for patients 65 and older discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

## *Numerator Details*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned

hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure’s patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled “Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0” posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### 0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index pneumonia admission, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims and VA administrative data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The planned readmission algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the pneumonia measure without modifications.

The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

### *Denominator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of pneumonia, including aspiration pneumonia or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary discharge diagnosis of severe sepsis; and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

### *Denominator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal discharge diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis;

2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and,

5. Not transferred from another acute care facility.

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

The 30-day pneumonia (PN) readmission measure excludes index admissions for patients:

1. Discharged against medical advice (AMA);

2. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries);

3. Admitted within 30 days of a prior index admission for pneumonia.

*Exclusion Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

The pneumonia readmission measure excludes index admissions for patients:

1. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

2. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database.

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

3. Pneumonia admissions within 30 days of discharge from a qualifying pneumonia index admission are identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.

*Risk Adjustment*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Statistical risk model

141973| 112469| 146637

141973| 112469| 146637

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

N/A

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Rate/proportion better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for pneumonia using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in

patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality.

The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology).

References:

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 141973| 112469| 146637

## *Submission items*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

5.1 Identified measures: 0231 : Pneumonia Mortality Rate (IQI #20)

0279 : Community Acquired Pneumonia Admission Rate (PQI 11)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

2579 : Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2880 and NQF #1551

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

*Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Centers for Medicare & Medicaid Services

*Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

The measure estimates a hospital-level risk-standardized readmission rate (RSRR) following elective primary THA and/or TKA in Medicare Fee-For-Service (FFS) beneficiaries who are 65 years and older. The outcome (readmission) is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission (the admission included in the measure cohort). A specified set of planned readmissions do not count in the readmission outcome.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality(AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs).

Reference:

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_THATKAreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Facility

### *Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Inpatient/Hospital

### *Numerator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

The outcome for this measure is 30-day readmissions. We define readmissions as inpatient admissions for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge of the index hospitalization. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission, because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

### *Numerator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care.

The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates "exposure time" (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### 1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index THA and/or TKA hospitalization, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, and rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the THA/TKA readmission measure with small modifications.

The Planned Readmission Algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

### *Denominator Statement*

#### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

#### 1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

The target population for the publicly reported measure includes admissions for Medicare FFS beneficiaries who are at least 65 years of age undergoing elective primary THA and/or TKA procedures.

Additional details are provided in S.9 Denominator Details.

### *Denominator Details*

#### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

To be included in the measure cohort used in public reporting, patients must meet the following additional inclusion criteria:

1. Enrolled in Medicare FFS Part A and Part B Medicare for the 12 months prior to the date of admission; and enrolled in Part A during the index admission;

2. Aged 65 or over;

3. Discharged alive from a non-federal acute care hospital; and

4. Have a qualifying elective primary THA/TKA procedure; elective primary THA/TKA procedures defined as those procedures without any of the following:

• Femur, hip, or pelvic fractures coded in principal or secondary discharge diagnosis fields of the index admission;

• Partial hip arthroplasty (PHA) procedures with a concurrent THA/TKA;

• Revision procedures with a concurrent THA/TKA;

• Resurfacing procedures with a concurrent THA/TKA;

• Mechanical complication coded in the principal discharge diagnosis field;

• Malignant neoplasm of the pelvis, sacrum, coccyx, lower limbs, or bone/bone marrow or a disseminated malignant neoplasm coded in the principal discharge diagnosis field;

• Removal of implanted devices/prostheses; or

• Transfer from another acute care facility for the THA/TKA

This measure can also be used for an all-payer population aged 18 years and older. We have explicitly tested the measure in both patients aged 18 years and older and those aged 65 years or older (see Testing Attachment for details, 2b4.11).

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

The THA/TKA readmission measure excludes admissions for patients:

1. Without at least 30 days post-discharge enrollment in FFS Medicare;

2. Who were discharged against medical advice (AMA);

3. Admitted for the index procedure and subsequently transferred to another acute care facility;

4. Who had more than two THA/TKA procedure codes during the index hospitalization; or

5. Who had THA/TKA admissions within 30 days of a prior THA/TKA index admission.

*Exclusion Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

This measure excludes index admissions for patients:

1. Without at least 30 days of post-discharge enrollment in FFS Medicare as determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Admitted for the index procedure and subsequently transferred to another acute care facility, which are defined as when a patient with an inpatient hospital admission (with at least one qualifying THA/TKA procedure) is discharged from an acute care hospital and admitted to another acute care hospital on the same or next day.

Rationale: Patients admitted for the index procedure and subsequently transferred to another acute care facility are excluded, as determining which hospital the readmission outcome should be attributed to is difficult.

4. Who had more than two THA/TKA procedure codes during the index hospitalization, which is identified by examining procedure codes in the claims data.

Rationale: Although clinically possible, it is highly unlikely that patients would receive more than two elective THA/TKA procedures in one hospitalization, which may reflect a coding error.

5. Who had THA/TKA admissions within 30 days prior to THA/TKA index admission.

Rationale: Additional THA/TKA admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.

*Risk Adjustment*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Statistical risk model

112469| 109921| 118210| 135810| 117446| 146637| 141015

112469| 109921| 118210| 135810| 117446| 146637| 141015

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

N/A

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Rate/proportion better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk

adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

The measure estimates hospital-level 30-day all-cause RSRRs following elective primary THA/TKA using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of “predicted” to the number of “expected” readmission at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital’s performance with its observed case mix, and the denominator is the number of readmissions expected based on the nation’s performance with that hospital’s case mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital’s performance given its case mix to an average hospital’s performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality.

The “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Grosso et al., 2012), which is also posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology).

References:

Grosso L, Curtis J, Geary L, et al. Hospital-level 30-Day All-Cause Risk-Standardized Readmission Rate Following Elective Primary Total Hip Arthroplasty (THA) And/Or Total Knee Arthroplasty (TKA) Measure Methodology Report. 2012.

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 112469| 109921| 118210| 135810| 117446| 146637| 141015

*Submission items*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

5.1 Identified measures: 0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

1550 : Hospital-level risk-standardized complication rate (RSCR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

3493 : Risk-standardized complication rate (RSCR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA) for Merit-based Incentive Payment System (MIPS) Eligible Clinicians and Eligible Clinician Groups

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome measures (for example, process measures) with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2880 and NQF #1789

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

### *Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Centers for Medicare & Medicaid Services

### *Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

This measure estimates a hospital-level, risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission within 30 days of discharge from an index admission with an eligible condition or procedure. The measure reports a single summary RSRR, derived from the volume-weighted results of five different models, one for each of the following specialty cohorts based on groups of discharge condition categories or procedure categories: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. The measure also indicates the hospital-level standardized readmission ratios (SRR) for each of these five specialty cohorts. The outcome is defined as unplanned readmission for any cause within 30 days of the discharge date from the index admission (the admission included in the measure cohort). A specified set of readmissions are planned and do not count in the readmission outcome. CMS annually reports the measure for Medicare fee-for-service (FFS) patients who are 65 years or older and are hospitalized in non-federal short-term acute care hospitals.

For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP) beginning in 2017, the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition or procedure within 30 days of hospital discharge. The ACR measure is calculated using the same five specialty cohorts and estimates an ACO-level standardized risk ratio for each. CMS annually reports the measure for patients who are 65 years or older, are enrolled in Medicare FFS, and are ACO assigned beneficiaries.

The updates in this form reflect changes both to the original HWR measure and the ACS measure version. For instances where the two versions differ, we provide additional clarifications below the original description.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Claims Data sources for the Medicare FFS measure:

HWR

1. Medicare Part A claims data for calendar years 2007 and 2008 were combined and then randomly split into two equal subsets (development sample and validation sample). Risk variable selection was done using the development sample, the risk models for each of the five specialty cohorts in the measure were applied to the validation sample and the models' performance was compared. In addition we re-tested the models in Medicare Part A claims data from calendar year 2009 to look for temporal stability in the models' performance. The number of measured entities and index admissions are listed below by specialty cohort.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission and following discharge from index admission

ACR

1. Medicare Part A claims data for calendar years 2013, 2014, and 2015.

2. Medicare Enrollment Database (EDB).

Reference:

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

Available in attached appendix at A.1 Attachment DelAP_4-107f_NQF1789HWR_DataDictionary_Final082819-637263622402629808.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Facility

*Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Inpatient/Hospital, Outpatient Services

*Numerator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in

acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

The outcome for both the original HWR and ACR measures is 30-day readmission. We define readmission as an inpatient admission for any cause, except for certain planned readmissions, within 30 days from the date of discharge from an eligible index admission. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

*Numerator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### 1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Outcome definition

The measure counts readmissions to any short-term acute care hospital for any cause within 30 days of the date of discharge from an eligible index admission, excluding planned readmissions as defined below.

Rationale

From a patient perspective, an unplanned readmission from any cause is an adverse event. Outcomes occurring within 30 days of discharge can be influenced by hospital care and the early transition to the non-acute care setting. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce readmissions. However, planned readmissions are generally not a signal of quality of care. Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge.

It is important to note that for the HWR measure, a readmission is included as an index admission if it meets all other eligibility criteria. This differs from the publicly reported condition-specific and procedure-specific readmission measures, which do not consider a readmission as a new index admission within the same measure.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (obstetric delivery, transplant surgery, maintenance chemotherapy/radiotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the HWR measure. In 2013, CMS applied the algorithm to its other readmission measures.

For more details on the Planned Readmission Algorithm, please see Appendix E of the report titled "2019 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Wide Readmission"

Wallace Lori, Grady J, Djordjevic Darinka, et al. 2019 All-Cause Hospital Wide Measure Updates and Specifications Report.

https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841

### *Denominator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

The measure includes admissions for Medicare beneficiaries who are 65 years and older and are discharged from all non-federal, acute care inpatient US hospitals (including territories) with a complete claims history for the 12 months prior to admission.

ACR-Specific: The measure at the ACO level includes all relevant admissions for ACO assigned beneficiaries who are 65 and older, and are discharged from all non-Federal short-stay acute care hospitals, including critical access hospitals.

Additional details are provided in S.7 Denominator Details.

### *Denominator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

To be included in the measure cohort, patients must meet the following inclusion criteria:

1. Enrolled in Medicare FFS Part A for the 12 months prior to the date of admission and during the index admission;

2. Aged 65 or older;

3. Discharged alive from a non-federal short-term acute care hospital; and

4. Not transferred to another acute care facility.

ACR- Specific: An additional criterion for the ACO version of this measure is that only hospitalizations for ACO-assigned beneficiaries that meet all of the other criteria listed above are included. The cohort definition is otherwise identical to that of the HWR described below.

The measure first assigns admissions with qualifying Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) procedure categories to the Surgery/Gynecology Cohort. This cohort includes admissions likely cared for by surgical or gynecological teams.

The measure then sorts admissions into one of the four remaining specialty cohorts based on the AHRQ CCS diagnosis category of the principal discharge diagnosis:

The Cardiorespiratory Cohort includes several condition categories with very high readmission rates such as pneumonia, chronic obstructive pulmonary disease, and heart failure. These admissions are combined into a single cohort because they are often clinically indistinguishable, and patients are often simultaneously treated for several of these diagnoses.

The Cardiovascular Cohort includes condition categories such as acute myocardial infarction that in large hospitals might be cared for by a separate cardiac or cardiovascular team.

The Neurology Cohort includes neurologic condition categories such as stroke that in large hospitals might be cared for by a separate neurology team.

The Medicine Cohort includes all non-surgical patients who were not assigned to any of the other cohorts.

The full list of the specific diagnosis and procedure AHRQ CCS categories used to define the specialty cohorts can be found in the attached data dictionary.

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Both the original HWR and ACR versions of the measure exclude index admissions for patients:

1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals;
2. Without at least 30 days post-discharge enrollment in Medicare FFS;
3. Discharged against medical advice;
4. Admitted for primary psychiatric diagnoses;
5. Admitted for rehabilitation; or
6. Admitted for medical treatment of cancer.

*Exclusion Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Both the original HWR and ACR versions of the measure exclude index admissions for patients:

1. Admitted to PPS-exempt cancer hospitals; identified by the Medicare provider ID

Rationale: These hospitals care for a unique population of patients that cannot reasonably be compared to patients admitted to other hospitals.

2. Without at least 30 days of post-discharge enrollment in Medicare FFS; determined using data captured in the Medicare Enrollment Database (EDB)

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

3. Discharged against medical advice; identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

4. Admitted for primary psychiatric diagnoses

Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to short-term acute care hospitals.

5. Admitted for rehabilitation

Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care.

6. Admitted for medical treatment of cancer

Rationale: These admissions have a different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions. Patients with cancer admitted for other diagnoses or for surgical treatment of their cancer remain in the measure.

*Risk Adjustment*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Statistical risk model

112469| 118210| 135810| 141973| 146637| 146313

112469| 118210| 135810| 141973| 146637| 146313

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

N/A

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Rate/proportion better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two

random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

The measure estimates hospital-level 30-day all-cause RSRRs using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand et al., 2007). At the patient level, it models the log-odds of hospital readmission within 30 days of discharge using age, selected clinical covariates, and a hospital-specific effect. At the hospital level, the approach models the hospital-specific effects as arising from a normal distribution. The hospital effect represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific effects are given a distribution to account for the clustering (non-independence) of patients within the same hospital (Normand et al., 2007). If there were no differences among hospitals, then after adjusting for patient risk, the hospital effects should be identical across all hospitals.

Admissions are assigned to one of five mutually exclusive specialty cohort groups consisting of related conditions or procedures. For each specialty cohort group, the SRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions at a given hospital. For each hospital, the numerator of the ratio is the number of readmissions within 30 days, predicted based on the hospital's performance with its observed case mix and service mix, and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix and service mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows a particular hospital's performance, given its case mix and service mix, to be compared to an average hospital's performance with the same case mix and service mix. Thus, a lower ratio

indicates lower-than-expected readmission rates or better quality, while a higher ratio indicates higher-than-expected readmission rates or worse quality.

For each specialty cohort, the “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific effect on the risk of readmission. The estimated hospital-specific effect for each cohort is added to the sum of the estimated regression coefficients multiplied by patient characteristics. The results are log-transformed and summed over all patients attributed to a hospital to calculate a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common effect using all hospitals in our sample is added in place of the hospital-specific effect. The results are log-transformed and summed over all patients attributed to a hospital to calculate an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the data in that period.

The specialty cohort SRRs are then pooled for each hospital using a volume-weighted geometric mean to create a hospital-wide combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012).

ACR-specific: The ACR quality measure was adapted from the HWR quality measure. The unit of analysis was changed from the hospital to the ACO. This was possible because both the HWR and ACR measures assess readmission performance for a population that clusters patients together (either in hospitals or in ACOs). The goal is to isolate the effects of beneficiary characteristics on the probability that a patient will be readmitted from the effects of being in a specific hospital or ACO. In addition, planned readmissions are excluded for the ACR quality measure in the same way that they are excluded for the HWR measure. The ACR measure is calculated identically to what is described above for the HWR measure.

References:

Horwitz L, Partovian C, Lin Z, et al. Hospital-Wide All-Cause Unplanned Readmission Measure: Final Technical Report. 2012;

https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 112469| 118210| 135810| 141973| 146637| 146313

## *Submission items*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

### 1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI)

0329 : Risk-Adjusted 30-Day All-Cause Readmission Rate

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1768 : Plan All-Cause Readmissions (PCR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: This measure and the National Committee for Quality Assurance (NCQA) Plan All-Cause Readmissions (PCR) Measure #1768 are related measures, but are not competing because they don’t have the same measure focus and same target population. In addition, both have been previously harmonized to the extent possible under the guidance of the National Quality Forum Steering Committee in 2011. Each of these measures has different specifications. NCQA’s Measure #1768 counts the number of inpatient stays for patients aged 18 and older during a measurement year that were followed by an acute readmission for any diagnosis to any hospital within 30 days. It contrasts this count with a calculation of the predicted probability of an acute readmission. NCQA’s measure is intended for quality monitoring and accountability at the health plan level. This measure estimates the risk-standardized rate of unplanned, all-cause readmissions to a hospital or ACO for any eligible condition

within 30 days of hospital discharge for patients aged 18 and older. The measure will result in a single summary risk-adjusted readmission rate for conditions or procedures that fall under five specialties: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. This measure is specified for evaluating hospital or ACO performance. However, despite these differences in cohort specifications, both measures under NQF guidance have been harmonized to the extent possible through modifications such as exclusion of planned readmissions. We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2880 and NQF #1891

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

### *Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Centers for Medicare & Medicaid Services

### *Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and over discharged from the hospital with either a principal discharge diagnosis of COPD or a principal discharge diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. The outcome (readmission) is defined as unplanned readmission for any cause within 30 days of the

discharge date for the index admission (the admission included in the measure cohort). A specified set of planned readmissions do not count in the readmission outcome. CMS annually reports the measure for patients who are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual-eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs.

References

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_COPDreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Facility

*Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Inpatient/Hospital

*Numerator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

The outcome for this measure is 30-day readmission. We define readmission as an inpatient admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for patients discharged from the hospital with a principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first one is counted as a

readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

*Numerator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index COPD admission, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare and VA administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The planned readmission algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/ immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the COPD measure without modifications.

The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

*Denominator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

The cohort includes admissions for patients aged 65 or older, who have been discharged from the hospital with either a principal discharge diagnosis of COPD OR a principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD and with a complete claims history for the 12 months prior to admission.

Additional details are provided in S.9 Denominator Details.

*Denominator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of COPD with exacerbation;

2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B Medicare for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and,

5. Not transferred to another acute care facility.

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

The 30-day COPD readmission measures exclude index admissions for patients:

1. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries);

2. Discharged against medical advice (AMA); and,

3. Admitted within 30 days of a prior index admission for COPD.

*Exclusion Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database.

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. COPD admissions within 30 days of discharge from a qualifying COPD index admission are identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional COPD admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.

*Risk Adjustment*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Statistical risk model

112469| 118210| 135810| 141973| 146637| 141015

112469| 118210| 135810| 141973| 146637| 141015

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

N/A

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Rate/proportion better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference (“excess”) between a hospital’s predicted days and expected days per 100 discharges. “Predicted days” is the average number of days a hospital’s patients spent in acute care after adjusting for the risk

factors (included in the attached data dictionary). “Expected days” is the average number of risk-adjusted days in acute care a hospital’s patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for COPD using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge from the index admission using age, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of “predicted” to the number of “expected” readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital’s performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation’s performance with that hospital’s case mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital’s performance given its case mix to an average hospital’s performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality.

The “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the

hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology).

References:

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 112469| 118210| 135810| 141973| 146637| 141015

*Submission items*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

5.1 Identified measures: 0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0275 : Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization

2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data

2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2880 and NQF #2515

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

### *Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Centers for Medicare & Medicaid Services

### *Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days.

The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as unplanned readmission for any cause within 30-days from the date of discharge for a qualifying index CABG procedure, in patients 65 years and older.

An index admission is the hospitalization for a qualifying isolated CABG procedure considered for the readmission outcome.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs.

References:

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_CABGreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Facility

*Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Inpatient/Hospital

*Numerator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for an isolated CABG surgery in patients 65 and older. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first one is counted as a readmission. The measure looks for a dichotomous yes or no

outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

*Numerator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### 2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge after undergoing isolated CABG surgery, excluding planned readmissions as defined below. Although clinical experts agree that planned readmissions are rare after CABG, they likely do occur. Therefore, to identify these planned readmissions we have adapted and applied an algorithm originally created to identify planned readmissions for a hospital-wide (i.e., not condition-specific) readmission measure.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

In brief, the algorithm identifies a short list of always planned readmissions (those where the principal discharge diagnosis is major organ transplant, obstetrical delivery, or maintenance chemotherapy) as well as those readmissions with a potentially planned procedure (e.g., total hip replacement) AND a non-acute principle discharge diagnosis code. For example, a readmission for colon resection is considered planned if the principal diagnosis is colon cancer but unplanned if the principal diagnosis is abdominal pain, as this might represent a complication of the CABG procedure or hospitalization. Readmissions that included potentially planned procedures with an acute principal diagnosis or procedures that might represent specific complications of CABG, such as PTCA or repeat CABG are not excluded from the measure outcome as they are considered unplanned in this measure.

The planned readmission algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/ immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the CABG measure with modifications.

The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

It should be noted that this approach differs from that adopted by STS for their registry-based measure, in which all 30-day readmissions were considered to be unplanned.

Outcome Attribution

Attribution of the outcome in situations where a patient has multiple contiguous admissions, at least one of which involves an index CABG procedure (i.e., the patient is either transferred into the hospital that performs the index CABG or is transferred out to another hospital following the index CABG) is as follows:

- If a patient undergoes a CABG procedure in the first hospital and is then transferred to a second hospital where there is no CABG procedure, the readmission outcome is attributed to the first hospital performing the index CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain.

Rationale: A transfer following CABG is most likely due to a complication of the index procedure and that care provided by the hospital performing the CABG procedure likely dominates readmission risk even among transferred patients.

- If a patient is admitted to a first hospital but does not receive a CABG procedure there and is then transferred to a second hospital where a CABG is performed, the readmission outcome is attributed to the second hospital performing the index CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain.

Rationale: Care provided by the hospital performing the CABG procedure likely dominates readmission risk.

-If a patient undergoes a CABG procedure in the first hospital and is transferred to a second hospital where another CABG procedure is performed, the readmission outcome is attributed to the first hospital performing the index (first) CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain.

Rationale: A transfer following CABG is most likely due to a complication of the index procedure, and care provided by the hospital performing the index CABG procedure likely dominates readmission risk even among transferred patients.

### *Denominator Statement*

#### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

The cohort includes admissions for patients who are age 65 and older with a qualifying isolated CABG procedure and complete claims history for the 12 months prior to the index admission.

*Denominator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

In order to create a clinically coherent population for risk adjustment, and in accordance with existing NQF-approved CABG measures and clinical expert opinion, the measure is intended to capture isolated CABG patients (i.e., patients undergoing CABG procedures without concomitant valve or other major cardiac or vascular procedures).

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

For all cohorts, hospitalizations are excluded if they meet any of the following criteria, for admissions:

1. Without at least 30 days post-discharge enrollment in FFS Medicare

2. Discharged against medical advice (AMA)

3. Admissions for subsequent qualifying CABG procedures during the measurement period

## *Exclusion Details*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

### 2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

The CABG readmission measure excludes hospitalizations if they meet any of the following criteria:

1. Without at least 30 days post-discharge enrollment in FFS Medicare

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

2. Admissions for subsequent qualifying CABG procedures during the measurement period.

Rationale: CABG procedures are expected to last for several years without the need for revision or repeat revascularization. A repeat CABG procedure during the measurement period likely represents a complication of the original CABG procedure and is a clinically more complex and higher risk surgery. Therefore, we select the first CABG surgery admission for inclusion in the measure and exclude subsequent CABG surgery admissions from the cohort.

## *Risk Adjustment*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Statistical risk model

118210| 112469| 135466| 146637| 141015

118210| 112469| 135466| 146637| 141015

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

N/A

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Rate/proportion better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

The measure estimates hospital-level 30-day, all-cause RSRRs following hospitalization for isolated CABG surgery using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of “predicted” to the number of “expected” readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital’s performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation’s performance with that hospital’s case mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital’s performance given its case mix to an average hospital’s performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality.

The “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet: (https://qualitynet.org/inpatient/measures/readmission/methodology).

References:

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 118210| 112469| 135466| 146637| 141015

*Submission items*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0119 : Risk-Adjusted Operative Mortality for CABG

0115 : Risk-Adjusted Surgical Re-exploration

0114 : Risk-Adjusted Postoperative Renal Failure

0131 : Risk-Adjusted Stroke/Cerebrovascular Accident

0130 : Risk-Adjusted Deep Sternal Wound Infection

0129 : Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

2558 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery

3494 : Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: The CABG readmission measure, which was developed in close collaboration with STS, has a target population (i.e., isolated CABG patients) that is harmonized with the above measures to the extent possible given the differences between clinical and administrative data. The exclusions are nearly identical to the STS measures' cohort exclusions with the exception of epicardial MAZE procedures; STS excludes these procedures from the registry-based CABG readmission measure cohort because the version of registry data used for measure development did not allow them to differentiate them from open maze procedures. The age range for the proposed CABG readmission and existing NQF-endorsed STS measure cohorts differs; STS measures are specified for age 18 and over, and the CABG readmission measure is currently specified for age 65 and over. The proposed CABG readmission measure is harmonized with the above measures to the extent possible given the different data sources used for development and reporting.

5b.1 If competing, why superior or rationale for additive value: This measure was developed concurrently with a clinical registry data-based readmission measure (Risk-adjusted readmission measure for coronary artery bypass graft (CABG)). The measure steward for the registry-based readmission measure for CABG is also CM

## Comparison of NQF #2880 and NQF #2881

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

### *Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Centers for Medicare & Medicaid Services (CMS)

### *Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for

patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Measure score: The measure is a risk standardized score at the hospital level for days spent in acute care for patients with an AMI.

Measure focus and time frame: This measure estimates days spent in acute care (i.e. time spent in ED, unplanned readmission and observation stays) within 30 days of discharge from an inpatient hospitalization for acute myocardial infarction (AMI)

This measure is intended to capture the quality of care transitions provided to discharged patients hospitalized with AMI by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: 1) emergency department (ED) visits, 2) observation stays, and 3) unplanned readmissions at any time during the 30 days post-discharge. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm (PRA). Days spent in each care setting are aggregated for the 30 days post-discharge with a minimum of half-day increments (i.e. an ED visit lasting 2 hours would be counted as 0.5 days).

Target population: CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs).

References

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_AMI-EDAC_Spring2021.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Facility

*Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Inpatient/Hospital

## *Numerator Statement*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

### 2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index AMI hospitalization. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index AMI hospitalization.

Additional details are provided in S.5 Numerator Details.

## *Numerator Details*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### 2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index AMI admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with AMI who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for AMI during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care.

The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates "exposure time" (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims and VA administrative data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The planned readmission algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day AMI EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for AMI, version 4.0" posted in data field S.1 or at https://www.qualitynet.org/inpatient/measures/edac/methodology

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### *Denominator Statement*

#### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months

Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-federal and VA acute care hospitals for AMI. The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of AMI and with continuous 12 months Medicare enrollment prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided n S.7 Denominator Details.

*Denominator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Having a principal discharge diagnosis of AMI

2. Enrolled in Medicare FFS Part A and Part B for the first 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred to another acute care facility.

ICD-9 and ICD-10 cohort codes are included in the attached Data Dictionary.

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. Same-day discharges

4. AMI admissions within 30 days of discharge from a prior AMI index admission

*Exclusion Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Same-day discharges, identified when the admission and discharge dates on the claim are equal.

Rationale: Patients admitted and then discharged on the same day are not included as an index admission because it is unlikely that these admissions are for clinically significant AMIs.

4. AMI admissions within 30 days of discharge from a prior AMI index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional AMI admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

*Risk Adjustment*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

N/A

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for AMI using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival

times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Acute Myocardial Infarction (AMI) (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

*Submission items*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day AMI readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2880 and NQF #2882

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

*Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

*Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on

admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

*Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

*Numerator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an

unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

*Numerator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims

data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day HF EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned

hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates "exposure time" (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### *Denominator Statement*

#### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS
2. Discharged against medical advice
3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

*Exclusion Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

*Risk Adjustment*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference (“excess”) between a hospital’s predicted days and expected days per 100 discharges. “Predicted days” is the average number of days a hospital’s patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). “Expected days” is the average number of risk-adjusted days in acute care a hospital’s patients would have been expected to

spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

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### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

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*Submission items*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2882 and NQF #0229

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

### *Steward*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Centers for Medicare & Medicaid Services

### *Description*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED)

visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

The measure estimates a hospital-level 30-day, all-cause, risk-standardized mortality rate for patients discharged from the hospital with a principal diagnosis of HF. Mortality is defined as death for any cause within 30 days after the date of admission for the index admission. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

*Type*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Outcome

*Data Source*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency

services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): The American Community Survey data is collected annually and an aggregated 5-years data were used to calculate the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) composite index score.

References:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_HFmortality_Fall2020_final_7.22.20.xlsx

*Level*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Facility

*Setting*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Inpatient/Hospital

*Numerator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or

admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

The outcome for this measure is 30-day all-cause mortality. We define mortality as death from any cause within 30 days from the date of admission for patients 65 and older hospitalized with a principal diagnosis of HF.

*Numerator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

The measure counts all deaths (including in-hospital deaths) for any cause within 30 days of the date of the index HF admission.

Identifying deaths in the FFS measure

As currently reported, we identify deaths for FFS Medicare patients 65 years and older in the Medicare Enrollment Database (EDB) and for VA patients in the VA data.

*Denominator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

This claims-based measure is used for a cohort of patients aged 65 years or older.

The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of HF and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those

patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal discharge diagnosis of heart failure

2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of the index admission and Part A during the index admission, or those who are VA beneficiaries

3. Aged 65 or over

4. Not transferred from another acute care facility

We have explicitly tested the measure for those aged 65+ years and those aged 65+ years (see Testing Attachment for details).

*Exclusions*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS
2. Discharged against medical advice
3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

The mortality measures exclude index admissions for patients:

1. Discharged alive on the day of admission or the following day who were not transferred to another acute care facility;

2. With inconsistent or unknown vital status or other unreliable demographic (age and gender) data;

3. Enrolled in the Medicare hospice program or used VA hospice services any time in the 12 months prior to the index admission, including the first day of the index admission;

4. Discharged against medical advice (AMA); or

5. Patients undergoing left ventricular assist device (LVAD) implantation or heart transplantation during an index admission or who have a history of LVAD or heart transplant in the preceding year.

For patients with more than one admission for a given condition in a given year, only one index admission for that condition is randomly selected for inclusion in the cohort for each year.

*Exclusion Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

1. The discharge disposition indicator is used to identify patients alive at discharge. Transfers are identified in the claims when a patient with a qualifying admission is discharged from an acute care hospital and admitted to another acute care hospital on the same day or next day. Patient length of stay and condition is identified from the admission claim.

Rationale: This exclusion prevents inclusion of patients who likely did not have clinically significant HF.

2. Inconsistent vital status or unreliable data are identified if any of the following conditions are met 1) the patient's age is greater than 115 years: 2) if the discharge date for a hospitalization is before the admission date; 3) if the patient has a sex other than 'male' or 'female'.

Rationale: Reliable and consistent data are necessary for valid calculation of the measure.

3. Hospice enrollment in the 12 months prior to or on the index admission is identified using hospice data and the Inpatient standard analytic file (SAF).

Rationale: These patients are likely continuing to seek comfort measures only; thus, mortality is not necessarily an adverse outcome or signal of poor quality care.

4. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

5. Patients with LVAD implantation or heart transplantation during an index admission or in the previous 12 months are identified by the corresponding codes for these procedures included in claims data.

Rationale: Patients undergoing implantation of an LVAD designed to offer intermediate to long-term support (weeks to years) as a bridge to heart transplant or destination therapy represent a clinically distinct, highly-selected group of patients cared for at highly specialized medical centers.

*Risk Adjustment*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Statistical risk model

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**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Statistical risk model

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*Stratification*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

N/A

*Type Score*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

Rate/proportion better quality = lower score

*Algorithm*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part

– with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

The measure estimates hospital-level 30-day all-cause RSMRs following hospitalization for HF using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals [Normand and Shahian, 2007]. At the patient level, it models the log-odds of mortality within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a mortality at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSMR is calculated as the ratio of the number of "predicted" to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, and a higher ratio indicates higher-than-expected mortality rates or worse quality.

The “predicted” number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of mortality. The estimated hospital-specific intercept is added coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of deaths (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet [https://qualitynet.org/inpatient/measures/mortality/methodology].

References:

1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 118210| 112469| 146637| 141015| 150289

*Submission items*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure

imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**0229: Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0358 : Heart Failure Mortality Rate (IQI 16)

0468 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia hospitalization

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization

3502 : Hybrid Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure

3504 : Claims-Only Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Our measure cohort was heavily vetted by clinical experts, a technical expert panel, and a public comment period. Additionally, the measure, with the specified cohort, has been publicly reported since 2008. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2882 and NQF #0230

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

*Steward*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Centers for Medicare & Medicaid Services

*Description*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

The measure estimates a hospital-level 30-day risk-standardized mortality rate (RSMR) for patients discharged from the hospital with a principal diagnosis of AMI. Mortality is defined as death for any cause within 30 days after the date of admission for the index admission. CMS annually reports the measure for patients who are 65 years or older and are either Medicare fee-for-service (FFS) beneficiaries and hospitalized in non-federal hospitals or are hospitalized in Veterans Health Administration (VA) facilities.

*Type*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Outcome

*Data Source*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): The American Community Survey data is collected annually and an aggregated 5-years data were used to calculate the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) composite index score.

References:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_AMImortality_Fall2020_final_7.22.20.xlsx

*Level*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Facility

*Setting*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Inpatient/Hospital

*Numerator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

The outcome for this measure is 30-day all-cause mortality. We define mortality as death from any cause within 30 days from the date of admission for patients hospitalized with a principal diagnosis of AMI.

*Numerator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-

discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure’s patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled “Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0” posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

The measure counts all deaths (including in-hospital deaths) for any cause to any acute care hospital within 30 days of the date of the index AMI hospitalization.

Identifying deaths in the FFS measure

As currently reported, we identify deaths for FFS Medicare patients 65 years and older in the Medicare Enrollment Database (EDB) and for VA patients in the VA data.

*Denominator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis

(not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

This claims-based measure is used for patients aged 65 years or older.

The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of AMI and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Having a principal discharge diagnosis of AMI;

2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of the index admission and Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over; and

4. Not transferred from another acute care facility.

We have explicitly tested the measure for those aged 65+ years (see Testing Attachment for details).

*Exclusions*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS
2. Discharged against medical advice
3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

The mortality measures exclude index admissions for patients:

1. Discharged alive on the day of admission or the following day who were not transferred to another acute care facility;

2. With inconsistent or unknown vital status or other unreliable demographic (age and gender) data;

3. Enrolled in the Medicare hospice program or used VA hospice services any time in the 12 months prior to the index admission, including the first day of the index admission; or

4. Discharged against medical advice (AMA).

For patients with more than one admission for a given condition in a given year, only one index admission for that condition is randomly selected for inclusion in the cohort.

*Exclusion Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

1. The discharge disposition indicator is used to identify patients alive at discharge. Transfers are identified in the claims when a patient with a qualifying admission is discharged from an acute care hospital and admitted to another acute care hospital on the

same day or next day. Patient length of stay and condition is identified from the admission claim.

Rationale: This exclusion prevents inclusion of patients who likely did not have clinically significant AMI.

2. Inconsistent vital status or unreliable data are identified if any of the following conditions are met 1) the patient's age is greater than 115 years; 2) if the discharge date for a hospitalization is before the admission date; and 3) if the patient has a sex other than 'male' or 'female'.

Rationale: Reliable and consistent data are necessary for valid calculation of the measure.

3. Hospice enrollment in the 12 months prior to or on the index admission is identified using hospice data. This exclusion applies when the measure is used in Medicare FFS patients only.

Rationale: These patients are likely continuing to seek comfort measures only; thus, mortality is not necessarily an adverse outcome or signal of poor quality care.

4. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

*Risk Adjustment*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Statistical risk model

118210| 112469| 146637| 150289

118210| 112469| 146637| 150289

*Stratification*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

N/A

*Type Score*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

Rate/proportion better quality = lower score

*Algorithm*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

The measure estimates hospital-level 30-day all-cause RSMRs following hospitalization for AMI using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals [Normand and Shahian, 2007]. At the patient level, it models the log-odds of mortality within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a mortality at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSMR is calculated as the ratio of the number of "predicted" to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the

denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, and a higher ratio indicates higher-than-expected mortality rates or worse quality.

The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of mortality. The estimated hospital-specific intercept is added coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of deaths (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet [https://qualitynet.org/inpatient/measures/mortality/methodology].

References:

1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.

2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for AMI and HF 30-Day Mortality Methodology. 2005. 118210| 112469| 146637| 150289

*Submission items*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**0230: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization**

5.1 Identified measures: 0730 : Acute Myocardial Infarction (AMI) Mortality Rate

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0468 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization

2431 : Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)

3502 : Hybrid Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure

3504 : Claims-Only Hospital-Wide (All-Condition, All-Procedure) Risk-Standardized Mortality Measure

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Our measure cohort was heavily vetted by clinical experts, a technical expert panel, and a public comment period. Additionally, the measure, with the specified cohort, has been publicly reported since 2008. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2882 and NQF #0330

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

### *Steward*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Centers for Medicare & Medicaid Services

### *Description*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

The measure estimates a hospital-level risk-standardized readmission rate (RSRR) for patients discharged from the hospital with a principal diagnosis of heart failure (HF). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. The target population is patients age 65 and over. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

### *Type*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Outcome

*Data Source*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, and inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs.

References

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_HFreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Facility

*Setting*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Inpatient/Hospital

*Numerator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

The outcome for this measure is 30-day readmissions. We define readmissions as any inpatient acute care admission, with the exception of certain planned readmissions, within 30 days from the date of discharge from an index admission with a principal discharge diagnosis of HF in patients 65and older. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission, because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

Additional details are provided in S.5 Numerator Details.

*Numerator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure’s patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index HF admission, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims and VA administrative data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (obstetric delivery, transplant surgery, maintenance chemotherapy/radiotherapy/ immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the HF readmission measure, CMS used the Planned Readmission Algorithm without modifications.

The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

*Denominator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

The cohort includes admissions for patients aged 65years and older discharged from the hospital with a principal discharge diagnosis of HF, and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details

*Denominator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

To be included in the measure cohort used in public reporting, patients must meet the following additional inclusion criteria:

1. Principal discharge diagnosis of HF;

2. Enrolled in Medicare fee-for-service (FFS) Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and,

5. Not transferred to another acute care facility.

*Exclusions*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS
2. Discharged against medical advice
3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

The 30-day HF readmission measure excludes index admissions for patients:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);

2. Discharged against medical advice (AMA);

3. Admitted within 30 days of a prior index admission for HF; and

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

*Exclusion Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

The HF readmission measure excludes index admissions for patients:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database.

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a qualifying HF index admission are identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, which are identified by the corresponding codes included in claims data (codes can be found in attached Data Dictionary).

Rationale: Patients with these procedures are a clinically distinct group with a different risk of the readmission outcome.

*Risk Adjustment*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Statistical risk model

117446| 141973| 137977| 112469| 146637| 150289

117446| 141973| 137977| 112469| 146637| 150289

*Stratification*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

N/A

*Type Score*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

Rate/proportion better quality = lower score

*Algorithm*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

The measure estimates hospital-level 30-day all-cause RSRRs following hospitalization for HF using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient- and hospital-levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient-level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of "predicted" readmissions to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission, or better quality, and a higher ratio indicates higher-than-expected readmission, or worse quality.

The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific effect is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are

log transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital specific intercept. The results are log transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005).

References:

1. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226.

2. Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models for HF and HF 30-Day Readmission Methodology. 2005. 117446| 141973| 137977| 112469| 146637| 150289

*Submission items*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations

of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**0330: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization**

5.1 Identified measures: 0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2886 : Risk-Standardized Acute Admission Rates for Patients with Heart Failure

2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2882 and NQF #0505

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

*Steward*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Centers for Medicare & Medicaid Services

*Description*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with a principal diagnosis of acute myocardial infarction (AMI). Readmission is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

*Type*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Outcome

*Data Source*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains administrative data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs.

References

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_AMIreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Facility

*Setting*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Inpatient/Hospital

*Numerator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The outcome for this measure is 30-day all-cause readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index for patients 65 and older discharged from the hospital with a principal discharge diagnosis of AMI. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

Additional details are provided in S.5 Numerator Details.

*Numerator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates "exposure time" (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index AMI admission, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare and VA administrative claims data. The algorithm identifies

admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The planned readmission algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/ immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the AMI measure without modifications.

The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

*Denominator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal diagnosis of AMI; and with a complete claims history for the 12 months prior to admission.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal discharge diagnosis of AMI;

2. Enrolled in Medicare fee-for-service (FFS) Part A and B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and,

5. Not transferred to another acute care facility.

*Exclusions*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The 30-day AMI readmission measure excludes index admissions for patients:

1) Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries);

2) Discharged against medical advice (AMA);

3) Same-day discharges; or

4) Admitted within 30 days of a prior index admission for AMI.

*Exclusion Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The AMI readmission measure excludes index admissions for patients:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database.

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Same-day discharges. This information is identified in claims data.

Rationale: Patients admitted and then discharged on the same day are not included as an index admission because it is unlikely that these patients had clinically significant AMIs.

4. AMI admissions within 30 days of discharge from a qualifying AMI index admission are identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional AMI admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.

*Risk Adjustment*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Statistical risk model

118210| 112469| 146637

118210| 112469| 146637

*Stratification*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

N/A

*Type Score*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

Rate/proportion better quality = lower score

*Algorithm*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for AMI using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes

within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality.

The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully and in the original methodology reports posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology)

References

Normand S-LT, Shahian D, M,. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Statistical Science. 2007;22(2):206-226 118210| 112469| 146637

## *Submission items*

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**0505: Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.**

5.1 Identified measures: 0730 : Acute Myocardial Infarction (AMI) Mortality Rate

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

2431 : Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for Acute Myocardial Infarction (AMI)

2473 : Hybrid hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI)

2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2882 and NQF #0506

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

### *Steward*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Centers for Medicare & Medicaid Services

### *Description*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and older discharged from the hospital with either a principal discharge diagnosis of pneumonia (including aspiration pneumonia) or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as present on admission (POA). Readmission is defined as an unplanned readmission for any cause within 30 days of the discharge date for the index admission. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm. CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

### *Type*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Outcome

*Data Source*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ)

Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs).

References

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_PNreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Facility

*Setting*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Inpatient/Hospital

*Numerator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for patients 65 and older discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered

planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

*Numerator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts

reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index pneumonia admission, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims and VA administrative data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The planned readmission algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the pneumonia measure without modifications.

The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

*Denominator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration

pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

The cohort includes admissions for patients aged 65 years and older discharged from the hospital with a principal discharge diagnosis of pneumonia, including aspiration pneumonia or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary discharge diagnosis of severe sepsis; and with a complete claims history for the 12 months prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal discharge diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis;

2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and,

5. Not transferred from another acute care facility.

## *Exclusions*

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS
2. Discharged against medical advice
3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

### 0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

The 30-day pneumonia (PN) readmission measure excludes index admissions for patients:

1. Discharged against medical advice (AMA);

2. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries);

3. Admitted within 30 days of a prior index admission for pneumonia.

## *Exclusion Details*

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

### 0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

The pneumonia readmission measure excludes index admissions for patients:

1. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

2. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database.

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

3. Pneumonia admissions within 30 days of discharge from a qualifying pneumonia index admission are identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.

*Risk Adjustment*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Statistical risk model

141973| 112469| 146637

141973| 112469| 146637

*Stratification*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

N/A

*Type Score*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

Rate/proportion better quality = lower score

*Algorithm*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for pneumonia using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality.

The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results

are transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology).

References:

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 141973| 112469| 146637

*Submission items*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**0506: Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization**

5.1 Identified measures: 0231 : Pneumonia Mortality Rate (IQI #20)

0279 : Community Acquired Pneumonia Admission Rate (PQI 11)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

2579 : Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2882 and NQF #1551

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

### *Steward*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Centers for Medicare & Medicaid Services

### *Description*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients

who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

The measure estimates a hospital-level risk-standardized readmission rate (RSRR) following elective primary THA and/or TKA in Medicare Fee-For-Service (FFS) beneficiaries who are 65 years and older. The outcome (readmission) is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission (the admission included in the measure cohort). A specified set of planned readmissions do not count in the readmission outcome.

*Type*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Outcome

*Data Source*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to

obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived from the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality(AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs).

Reference:

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_THATKAreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Facility

*Setting*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Inpatient/Hospital

*Numerator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

The outcome for this measure is 30-day readmissions. We define readmissions as inpatient admissions for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge of the index hospitalization. If a patient has more than one

unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission, because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

*Numerator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### 1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index THA and/or TKA hospitalization, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, and rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the THA/TKA readmission measure with small modifications.

The Planned Readmission Algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

*Denominator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

The target population for the publicly reported measure includes admissions for Medicare FFS beneficiaries who are at least 65 years of age undergoing elective primary THA and/or TKA procedures.

Additional details are provided in S.9 Denominator Details.

*Denominator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

To be included in the measure cohort used in public reporting, patients must meet the following additional inclusion criteria:

1. Enrolled in Medicare FFS Part A and Part B Medicare for the 12 months prior to the date of admission; and enrolled in Part A during the index admission;

2. Aged 65 or over;

3. Discharged alive from a non-federal acute care hospital; and

4. Have a qualifying elective primary THA/TKA procedure; elective primary THA/TKA procedures defined as those procedures without any of the following:

• Femur, hip, or pelvic fractures coded in principal or secondary discharge diagnosis fields of the index admission;

- Partial hip arthroplasty (PHA) procedures with a concurrent THA/TKA;
- Revision procedures with a concurrent THA/TKA;
- Resurfacing procedures with a concurrent THA/TKA;
- Mechanical complication coded in the principal discharge diagnosis field;
- Malignant neoplasm of the pelvis, sacrum, coccyx, lower limbs, or bone/bone marrow or a disseminated malignant neoplasm coded in the principal discharge diagnosis field;
- Removal of implanted devices/prostheses; or
- Transfer from another acute care facility for the THA/TKA

This measure can also be used for an all-payer population aged 18 years and older. We have explicitly tested the measure in both patients aged 18 years and older and those aged 65 years or older (see Testing Attachment for details, 2b4.11).

*Exclusions*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS
2. Discharged against medical advice
3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

The THA/TKA readmission measure excludes admissions for patients:

1. Without at least 30 days post-discharge enrollment in FFS Medicare;
2. Who were discharged against medical advice (AMA);
3. Admitted for the index procedure and subsequently transferred to another acute care facility;
4. Who had more than two THA/TKA procedure codes during the index hospitalization; or
5. Who had THA/TKA admissions within 30 days of a prior THA/TKA index admission.

*Exclusion Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

This measure excludes index admissions for patients:

1. Without at least 30 days of post-discharge enrollment in FFS Medicare as determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Admitted for the index procedure and subsequently transferred to another acute care facility, which are defined as when a patient with an inpatient hospital admission (with at least one qualifying THA/TKA procedure) is discharged from an acute care hospital and admitted to another acute care hospital on the same or next day.

Rationale: Patients admitted for the index procedure and subsequently transferred to another acute care facility are excluded, as determining which hospital the readmission outcome should be attributed to is difficult.

4. Who had more than two THA/TKA procedure codes during the index hospitalization, which is identified by examining procedure codes in the claims data.

Rationale: Although clinically possible, it is highly unlikely that patients would receive more than two elective THA/TKA procedures in one hospitalization, which may reflect a coding error.

5. Who had THA/TKA admissions within 30 days prior to THA/TKA index admission.

Rationale: Additional THA/TKA admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.

*Risk Adjustment*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Statistical risk model

112469| 109921| 118210| 135810| 117446| 146637| 141015

112469| 109921| 118210| 135810| 117446| 146637| 141015

### *Stratification*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

N/A

### *Type Score*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

Rate/proportion better quality = lower score

### *Algorithm*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

The measure estimates hospital-level 30-day all-cause RSRRs following elective primary THA/TKA using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmission at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator is the number of readmissions expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality.

The "predicted" number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Grosso et al., 2012), which is also posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology).

References:

Grosso L, Curtis J, Geary L, et al. Hospital-level 30-Day All-Cause Risk-Standardized Readmission Rate Following Elective Primary Total Hip Arthroplasty (THA) And/Or Total Knee Arthroplasty (TKA) Measure Methodology Report. 2012.

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 112469| 109921| 118210| 135810| 117446| 146637| 141015

*Submission items*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**1551: Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)**

5.1 Identified measures: 0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

1550 : Hospital-level risk-standardized complication rate (RSCR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

3493 : Risk-standardized complication rate (RSCR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA) for Merit-based Incentive Payment System (MIPS) Eligible Clinicians and Eligible Clinician Groups

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome measures (for example, process measures) with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2882 and NQF #1789

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

### *Steward*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Centers for Medicare & Medicaid Services

### *Description*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

This measure estimates a hospital-level, risk-standardized readmission rate (RSRR) of unplanned, all-cause readmission within 30 days of discharge from an index admission with an eligible condition or procedure. The measure reports a single summary RSRR, derived from the volume-weighted results of five different models, one for each of the following specialty cohorts based on groups of discharge condition categories or procedure categories: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. The measure also indicates the hospital-level standardized readmission ratios (SRR) for each of these five specialty cohorts. The outcome is defined as unplanned readmission for any cause within 30 days of the discharge date from the index admission (the admission included in the measure cohort). A specified set of readmissions are

planned and do not count in the readmission outcome. CMS annually reports the measure for Medicare fee-for-service (FFS) patients who are 65 years or older and are hospitalized in non-federal short-term acute care hospitals.

For the All-Cause Readmission (ACR) measure version used in the Shared Savings Program (SSP) beginning in 2017, the measure estimates an Accountable Care Organization (ACO) facility-level RSRR of unplanned, all-cause readmission after admission for any eligible condition or procedure within 30 days of hospital discharge. The ACR measure is calculated using the same five specialty cohorts and estimates an ACO-level standardized risk ratio for each. CMS annually reports the measure for patients who are 65 years or older, are enrolled in Medicare FFS, and are ACO assigned beneficiaries.

The updates in this form reflect changes both to the original HWR measure and the ACS measure version. For instances where the two versions differ, we provide additional clarifications below the original description.

*Type*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Outcome

*Data Source*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Claims Data sources for the Medicare FFS measure:

HWR

1. Medicare Part A claims data for calendar years 2007 and 2008 were combined and then randomly split into two equal subsets (development sample and validation sample). Risk variable selection was done using the development sample, the risk models for each of the five specialty cohorts in the measure were applied to the validation sample and the models' performance was compared. In addition we re-tested the models in Medicare Part

A claims data from calendar year 2009 to look for temporal stability in the models' performance. The number of measured entities and index admissions are listed below by specialty cohort.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission and following discharge from index admission

ACR

1. Medicare Part A claims data for calendar years 2013, 2014, and 2015.

2. Medicare Enrollment Database (EDB).

Reference:

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

Available in attached appendix at A.1 Attachment DelAP_4-107f_NQF1789HWR_DataDictionary_Final082819-637263622402629808.xlsx

*Level*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Facility

*Setting*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Inpatient/Hospital, Outpatient Services

*Numerator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

The outcome for both the original HWR and ACR measures is 30-day readmission. We define readmission as an inpatient admission for any cause, except for certain planned readmissions, within 30 days from the date of discharge from an eligible index admission. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an

unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

*Numerator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### 1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Outcome definition

The measure counts readmissions to any short-term acute care hospital for any cause within 30 days of the date of discharge from an eligible index admission, excluding planned readmissions as defined below.

Rationale

From a patient perspective, an unplanned readmission from any cause is an adverse event. Outcomes occurring within 30 days of discharge can be influenced by hospital care and the early transition to the non-acute care setting. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce readmissions. However, planned readmissions are generally not a signal of quality of care. Including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures within 30 days of discharge.

It is important to note that for the HWR measure, a readmission is included as an index admission if it meets all other eligibility criteria. This differs from the publicly reported condition-specific and procedure-specific readmission measures, which do not consider a readmission as a new index admission within the same measure.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (obstetric delivery, transplant surgery, maintenance chemotherapy/radiotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the HWR measure. In 2013, CMS applied the algorithm to its other readmission measures.

For more details on the Planned Readmission Algorithm, please see Appendix E of the report titled "2019 All-Cause Hospital-Wide Measure Updates and Specifications Report: Hospital-Wide Readmission"

Wallace Lori, Grady J, Djordjevic Darinka, et al. 2019 All-Cause Hospital Wide Measure Updates and Specifications Report.

https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841

*Denominator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

The measure includes admissions for Medicare beneficiaries who are 65 years and older and are discharged from all non-federal, acute care inpatient US hospitals (including territories) with a complete claims history for the 12 months prior to admission.

ACR-Specific: The measure at the ACO level includes all relevant admissions for ACO assigned beneficiaries who are 65 and older, and are discharged from all non-Federal short-stay acute care hospitals, including critical access hospitals.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

### 1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

To be included in the measure cohort, patients must meet the following inclusion criteria:

1. Enrolled in Medicare FFS Part A for the 12 months prior to the date of admission and during the index admission;

2. Aged 65 or older;

3. Discharged alive from a non-federal short-term acute care hospital; and

4. Not transferred to another acute care facility.

ACR- Specific: An additional criterion for the ACO version of this measure is that only hospitalizations for ACO-assigned beneficiaries that meet all of the other criteria listed above are included. The cohort definition is otherwise identical to that of the HWR described below.

The measure first assigns admissions with qualifying Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) procedure categories to the Surgery/Gynecology Cohort. This cohort includes admissions likely cared for by surgical or gynecological teams.

The measure then sorts admissions into one of the four remaining specialty cohorts based on the AHRQ CCS diagnosis category of the principal discharge diagnosis:

The Cardiorespiratory Cohort includes several condition categories with very high readmission rates such as pneumonia, chronic obstructive pulmonary disease, and heart failure. These admissions are combined into a single cohort because they are often clinically indistinguishable, and patients are often simultaneously treated for several of these diagnoses.

The Cardiovascular Cohort includes condition categories such as acute myocardial infarction that in large hospitals might be cared for by a separate cardiac or cardiovascular team.

The Neurology Cohort includes neurologic condition categories such as stroke that in large hospitals might be cared for by a separate neurology team.

The Medicine Cohort includes all non-surgical patients who were not assigned to any of the other cohorts.

The full list of the specific diagnosis and procedure AHRQ CCS categories used to define the specialty cohorts can be found in the attached data dictionary.

## *Exclusions*

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

### 1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

Both the original HWR and ACR versions of the measure exclude index admissions for patients:

1. Admitted to Prospective Payment System (PPS)-exempt cancer hospitals;

2. Without at least 30 days post-discharge enrollment in Medicare FFS;

3. Discharged against medical advice;

4. Admitted for primary psychiatric diagnoses;

5. Admitted for rehabilitation; or

6. Admitted for medical treatment of cancer.

*Exclusion Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Both the original HWR and ACR versions of the measure exclude index admissions for patients:

1. Admitted to PPS-exempt cancer hospitals; identified by the Medicare provider ID

Rationale: These hospitals care for a unique population of patients that cannot reasonably be compared to patients admitted to other hospitals.

2. Without at least 30 days of post-discharge enrollment in Medicare FFS; determined using data captured in the Medicare Enrollment Database (EDB)

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

3. Discharged against medical advice; identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

4. Admitted for primary psychiatric diagnoses

Rationale: Patients admitted for psychiatric treatment are typically cared for in separate psychiatric or rehabilitation centers that are not comparable to short-term acute care hospitals.

5. Admitted for rehabilitation

Rationale: These admissions are not typically to a short-term acute care hospital and are not for acute care.

6. Admitted for medical treatment of cancer

Rationale: These admissions have a different mortality and readmission profile than the rest of the Medicare population, and outcomes for these admissions do not correlate well with outcomes for other admissions. Patients with cancer admitted for other diagnoses or for surgical treatment of their cancer remain in the measure.

*Risk Adjustment*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Statistical risk model

112469| 118210| 135810| 141973| 146637| 146313

112469| 118210| 135810| 141973| 146637| 146313

*Stratification*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

N/A

*Type Score*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

Rate/proportion better quality = lower score

*Algorithm*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference (“excess”) between a hospital’s predicted days and expected days per 100 discharges. “Predicted days” is the average number of days a hospital’s patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). “Expected days” is the average number of risk-adjusted days in acute care a hospital’s patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI,

HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

The measure estimates hospital-level 30-day all-cause RSRRs using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand et al., 2007). At the patient level, it models the log-odds of hospital readmission within 30 days of discharge using age, selected clinical covariates, and a hospital-specific effect. At the hospital level, the approach models the hospital-specific effects as arising from a normal distribution. The hospital effect represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific effects are given a distribution to account for the clustering (non-independence) of patients within the same hospital (Normand et al., 2007). If there were no differences among hospitals, then after adjusting for patient risk, the hospital effects should be identical across all hospitals.

Admissions are assigned to one of five mutually exclusive specialty cohort groups consisting of related conditions or procedures. For each specialty cohort group, the SRR is calculated as the ratio of the number of “predicted” readmissions to the number of “expected” readmissions at a given hospital. For each hospital, the numerator of the ratio is the number of readmissions within 30 days, predicted based on the hospital’s performance with its observed case mix and service mix, and the denominator is the number of readmissions expected based on the nation’s performance with that hospital’s case mix and service mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows a particular hospital’s performance, given its case mix and service mix, to be compared to an average hospital’s performance with the same case mix and service mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, while a higher ratio indicates higher-than-expected readmission rates or worse quality.

For each specialty cohort, the “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific effect on the risk of readmission. The estimated hospital-specific effect for each cohort is added to the sum of the estimated regression coefficients multiplied by patient characteristics. The results are log-transformed and summed over all patients attributed to a hospital to calculate a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common effect using all hospitals in our sample is added in place of the hospital-specific effect. The results are log-transformed and summed over all patients attributed to a hospital to calculate an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the data in that period.

The specialty cohort SRRs are then pooled for each hospital using a volume-weighted geometric mean to create a hospital-wide combined SRR. The combined SRR is multiplied by the national observed readmission rate to produce the RSRR. The statistical modeling approach is described fully in the original methodology report (Horwitz et al., 2012).

ACR-specific: The ACR quality measure was adapted from the HWR quality measure. The unit of analysis was changed from the hospital to the ACO. This was possible because both the HWR and ACR measures assess readmission performance for a population that clusters patients together (either in hospitals or in ACOs). The goal is to isolate the effects of beneficiary characteristics on the probability that a patient will be readmitted from the effects of being in a specific hospital or ACO. In addition, planned readmissions are excluded for the ACR quality measure in the same way that they are excluded for the HWR measure. The ACR measure is calculated identically to what is described above for the HWR measure.

References:

Horwitz L, Partovian C, Lin Z, et al. Hospital-Wide All-Cause Unplanned Readmission Measure: Final Technical Report. 2012;

https://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 112469| 118210| 135810| 141973| 146637| 146313

## *Submission items*

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences:

EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**1789: Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)**

5.1 Identified measures: 0695 : Hospital 30-Day Risk-Standardized Readmission Rates following Percutaneous Coronary Intervention (PCI)

0329 : Risk-Adjusted 30-Day All-Cause Readmission Rate

0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1768 : Plan All-Cause Readmissions (PCR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: This measure and the National Committee for Quality Assurance (NCQA) Plan All-Cause Readmissions (PCR) Measure #1768 are related measures, but are not competing because they don't have the same measure focus and same target population. In addition, both have been previously harmonized to the extent possible under the guidance of the National Quality Forum Steering Committee in 2011. Each of these measures has different specifications. NCQA's Measure #1768 counts the number of inpatient stays for patients aged 18 and older during a measurement year that were followed by an acute readmission for any diagnosis to any hospital within 30 days. It contrasts this count with a calculation of the predicted probability of an acute readmission. NCQA's measure is intended for quality monitoring and accountability at the health plan level. This measure estimates the risk-standardized rate of unplanned, all-cause readmissions to a hospital or ACO for any eligible condition within 30 days of hospital discharge for patients aged 18 and older. The measure will result in a single summary risk-adjusted readmission rate for conditions or procedures that fall under five specialties: surgery/gynecology, general medicine, cardiorespiratory, cardiovascular, and neurology. This measure is specified for evaluating hospital or ACO performance. However, despite these differences in cohort specifications, both measures under NQF guidance have been harmonized to the extent possible through modifications such as exclusion of planned readmissions. We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2882 and NQF #1891

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia
1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

### *Steward*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Centers for Medicare & Medicaid Services

### *Description*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

The measure estimates a hospital-level 30-day, all-cause, risk-standardized readmission rate (RSRR) for patients age 65 and over discharged from the hospital with either a principal discharge diagnosis of COPD or a principal discharge diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. The outcome (readmission) is defined as unplanned readmission for any cause within 30 days of the discharge date for the index admission (the admission included in the measure cohort). A specified set of planned readmissions do not count in the readmission outcome. CMS annually reports the measure for patients who are 65 years or older and are enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

### *Type*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Outcome

*Data Source*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File (MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual-eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs.

References

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_COPDreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Facility

*Setting*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Inpatient/Hospital

*Numerator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

The outcome for this measure is 30-day readmission. We define readmission as an inpatient admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for patients discharged from the hospital with a principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

*Numerator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure’s patient cohort. For the CMS 30-day PN EDAC measure, CMS

used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index COPD admission, excluding planned readmissions as defined below.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare and VA administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The planned readmission algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/ immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the COPD measure without modifications.

The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

*Denominator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports

the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

The cohort includes admissions for patients aged 65 or older, who have been discharged from the hospital with either a principal discharge diagnosis of COPD OR a principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of acute exacerbation of COPD and with a complete claims history for the 12 months prior to admission.

Additional details are provided in S.9 Denominator Details.

*Denominator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal discharge diagnosis of COPD or principal discharge diagnosis of respiratory failure with a secondary discharge diagnosis of COPD with exacerbation;

2. Enrolled in Medicare fee-for-service (FFS) in Part A and Part B Medicare for the 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital or VA hospital; and,

5. Not transferred to another acute care facility.

*Exclusions*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS
2. Discharged against medical advice

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

The 30-day COPD readmission measures exclude index admissions for patients:

1. Without at least 30 days post-discharge enrollment in FFS Medicare (in the case of patients who are not VA beneficiaries);

2. Discharged against medical advice (AMA); and,

3. Admitted within 30 days of a prior index admission for COPD.

*Exclusion Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), which is identified with enrollment data from the Medicare Enrollment Database.

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

2. Discharges against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. COPD admissions within 30 days of discharge from a qualifying COPD index admission are identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional COPD admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission does not count as both an index admission and a readmission for another index admission.

*Risk Adjustment*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Statistical risk model

112469| 118210| 135810| 141973| 146637| 141015

112469| 118210| 135810| 141973| 146637| 141015

*Stratification*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

N/A

*Type Score*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

Rate/proportion better quality = lower score

*Algorithm*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI,

HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

The measure estimates hospital-level 30-day, all-cause, RSRRs following hospitalization for COPD using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of discharge from the index admission using age, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of “predicted” to the number of “expected” readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital’s performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation’s performance with that hospital’s case mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital’s performance given its case mix to an average hospital’s performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality.

The “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression

models are described fully in the original methodology report posted on QualityNet (https://qualitynet.org/inpatient/measures/readmission/methodology).

References:

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 112469| 118210| 135810| 141973| 146637| 141015

*Submission items*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**1891: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization**

5.1 Identified measures: 0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0275 : Chronic Obstructive Pulmonary Disease (COPD) or Asthma in Older Adults Admission Rate (PQI 05)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1893 : Hospital 30-Day, all-cause, risk-standardized mortality rate (RSMR) following chronic obstructive pulmonary disease (COPD) hospitalization

2879 : Hybrid Hospital-Wide Readmission (HWR) Measure with Claims and Electronic Health Record Data

2888 : Accountable Care Organization Risk-Standardized Acute Hospital Admission Rate for Patients with Multiple Chronic Conditions

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: We did not include in our list of related measures any non-outcome (e.g., process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure).

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2882 and NQF #2515

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

### *Steward*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Centers for Medicare & Medicaid Services

### *Description*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as unplanned readmission for any cause within 30-days from the date of discharge for a qualifying index CABG procedure, in patients 65 years and older.

An index admission is the hospitalization for a qualifying isolated CABG procedure considered for the readmission outcome.

*Type*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Outcome

*Data Source*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File

(MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated AHRQ SES index score at the patient nine-digit zip code level for use in studying the association between our measure and SRFs.

References:

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_CABGreadmission_Fall2020_final_7.22.20.xlsx

*Level*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Facility

*Setting*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Inpatient/Hospital

*Numerator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

The outcome for this measure is 30-day readmissions. We define readmission as an inpatient acute care admission for any cause, with the exception of certain planned readmissions, within 30 days from the date of discharge from the index admission for an isolated CABG surgery in patients 65 and older. If a patient has more than one unplanned admission (for any reason) within 30 days after discharge from the index admission, only the first one is counted as a readmission. The measure looks for a dichotomous yes or no outcome of whether each admitted patient has an unplanned readmission within 30 days. However, if the first readmission after discharge is considered planned, any subsequent

unplanned readmission is not counted as an outcome for that index admission because the unplanned readmission could be related to care provided during the intervening planned readmission rather than during the index admission.

*Numerator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts

reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge after undergoing isolated CABG surgery, excluding planned readmissions as defined below. Although clinical experts agree that planned readmissions are rare after CABG, they likely do occur. Therefore, to identify these planned readmissions we have adapted and applied an algorithm originally created to identify planned readmissions for a hospital-wide (i.e., not condition-specific) readmission measure.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

In brief, the algorithm identifies a short list of always planned readmissions (those where the principal discharge diagnosis is major organ transplant, obstetrical delivery, or maintenance chemotherapy) as well as those readmissions with a potentially planned procedure (e.g., total hip replacement) AND a non-acute principle discharge diagnosis code. For example, a readmission for colon resection is considered planned if the principal diagnosis is colon cancer but unplanned if the principal diagnosis is abdominal pain, as this might represent a complication of the CABG procedure or hospitalization. Readmissions that included potentially planned procedures with an acute principal diagnosis or procedures that might represent specific complications of CABG, such as PTCA or repeat CABG are not excluded from the measure outcome as they are considered unplanned in this measure.

The planned readmission algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/ immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures.

In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely

clinical experience of each measure's patient cohort. The planned readmission algorithm is applied to the CABG measure with modifications.

The planned readmission algorithm and associated code tables are attached in data field S.2b (Data Dictionary or Code Table).

It should be noted that this approach differs from that adopted by STS for their registry-based measure, in which all 30-day readmissions were considered to be unplanned.

Outcome Attribution

Attribution of the outcome in situations where a patient has multiple contiguous admissions, at least one of which involves an index CABG procedure (i.e., the patient is either transferred into the hospital that performs the index CABG or is transferred out to another hospital following the index CABG) is as follows:

- If a patient undergoes a CABG procedure in the first hospital and is then transferred to a second hospital where there is no CABG procedure, the readmission outcome is attributed to the first hospital performing the index CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain.

Rationale: A transfer following CABG is most likely due to a complication of the index procedure and that care provided by the hospital performing the CABG procedure likely dominates readmission risk even among transferred patients.

- If a patient is admitted to a first hospital but does not receive a CABG procedure there and is then transferred to a second hospital where a CABG is performed, the readmission outcome is attributed to the second hospital performing the index CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain.

Rationale: Care provided by the hospital performing the CABG procedure likely dominates readmission risk.

-If a patient undergoes a CABG procedure in the first hospital and is transferred to a second hospital where another CABG procedure is performed, the readmission outcome is attributed to the first hospital performing the index (first) CABG procedure and the 30-day window starts with the date of discharge from the final hospital in the chain.

Rationale: A transfer following CABG is most likely due to a complication of the index procedure, and care provided by the hospital performing the index CABG procedure likely dominates readmission risk even among transferred patients.

*Denominator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

The cohort includes admissions for patients who are age 65 and older with a qualifying isolated CABG procedure and complete claims history for the 12 months prior to the index admission.

*Denominator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

In order to create a clinically coherent population for risk adjustment, and in accordance with existing NQF-approved CABG measures and clinical expert opinion, the measure is intended to capture isolated CABG patients (i.e., patients undergoing CABG procedures without concomitant valve or other major cardiac or vascular procedures).

*Exclusions*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS
2. Discharged against medical advice
3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

For all cohorts, hospitalizations are excluded if they meet any of the following criteria, for admissions:

1. Without at least 30 days post-discharge enrollment in FFS Medicare
2. Discharged against medical advice (AMA)
3. Admissions for subsequent qualifying CABG procedures during the measurement period

## *Exclusion Details*

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

### 2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

The CABG readmission measure excludes hospitalizations if they meet any of the following criteria:

1. Without at least 30 days post-discharge enrollment in FFS Medicare

Rationale: The 30-day readmission outcome cannot be assessed in this group since claims data are used to determine whether a patient was readmitted.

2. Discharged against medical advice (AMA) are identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

2. Admissions for subsequent qualifying CABG procedures during the measurement period.

Rationale: CABG procedures are expected to last for several years without the need for revision or repeat revascularization. A repeat CABG procedure during the measurement period likely represents a complication of the original CABG procedure and is a clinically more complex and higher risk surgery. Therefore, we select the first CABG surgery admission for inclusion in the measure and exclude subsequent CABG surgery admissions from the cohort.

## *Risk Adjustment*

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Statistical risk model

118210| 112469| 135466| 146637| 141015

118210| 112469| 135466| 146637| 141015

*Stratification*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

N/A

*Type Score*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

Rate/proportion better quality = lower score

*Algorithm*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

The measure estimates hospital-level 30-day, all-cause RSRRs following hospitalization for isolated CABG surgery using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of readmission within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a readmission at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.

The RSRR is calculated as the ratio of the number of “predicted” to the number of “expected” readmissions at a given hospital, multiplied by the national observed readmission rate. For each hospital, the numerator of the ratio is the number of readmissions within 30 days predicted on the basis of the hospital’s performance with its observed case mix; and the denominator is the number of readmissions expected based on the nation’s performance with that hospital’s case mix. This approach is analogous to a ratio of “observed” to “expected” used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital’s performance given its case mix to an average hospital’s performance with the same case mix. Thus, a lower ratio indicates lower-than-expected readmission rates or better quality, and a higher ratio indicates higher-than-expected readmission rates or worse quality.

The “predicted” number of readmissions (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of readmission. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The “expected” number of readmissions (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period.

This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report posted on QualityNet: (https://qualitynet.org/inpatient/measures/readmission/methodology).

References:

Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. 118210| 112469| 135466| 146637| 141015

*Submission items*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**2515: Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0119 : Risk-Adjusted Operative Mortality for CABG

0115 : Risk-Adjusted Surgical Re-exploration

0114 : Risk-Adjusted Postoperative Renal Failure

0131 : Risk-Adjusted Stroke/Cerebrovascular Accident

0130 : Risk-Adjusted Deep Sternal Wound Infection

0129 : Risk-Adjusted Postoperative Prolonged Intubation (Ventilation)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

2558 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following coronary artery bypass graft (CABG) surgery

3494 : Hospital 90-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Coronary Artery Bypass Graft (CABG) Surgery

5a.1 Are specs completely harmonized? Yes

5a.2 If not completely harmonized, identify difference, rationale, impact: The CABG readmission measure, which was developed in close collaboration with STS, has a target population (i.e., isolated CABG patients) that is harmonized with the above measures to the extent possible given the differences between clinical and administrative data. The exclusions are nearly identical to the STS measures' cohort exclusions with the exception of epicardial MAZE procedures; STS excludes these procedures from the registry-based CABG readmission measure cohort because the version of registry data used for measure development did not allow them to differentiate them from open maze procedures. The age range for the proposed CABG readmission and existing NQF-endorsed STS measure cohorts differs; STS measures are specified for age 18 and over, and the CABG readmission measure is currently specified for age 65 and over. The proposed CABG readmission measure is harmonized with the above measures to the extent possible given the different data sources used for development and reporting.

5b.1 If competing, why superior or rationale for additive value: This measure was developed concurrently with a clinical registry data-based readmission measure (Risk-adjusted readmission measure for coronary artery bypass graft (CABG)). The measure steward for the registry-based readmission measure for CABG is also CM

## Comparison of NQF #2882 and NQF #2880

2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

### *Steward*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Centers for Medicare & Medicaid Services

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

### *Description*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for HF to provide a patient-centered assessment of the post-discharge period. This measure is intended to capture the quality of care transitions provided to discharged patients who had a HF hospitalization by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for

patients who are 65 years or older, are enrolled in Medicare Fee-For-Service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

*Type*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

*Data Source*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Claims, Other Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician Carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

No data collection instrument provided Attachment NQF_datadictionary_HF-EDAC_Spring2021.xlsx

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services

including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

*Level*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Facility

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

*Setting*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Emergency Department and Services, Inpatient/Hospital

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

*Numerator Statement*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The outcome for this measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index admission for HF. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index HF hospitalization.

Additional details are provided in S.5 Numerator Details.

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

*Numerator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index HF admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with HF who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for HF during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure’s patient cohort. For the CMS 30-day HF EDAC measure, CMS

used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for HF, version 4.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates "exposure time" (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### *Denominator Statement*

#### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for HF.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of HF (codes in the attached Data Dictionary) and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports this measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

#### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

*Denominator Details*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Have a principal diagnosis of HF;

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital (including Indian Health Service hospitals) and critical access hospitals; and,

5. Not transferred to another acute care facility.

Cohort codes are included in the attached data dictionary.

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

*Exclusions*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. HF admissions within 30 days of discharge from a prior HF index admission

4. With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission.

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS

2. Discharged against medical advice

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

## *Exclusion Details*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. HF admissions within 30 days of discharge from a prior HF index admission, identified by comparing the discharge date from the index admission with subsequent admission dates

Rationale: Additional HF admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

4. With a procedure code for LVAD implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission, identified via claims data

Rationale: These patients represent a clinically distinct group (ICD-10-PCS code list).

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

## *Risk Adjustment*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

*Stratification*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

N/A; this measure is not stratified.

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

*Type Score*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

*Algorithm*

**2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for HF using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference (“excess”) between a hospital’s predicted days and expected days per 100 discharges. “Predicted days” is the average number of days a hospital’s patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). “Expected days” is the average number of risk-adjusted days in acute care a hospital’s patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Heart Failure (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

## *Submission items*

### 2880: Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day HF readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS)

population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

## Comparison of NQF #2882 and NQF #2881

2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

### *Steward*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Centers for Medicare & Medicaid Services

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Centers for Medicare & Medicaid Services (CMS)

### *Description*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

This measure assesses days spent in acute care within 30 days of discharge from an inpatient hospitalization for pneumonia, including aspiration pneumonia or for sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia coded in the claim as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA. This measure is intended to capture the quality of care transitions provided to discharge patients hospitalized for an eligible pneumonia condition by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: emergency department (ED) visits, observation stays, and unplanned readmissions at any time during the 30 days post-discharge. In order to aggregate all three events, we measure each in terms of days. The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for patients who are 65 years or older, are enrolled in Medicare fee-for-service (FFS), and are hospitalized in non-federal short-term acute care hospitals.

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Measure score: The measure is a risk standardized score at the hospital level for days spent in acute care for patients with an AMI.

Measure focus and time frame: This measure estimates days spent in acute care (i.e. time spent in ED, unplanned readmission and observation stays) within 30 days of discharge from an inpatient hospitalization for acute myocardial infarction (AMI)

This measure is intended to capture the quality of care transitions provided to discharged patients hospitalized with AMI by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: 1) emergency department (ED) visits, 2)

observation stays, and 3) unplanned readmissions at any time during the 30 days post-discharge. Readmissions are classified as planned and unplanned by applying the planned readmission algorithm (PRA). Days spent in each care setting are aggregated for the 30 days post-discharge with a minimum of half-day increments (i.e. an ED visit lasting 2 hours would be counted as 0.5 days).

Target population: CMS annually reports the measure for patients who are 65 years or older and enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are patients hospitalized in Veterans Health Administration (VA) facilities.

*Type*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Outcome

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Outcome

*Data Source*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Claims, Enrollment Data Data sources for the Medicare FFS measure:

1. Medicare Part A inpatient, Part B hospital outpatient claims and physician carrier claims data: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

For development purposes, we obtained the Medicare Part B hospital and physician outpatient claims from the Chronic Condition Data Warehouse (CCW) 100% condition-specific datasets.

2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992).

Reference:

Fleming C, Fisher ES, Chang CH, Bubolz TA, Malenka DJ. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs hospitals. Medical Care. 1992; 30(5): 377-91. Data sources for the all-payer update

Attachment NQF_datadictionary_PN-EDAC_Spring2021.xlsx

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Claims, Enrollment Data, Other Data sources for the Medicare FFS measure:

Medicare Part A Inpatient and Part B Outpatient Claims: This data source contains claims data for FFS inpatient and outpatient services including Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission.

Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). The Master Beneficiary Summary File

(MBSF) is an annually created file derived the EDB that contains enrollment information for all Medicare beneficiaries including dual eligible status. Years 2016-2019 were used.

Veterans Health Administration (VA) Data: This data source contains data for VA inpatient and outpatient services including: inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician data for the 12 months prior to and including each index admission. Unlike Medicare FFS patients, VA patients are not required to have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission.

The American Community Survey (2013-2017): We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs).

References

Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91.

No data collection instrument provided Attachment NQF_datadictionary_AMI-EDAC_Spring2021.xlsx

*Level*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Facility

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Facility

*Setting*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Inpatient/Hospital

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Inpatient/Hospital

*Numerator Statement*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index hospitalization with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause within 30 days from the date of discharge from the index pneumonia hospitalization.

Additional details are provided in S.5 Numerator Details.

### 2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

The outcome of the measure is a count of the number of days the patient spends in acute care within 30 days of discharge from an eligible index AMI hospitalization. We define days in acute care as days spent in an ED, admitted to an observation unit, or admitted as an unplanned readmission for any cause to a short-term acute care hospital, within 30 days from the date of discharge from the index AMI hospitalization.

Additional details are provided in S.5 Numerator Details.

## *Numerator Details*

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index pneumonia admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with pneumonia who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for pneumonia during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The Planned Readmission Algorithm is a set of criteria for classifying readmissions as planned among the general Medicare population using Medicare administrative claims data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The Planned Readmission Algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure's patient cohort. For the CMS 30-day PN EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled "Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for pneumonia, version 3.0" posted in data field S.1 or at

https://www.qualitynet.org/inpatient/measures/edac/methodology.

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

### 2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

Outcome Definition

The measure counts ED treat-and-release visits, observation stays, and readmissions to any short-term acute care hospital for any cause within 30 days of the discharge date of the index AMI admission, excluding planned readmissions as defined below. Each ED treat-and-release visit is counted as one half-day (0.5 days). Observation stays are recorded in terms of hours and converted for the measure into half-days (rounded up). Each unplanned readmission day is counted as one full day (1 day). We count all eligible outcomes occurring in the 30-day period, even if they are repeat occurrences. Thus, an unplanned readmission that follows a planned readmission is still counted.

Rationale: From a patient perspective, days in acute care from any cause is an adverse event. In addition, making inferences about quality issues based solely on the documented cause of an acute care event is difficult. For example, a patient with AMI who develops a hospital-acquired infection may ultimately be readmitted for sepsis. In this context, considering the readmission to any acute care setting to be unrelated to the care that the patient received for AMI during the index admission would be inappropriate. Multiple events are counted in order to capture the full patient experience in the post-discharge period. Outcomes occurring within 30 days of discharge can be influenced by hospital care. The 30-day time frame is a clinically meaningful period for hospitals to collaborate with their communities to reduce days in acute care.

All eligible outcomes occurring in the 30-day period are counted, even if they are repeat occurrences. For example, if a patient returns to the ED three times on three different days, we count each ED visit as a half-day. Similarly, if a patient has two unplanned hospitalizations within 30 days, the days spent in each are counted. Therefore, the measure may include multiple ED visits, observation stays, and/or readmissions per patient. This approach is taken in order to capture the full patient experience in the post-discharge period. If a hospitalization or observation stay extends beyond the 30-day window, only those days within the 30-day window are counted.

The measure incorporates “exposure time” (the number of days each patient survives after discharge, up to 30). This exposure time is included to account for differential risk for EDAC after discharge among those patients who do not survive the full post-discharge period.

Planned Readmission Algorithm (Version 4.0)

The planned readmission algorithm is a set of criteria for classifying readmissions as planned using Medicare claims and VA administrative data. The algorithm identifies admissions that are typically planned and may occur within 30 days of discharge from the hospital.

The planned readmission algorithm has three fundamental principles:

1. A few specific, limited types of care are always considered planned (transplant surgery, maintenance chemotherapy/immunotherapy, rehabilitation);

2. Otherwise, a planned readmission is defined as a non-acute readmission for a scheduled procedure; and,

3. Admissions for acute illness or for complications of care are never planned.

The algorithm was developed in 2011 as part of the Hospital-Wide Readmission measure. In 2013, CMS applied the algorithm to its other readmission measures. In 2013, CMS applied the algorithm to its other readmission measures. In applying the algorithm to condition- and procedure-specific measures, teams of clinical experts reviewed the algorithm in the context of each measure-specific patient cohort and, where clinically indicated, adapted the content of the algorithm to better reflect the likely clinical experience of each measure’s patient cohort. For the CMS 30-day AMI EDAC measure, CMS used the Planned Readmission Algorithm without making any changes. The Planned Readmission Algorithm is updated annually to ensure changes in coding are captured to maintain the algorithms relevance.

For more details on the Planned Readmission Algorithm, please see the report titled “Condition-Specific Measures Updates and Specifications Report Hospital-Level 30-Day Risk-Standardized Excess Days in Acute Care Measures for AMI, version 4.0” posted in data field S.1 or at https://www.qualitynet.org/inpatient/measures/edac/methodology

Definition of Emergency Department Visit and Observation Stay

We defined ED visits and observation stays using specified billing codes or revenue center codes identified in Medicare hospital outpatient claims and physician carrier claims. The codes that define ED visits and observation stays are in the attached Data Dictionary.

## *Denominator Statement*

### 2882: Excess days in acute care (EDAC) after hospitalization for pneumonia

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-Federal and VA acute care hospitals for PN.

The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia, including aspiration pneumonia or a principal diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary diagnosis of severe sepsis coded as POA and with continuous 12 months Medicare enrollment prior to admission. CMS publicly reports the measure for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided in S.7 Denominator Details.

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

The target population for this measure is Medicare FFS beneficiaries aged 65 years and older hospitalized at non-federal and VA acute care hospitals for AMI. The cohort includes admissions for patients discharged from the hospital with a principal diagnosis of AMI and with continuous 12 months Medicare enrollment prior to admission. The measure is publicly reported by CMS for those patients 65 years and older who are Medicare FFS or VA beneficiaries admitted to non-federal or VA hospitals, respectively.

Additional details are provided n S.7 Denominator Details.

*Denominator Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Principal diagnosis of pneumonia, including aspiration pneumonia; or principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis coded as POA.

2. Enrolled in Medicare FFS Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries;

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred from another acute care facility.

Cohort codes are included in the attached Data Dictionary.

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria:

1. Having a principal discharge diagnosis of AMI

2. Enrolled in Medicare FFS Part A and Part B for the first 12 months prior to the date of admission, and enrolled in Part A during the index admission, or those who are VA beneficiaries

3. Aged 65 or over;

4. Discharged alive from a non-federal short-term acute care hospital; and,

5. Not transferred to another acute care facility.

ICD-9 and ICD-10 cohort codes are included in the attached Data Dictionary.

*Exclusions*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS
2. Discharged against medical advice
3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS
2. Discharged against medical advice
3. Same-day discharges
4. AMI admissions within 30 days of discharge from a prior AMI index admission

*Exclusion Details*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Pneumonia admissions within 30 days of discharge from a prior pneumonia index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional pneumonia admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

The measure excludes index hospitalizations that meet any of the following exclusion criteria:

1. Without at least 30 days of post-discharge enrollment in Medicare FFS (in the case of patients who are not VA beneficiaries), determined by examining the Medicare Enrollment Database (EDB).

Rationale: The 30-day outcome cannot be assessed in this group since claims data are used to determine whether a patient visited the ED, was placed under observation, or was readmitted.

2. Discharged against medical advice, identified using the discharge disposition indicator in claims data.

Rationale: Providers did not have the opportunity to deliver full care and prepare the patient for discharge.

3. Same-day discharges, identified when the admission and discharge dates on the claim are equal.

Rationale: Patients admitted and then discharged on the same day are not included as an index admission because it is unlikely that these admissions are for clinically significant AMIs.

4. AMI admissions within 30 days of discharge from a prior AMI index admission, identified by comparing the discharge date from the index admission with subsequent admission dates.

Rationale: Additional AMI admissions within 30 days are excluded as index admissions because they are part of the outcome. A single admission is not considered both an index admission and a readmission for another index admission.

*Risk Adjustment*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Statistical risk model

112469| 141973| 146637| 146313

112469| 141973| 146637| 146313

*Stratification*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

N/A. This measure is not stratified.

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

N/A

*Type Score*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

Other (specify): Excess days in acute care (EDAC) per 100 discharges better quality = lower score

*Algorithm*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for pneumonia using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption

that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2016).

References:

1. Horwitz L, Wang C, Altaf F, et al. 2016. Excess Days in Acute Care after Hospitalization for Pneumonia; Version 1.0. Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

### 2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

The measure estimates hospital-level 30-day all-cause EDAC following hospitalization for AMI using a random effects hurdle model. This model consists of the two-part logit/truncated Poisson model specifications for days in acute care and includes two random effects for hospitals – one for the logit part and one for the truncated Poisson part – with a non-zero covariance between the two random effects. This strategy accounts for within-hospital correlation of the observed outcome and accommodates the assumption that underlying differences in quality across hospitals lead to systematic differences in outcomes.

Specifically, CMS calculates EDAC, for each hospital, as the difference ("excess") between a hospital's predicted days and expected days per 100 discharges. "Predicted days" is the average number of days a hospital's patients spent in acute care after adjusting for the risk factors (included in the attached data dictionary). "Expected days" is the average number of risk-adjusted days in acute care a hospital's patients would have been expected to spend if discharged from an average performing hospital with the same case mix. We risk adjust the day count to account for age, gender, and comorbidities. The model used is appropriate for count data, and we incorporate exposure time to account for survival times shorter than 30 days. To be consistent with the reporting of the CMS 30-day AMI, HF, and pneumonia readmission measures, CMS multiplies the measure result by 100 such that the final EDAC measures represent EDAC per 100 discharges.

To assess hospital performance for each reporting period, we re-estimate the parameter estimates using the years of data in that period.

The random effects hurdle models are described fully in the original measure methodology report

(Horwitz et al., 2015).

References:

1. Horwitz L, Wang C, Altaf F, et al.2015. Excess Days in Acute Care after Hospitalization for Acute Myocardial Infarction (AMI) (Version 1.0) Final Measure Methodology Report.

https://www.qualitynet.org/inpatient/measures/edac/methodology 112469| 141973| 146637| 146313

*Submission items*

**2882: Excess days in acute care (EDAC) after hospitalization for pneumonia**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2881 : Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day Pneumonia readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

**2881: Excess days in acute care (EDAC) after hospitalization for acute myocardial infarction (AMI)**

5.1 Identified measures: 0330 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following heart failure (HF) hospitalization

0505 : Hospital 30-day all-cause risk-standardized readmission rate (RSRR) following acute myocardial infarction (AMI) hospitalization.

0506 : Hospital 30-day, All-Cause, Risk-Standardized Readmission Rate (RSRR) Following Pneumonia Hospitalization

0229 : Hospital 30-Day, All-Cause, Risk-Standardized Mortality Rate (RSMR) Following Heart Failure (HF) Hospitalization

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

1551 : Hospital-level 30-day risk-standardized readmission rate (RSRR) following elective primary total hip arthroplasty (THA) and/or total knee arthroplasty (TKA)

1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

1891 : Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization

2515 : Hospital 30-day, all-cause, unplanned, risk-standardized readmission rate (RSRR) following coronary artery bypass graft (CABG) surgery

2880 : Excess days in acute care (EDAC) after hospitalization for heart failure (HF)

2882 : Excess days in acute care (EDAC) after hospitalization for pneumonia

5a.1 Are specs completely harmonized? No

5a.2 If not completely harmonized, identify difference, rationale, impact: Measure harmonization: We developed the measure in the Medicare Fee-for-Service (FFS) population and completely harmonized the cohort definition and risk-adjustment strategy with those of the existing CMS 30-day AMI readmission measure. Key differences: EDAC measures are based on the count of excess days spent in acute care whereas the readmission measures focus on the dichotomous presence of any readmission within the 30 days past discharge. In addition to readmission, the EDAC measure also counts observation stays and ED visits as acute care time. This difference in the outcome measure imposes differences on the statistical modeling and reporting format. The interpretations of the measures are also based on relative differences in excess days in acute care based on variations in case mix. There are no differences in data collection burden.

5b.1 If competing, why superior or rationale for additive value: N/A

# Appendix F: Pre-Evaluation Comments

Comments received as of June 10, 2021.

## NQF #3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients With Heart Failure under the Merit-based Incentive Payment System

### *Commenter*

American Medical Association (AMA)

### *Comment*

The American Medical Association (AMA) appreciates the opportunity to comment on this measure. We strongly believe that while it is useful to understand the rate of admissions for patients with heart failure (HF), particularly for quality improvement, measures used in accountability programs must be based on strong evidence, actionable to ensure that improvements can be driven by those held accountable and proven to be reliable and valid at the levels to which the measure is attributed.

The AMA is concerned with the lack of evidence to support attribution of the measure at the individual physician level. Attribution must be determined based on evidence that the accountable unit is able to meaningfully influence the outcome, which aligns with the National Quality Forum (NQF) report, Improving Attribution Models. We believe that there are several concerns that are not adequately addressed including:

• Heart failure patients are often cared for by more than one cardiologist.
• More clarity around the definition of inpatient vs. outpatient providers (e.g., cardiologists) would be helpful.
• Many practices in large organizations comprise both primary and specialty practices and therefore it is not entirely clear how attribution might be determined.
• This may be of concern, for example, with Advanced Practice Practitioners who are often considered primary care but may also be in a cardiology practice. In this scenario, if a cardiology-specific APP has the most patient touchpoints, attribution could fall within primary care while in fact the cardiology practice is driving costs.
• Another example is an electrophysiologist who sees an appropriately referred patient for a device — and sees that patient twice in one year (e.g., the initial consultation, a follow-up visit) — she will now "own" the HF care for the year over the primary care provider, based on attribution logic.

We are also disappointed to see the minimum measure score reliability results of 0.401 using a minimum case number of 21 patients. We believe that measures must meet minimum acceptable thresholds of 0.7 for reliability.

The AMA supports and is encouraged to see that social risk factors were tested and will be included in the risk adjustment approach. We strongly recommend that dual eligibility be included in the adjustment since the results demonstrate that it is strongly predictive of an admission. We remain concerned that CMS continues to test social risk factors after assessment of clinical and demographic risk factors, and it is unclear why this multi-step approach is preferable. On review of the Evaluation of the NQF Trial period for Risk Adjustment for Social Risk Factors report, it is clear that the approaches to testing these data should be revised to strategies such as multi-level models or testing of social factors prior to clinical factors and that as access to new data becomes available, it may elucidate more differences that are unrelated to factors within a hospital's or physician's control. Additional testing that evaluates clinical and social risk factors at the same time or social prior to clinical variables rather than the current approach with clinical factors prioritized should be completed. This additional testing may provide support for inclusion of additional variables such as PCP density and further emphasize the need to include dual eligibility.

We ask that the Standing Committee carefully consider these concerns as they evaluate the measure.

## NQF #3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients With Heart Failure under the Merit-based Incentive Payment System

### *Commenter*

Federation of American Hospitals (FAH)

### *Comment*

The Federation of American Hospitals (FAH) appreciates the opportunity to comment on this measure. FAH agrees that measuring the frequency of admissions for patients with heart failure enables clinicians to understand where quality improvement efforts may be needed but does not support this measure for accountability uses due to several factors, including: there is insufficient evidence to support attribution to clinician groups; the minimum sample size and reliability threshold remain too low; and additional risk factors in the risk adjustment model are needed.

The FAH does not believe that it is appropriate to attribute these admissions to clinician groups. We were unable to find any data and empirical evidence to demonstrate that groups can meaningfully influence unplanned admissions for patients with heart failure. A practice's improvement in avoiding unplanned admissions must be based on its ability to leverage one or more structures or processes of care.

The FAH is concerned that while the median reliability score was 0.60 for practices with at least 21 patients, the range was from 0.401 to 0.995. The FAH believes that the developer must increase the minimum sample size to a higher number to produce a minimum reliability threshold of sufficient magnitude (e.g., 0.7 or higher). Ensuring that the resulting performance scores produce information that would not misrepresent the quality of care provided by a group is imperative and while an increase in

the sample size would result in a decrease in the number of groups to which the measure would apply, we believe that it would still be a considerable number of patients with heart failure that would continue to be factored into the measure.

The FAH applauds the developer for including social risk factors within the risk adjustment model and strongly advocates that dual eligibility also be included since it was a strong predictor of whether a patient would be admitted. If the desire is to develop measures that can be used in other programs that may not include an adjustment for complex patients, then it becomes imperative that all variables that are determined to be predictors that are outside of the control of a group be included.

# Appendix G: Post-Evaluation Comments

Two post evaluation comments were received by a member of the public for both #2880 and #3612. The submitted comments and the developer's responses are provided below.

## NQF #2880 Excess days in Acute Care (EDAC) After Hospitalization for Heart Failure (HF)

Standing Committee Recommendation: Recommended for Endorsement

Comment ID#: 7785

Commenter: John Barnes, Heart Failure Society of America

Council / Public: Public

Comment Period: Post-Evaluation Commenting Period

Date Comment was Submitted: September 17, 2021

Developer Response Required? Yes ☒ No ☐

Level of Support: N/A

Theme: N/A

### *Comment*

On behalf of the Heart Failure Society of America (HFSA), we are writing to provide comments on the Excess Days in Acute Care After Hospitalization for Heart Failure measure (#2880) currently under consideration by the NQF's All-Cause Admissions and Readmissions Committee. HFSA is a multidisciplinary organization working to improve and expand heart failure care through collaboration, education, research, innovation, and advocacy. Its vision is to significantly reduce the burden of heart failure.

HFSA is concerned about this measure since our members see heart failure patients discharged too early from acute care, when their blood pressure is still unstable or their fluid overload is far from resolved. In addition, hospitals already carry the financial burden of length of stay and this would only add another burden.

### *Developer Response:*

Thank you for your feedback. The intent of this measure is to capture the very outcome that you state that members see, by collectively measuring a set of adverse acute care outcomes that can occur post-discharge: 1) emergency department (ED) visits, 2) observation stays, and 3) unplanned readmissions at

any time during the 30 days post-discharge. While increased LOS could be one response to this measure (i.e., hospitals appropriately do not discharge patients before they are clinically stable, so they are not readmitted, go to the ED, or experience an observation stay), ideally this measure incentivizes care transitions so that patients with HF receive adequate follow-up and post-discharge ambulatory care to reduce the risk of a post- discharge hospital visit.
NQF Response: Not applicable.

### *NQF Committee Response:*

Thank you for your comment. The Standing Committee considered the unintended consequences of the measure and acknowledges the need to assess the potential for unintended consequences. We appreciate the demands on health care systems and the challenge in getting care right for our patients with heart failure. The Standing Committee further recommends that the developer and CMS continue to monitor the measure for unintended consequences as results of its use.

## NQF #3612 Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure Under the Merit-Based Incentive Payment System

Standing Committee Recommendation: Recommended for Endorsement

Comment ID#: 7786

Commenter: John Barnes, Heart Failure Society of America

Council / Public: Public

Comment Period: Post-Evaluation Commenting Period

Date Comment was Submitted: September 17, 2021

Developer Response Required? Yes ☒ No ☐

Level of Support: N/A Theme: N/A

### *Comment*

On behalf of the Heart Failure Society of America (HFSA), we are writing to provide comments on the Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure under MIPS measure (#3612) currently under consideration by the NQF's All-Cause Admissions and Readmissions Committee. HFSA is a multidisciplinary organization working to improve and expand heart failure care through collaboration, education, research, innovation, and advocacy. Its vision is to significantly reduce the burden of heart failure.

HFSA agrees with the measure steward that hospitalizations put patients at risk of exposure to adverse events, and we recognize the importance of continuity of follow-up post-discharge. However, we have significant concerns about assigning hospitalization rates per capita to a single clinician (or even clinician groups), particularly when our current health care system is increasingly team-based. As such, we do not believe this measure is appropriate for a physician-level accountability program like MIPS. We urge the NQF the abstain from endorsing this measure for use under MIPS and will similarly urge CMS not to finalize its recent proposal to adopt this measure for use under MIPS starting in 2022. A more appropriate strategy for measurement of this patient population, particularly in a pay-for-performance program, would be to focus on actions that are in the direct control of the physician or else to use this type of measure for facility or system-level accountability (e.g., ACOs, the VA, etc.).

HFSA also believes that metrics that count hospitalizations are misguided in that they focus purely on utilization, without regard to quality, and create perverse incentives by rewarding clinicians who up-code, avoid certain high-risk patients, or whose patients die without being admitted to the hospital. We are already seeing the impact of these perverse incentives in hospital-level programs that target readmissions. At the hospital level, “success” on the 30-day readmission metric (relative to “predicted”, the latter based on a weak predictive model) has been found to be associated with an excess mortality over the same time frame. If CMS were to shift this framework to MIPS and penalize individual providers by essentially capping the number of patients “they” may hospitalize, this would create a powerful disincentive to deliver potentially life-saving care and could be disastrous for our patients, particularly the sickest and most vulnerable ones.

HFSA strongly supports efforts to improve ambulatory care quality and care coordination, but we believe that clinician-level measurement of heart failure management needs to shift its focus from pure utilization metrics to coupling utilization with quality care delivery and reducing adverse events. For example, clinician-level metrics should focus on providing guideline-directed medical therapy (GDMT) and improving management of hypertension and diabetes, which all have the potential to reduce hospitalizations by making our patients healthy. Outcomes, namely survival, should be measured at the hospital-level. Similarly, it would be much more valuable to evaluate whether systems are in place to arrange follow-up care— for example, counting a hospital readmission if the patient did not have a follow-up arranged in 7-10 days or the hospital did not discharge a patient on GDMT. Clinician-level metrics should incentivize the adoption of these processes and tools that drive quality and favorable outcomes, including reductions to both hospitalization rates and mortality.

We also remind the NQF that every major heart failure trial looking at hospitalizations as an adverse event does so accounting for the competing risk of death (i.e., if the patient dies, he/she will not be hospitalized). This measure does not seem to account for the competing risk of death and it is unclear if CMS would simultaneously evaluate excess number of deaths per capita. Finally, we remind the NQF that heart failure patients have multiple comorbidities. In fact, more than half of hospitalizations among these patients are unrelated to worsening heart failure. As we previously expressed to the Measures Application Partnership (MAP), the risk adjustment methodology associated with this measure is inadequate in that it relies exclusively on claims data and on generally rigid variables that do not fully

account for severity of illness, medical complexity, and social determinants of health, all of which are critical drivers of heart failure admissions. Similarly, this measure does not adjust for social determinants and other risk factors. Many patients make appointments and just do not show for follow-up. It is also not uncommon that they do not fill medications; often these patients are underprivileged or underinsured and cannot afford medications (especially in January of each year when copays start over). Thus, if a patient does not own a car and does not have a smart phone or internet access for e-visits, the clinician is limited in his/her ability to prevent readmissions.

*Developer Response:*

Yale/CORE has replied below to each subtopic within the HSFA's comment, repeating their comment for context.

HFSA Comment: On behalf of the Heart Failure Society of America (HFSA), we are writing to provide comments on the Risk-Standardized Acute Cardiovascular-Related Hospital Admission Rates for Patients with Heart Failure under MIPS measure (#3612) currently under consideration by the NQF's All-Cause Admissions and Readmissions Committee. HFSA is a multidisciplinary organization working to improve and expand heart failure care through collaboration, education, research, innovation, and advocacy. Its vision is to significantly reduce the burden of heart failure.

HFSA agrees with the measure steward that hospitalizations put patients at risk of exposure to adverse events, and we recognize the importance of continuity of follow-up post-discharge. However, we have significant concerns about assigning hospitalization rates per capita to a single clinician (or even clinician groups), particularly when our current health care system is increasingly team-based. As such, we do not believe this measure is appropriate for a physician-level accountability program like MIPS. We urge the NQF the abstain from endorsing this measure for use under MIPS and will similarly urge CMS not to finalize its recent proposal to adopt this measure for use under MIPS starting in 2022. A more appropriate strategy for measurement of this patient population, particularly in a pay-for-performance program, would be to focus on actions that are in the direct control of the physician or else to use this type of measure for facility or system-level accountability (e.g., ACOs, the VA, etc.).

HFSA also believes that metrics that count hospitalizations are misguided in that they focus purely on utilization, without regard to quality, and create perverse incentives by rewarding clinicians who up-code, avoid certain high-risk patients, or whose patients die without being admitted to the hospital. We are already seeing the impact of these perverse incentives in hospital-level programs that target readmissions. At the hospital level, "success" on the 30-day readmission metric (relative to "predicted", the latter based on a weak predictive model) has been found to be associated with an excess mortality over the same time frame. If CMS were to shift this framework to MIPS and penalize individual providers by essentially capping the number of patients "they" may hospitalize, this would create a powerful disincentive to deliver potentially life-saving care and could be disastrous for our patients, particularly the sickest and most vulnerable ones.

HFSA strongly supports efforts to improve ambulatory care quality and care coordination, but we believe that clinician-level measurement of heart failure management needs to shift its focus from pure utilization metrics to coupling utilization with quality care delivery and reducing adverse events. For example, clinician-level metrics should focus on providing guideline-directed medical therapy (GDMT) and improving management of hypertension and diabetes, which all have the potential to reduce hospitalizations by making our patients healthy. Outcomes, namely survival, should be measured at the hospital-level. Similarly, it would be much more valuable to evaluate whether systems are in place to arrange follow-up care— for example, counting a hospital readmission if the patient did not have a follow-up arranged in 7-10 days or the hospital did not discharge a patient on GDMT. Clinician-level metrics should incentivize the adoption of these processes and tools that drive quality and favorable outcomes, including reductions to both hospitalization rates and mortality.

Yale/CORE Response: Yale-CORE appreciates the concerns raised by the HFSA. The measure is focused on acute unplanned CV-related admissions because they represent an actionable subset of admissions that can be influenced by primary care providers (PCPs) and cardiologists. Acute CV-related admissions occur when outpatient management of HF fails, or when patients develop new or worsening symptoms or CV complications. There is strong evidence supporting the assertion that ambulatory care clinicians can influence acute unplanned cardiovascular-related admission rates by providing high quality of care [1-7]. For example, Brown et al. pointed to four ambulatory care-focused Medicare Coordinated Care Demonstration programs that reduced hospitalizations for high-risk patients by 13-30 events per 100 beneficiaries per year (8-33% of hospitalizations). Brown et al. highlighted six program features that were associated with successfully reducing hospitalizations: 1) supplementing patient telephone calls with in-person meetings; 2) occasionally meeting in-person with providers; 3) acting as a communication hub for providers; 4) providing patients with evidence-based education; 5) providing strong medication management; and 6) providing comprehensive and timely transitional care after hospitalizations [1]. In addition, van Loenen et al. found that higher levels of provider continuity decreased the risk of avoidable hospitalizations for ambulatory care-sensitive conditions (ACSCs) and chronic diseases [6]. Hussey et al. [8] found that among Medicare beneficiaries, greater continuity of care was associated with lower hospitalization odds (OR=0.94, CI=0.93-0.95). Favorable results (declines in admissions) were also shown by Dorr et al. (2000), Levine et al. (2012), Littleford et al. (2010), and Zhang et al. (2008) [2-4, 7]. Several studies have demonstrated positive impact of early follow-up after hospitalization to reduce readmissions for HF [9-12].

The measure aims to incentivize effective and coordinated care for patients with HF to reduce the rates of these admissions. In designing this measure, CMS took into consideration the types of acute hospital admissions that ambulatory providers caring for patients with heart failure could be held accountable for and excluded those that do not reflect the quality of ambulatory care. Because ambulatory providers may not be able to control all of the factors that drive CV-related acute hospital admissions among patients with heart failure, the measure is carefully risk adjusted for comorbid conditions, severity of heart failure, frailty and disability, as well as for the AHRQ SES Index, a marker of socioeconomic disadvantage. We note that the target rate of admissions is not “capped” nor is it zero since disease progression often necessitates hospital admission to stabilize and treat CV complications; rather, the

measure assesses whether the admission rate for providers' patients is higher than expected given their risk factors.

We agree that some process measures, e.g., those focused on adoption of guideline-directed medical therapy in patients with heart failure or those focused on achievement of blood pressure or glycemic control targets, can be used to incentivize quality improvement for patients with heart failure. However, they do not capture all of the actions that clinicians can take to influence favorable outcomes. Moreover, patients are interested in surviving, avoiding hospital admissions, minimizing symptoms, achieving optimal functioning, and optimizing their quality of life. No set of process measures can be comprehensive enough to serve as a surrogate for these patient outcomes. Thus, CMS prioritizes the use of outcome measures to evaluate quality in MIPS.

CMS will continue to monitor for any unintended consequences of the measure. CMS notes that although thresholds to admit a patient with HF from the emergency department (ED) to the hospital can be variable, they are unlikely to be unduly influenced by ambulatory MIPS clinicians. When patients present with an acute illness to the ED, the decision to admit or discharge a patient is generally made by the ED physician. Therefore, it is unlikely that the measure would incentivize changes in thresholds to admit a HF patient or create caps on the number of patients admitted. In addition, the measure uses claims codes that are subject to auditing in order to minimize fraudulent coding.

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HSFA Comment: We also remind the NQF that every major heart failure trial looking at hospitalizations as an adverse event does so accounting for the competing risk of death (i.e., if the patient dies, he/she will not be hospitalized). This measure does not seem to account for the competing risk of death and it is unclear if CMS would simultaneously evaluate excess number of deaths per capita.

Yale/CORE Response: Yale-CORE appreciates the concerns about mortality as a competing outcome; this concern was taken into account during development of the measure since patients with HF are at high risk of both hospital admissions and mortality. The measure does not favor providers with higher mortality rates for two reasons. First, patients who die in the measurement year tend to be admitted more often in that year. Second, when a patient dies, he/she no longer contributes time to the measure denominator (person-years). A better score on the measure is achieved by helping patients stay alive and contribute to the denominator while avoiding hospitalization.

HSFA Comment: Finally, we remind the NQF that heart failure patients have multiple comorbidities. In fact, more than half of hospitalizations among these patients are unrelated to worsening heart failure. As we previously expressed to the Measures Application Partnership (MAP), the risk adjustment methodology associated with this measure is inadequate in that it relies exclusively on claims data and on generally rigid variables that do not fully account for severity of illness, medical complexity, and social determinants of health, all of which are critical drivers of heart failure admissions. Similarly, this measure does not adequately adjust for social determinants and other risk factors. Many patients make appointments and just do not show for follow-up. It is also not uncommon that they do not fill medications— often these patients are underprivileged or underinsured and cannot afford medications (especially in January of each year when copays start over). Thus, if a patient does not own a car and does not have a smart phone or internet access for e-visits, the clinician is limited in his/her ability to prevent readmissions.

Yale/CORE Response: Yale-CORE appreciates this input. The measure accounts for patients with more complicated or severe heart failure in several ways: 1) by excluding patients at advanced stages of heart failure, such as those with implanted left ventricular assist device (LVAD), those who receive home inotropic therapy, or those with prior heart transplant or with end stage renal disease; 2) by risk

adjustment for AICDs (defibrillators); 3) by risk adjustment for systolic heart failure; 4) by risk adjustment for comorbidities including chronic kidney disease, and for frailty/disability; and 5) by not including advanced heart failure/transplant specialists for attribution. Four residential and community context variables were evaluated for possible inclusion in the risk-adjustment model: 1) the AHRQ SES Index, 2) rural residence, 3) PCP density, and 4) cardiologist density, and one individual level variable: Medicare-Medicaid dual eligibility. Given the measure conceptual model, empiric findings, and feedback received from the national TEP and Clinician Committee during measure development, CMS decided to adjust the measure for the AHRQ SES Index. The AHRQ SES Index variable captures multiple aspects of social deprivation that can impact patients' health and health outcomes, including poverty and median household income; unemployment; education; and housing value and quality. These factors are deeply rooted in societal disparities, and MIPS providers may have little ability to influence their effect. However, ambulatory providers can work with patients to improve on their continuity of care, adherence to prescribed medications, and access to appointments.
NQF Response: Not applicable.

### *NQF Committee Response*

Thank you for your comment. The Standing Committee and NQF Scientific Methods Panel (SMP) considered the attribution and the risk adjustment model for the measure. Both the SMP and Standing Committee reviewed this information during the measure evaluation proceedings. The SMP passed the measure on both reliability and validity, in which attribution and risk adjustment are considered. The Standing Committee upheld the SMP's rating for reliability and validity and voted to recommend this measure for endorsement. NQF criteria considers unintended consequences in the usability criterion. However, for new measures that are not in use, data on unintended consequences is often not available due to the measure not being used. Therefore, the Standing Committee acknowledges the need to assess the potential for unintended consequences and considered this in its vote to recommend the measure for endorsement. The Standing Committee further recommends that the developer and CMS continue to monitor the measure for unintended consequences as results of its use.

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