MEASURE WORKSHEET

This document summarizes the evaluation of the measure as it progresses through NQF's Consensus Development Process (CDP). The information submitted by measure developers/stewards is included after the Brief Measure Information, Preliminary Analysis, and Pre-meeting Public and Member Comments sections.

To navigate the links in the worksheet: Ctrl + click link to go to the link; ALT + LEFT ARROW to return

Brief Measure Information

NQF #: 3188
De.2. **Measure Title:** 30-Day Unplanned Readmissions for Cancer Patients
Co.1.1. **Measure Steward:** Seattle Cancer Care Alliance
De.3. **Brief Description of Measure:** 30-Day Unplanned Readmissions for Cancer Patients measure is a cancer-specific measure. It provides the rate at which all adult cancer patients covered as Fee-for-Service Medicare beneficiaries have an unplanned readmission within 30 days of discharge from an acute care hospital. The unplanned readmission is defined as a subsequent inpatient admission to an acute care hospital, which occurs within 30 days of the discharge date of an eligible index admission and has an admission type of "emergency" or "urgent."
1b.1. **Developer Rationale:** For many cancer patients, readmission following hospitalization may be preventable and should be addressed to potentially lower costs and improve patient outcomes. The ADCC recognizes the need for oncology-specific efficiency measures, including unplanned readmissions because planned readmissions are often used in clinical pathways for cancer patients. In 2014, the ADCC identified C4QI's 30-Day Unplanned Readmissions for Cancer Patients measure as a potential accountability measure for the PPS-Exempt Cancer Hospitals Quality Reporting Program (PCHQR). C4QI's 21 members (11 ADCC hospitals/PCHs and 10 other academic medical centers, or AMC) have utilized this claims-based, cancer-specific unplanned readmissions measure since 2012. It is designed to reflect the unique clinical aspects of oncology and to provide a more comprehensive measurement of unplanned readmissions in cancer patients, when compared with existing measures (e.g., the HWR measure). It considers patients with an admission type of "emergency" or "urgent" within 30 days of an index admission as an unplanned readmission. It excludes readmissions for patients readmitted for chemotherapy or radiation therapy treatment or with disease progression. Using this measure, hospitals can better identify and address preventable readmissions for cancer patients.

An earlier version of this measure (NQF #2884) was reviewed by the NQF All-Cause Admissions and Readmissions Project 2015-2017 Technical Expert Panel (TEP) in June 2016. Following the recommendation of the TEP, the ADCC broadened the measure to capture readmissions of cancer patients to any short-term acute care PPS hospital and pursued additional testing of the measure using Medicare claims data (i.e., the Standard Analytical Files). This expansion produced unplanned readmissions rates of patients discharged from PCHs and readmitted to any short-term acute care hospital (defined as PCHs, short-term acute care Prospective Payment System, or PPS, hospitals, and Critical Access Hospitals, or CAH). Additionally, it provided comparative rates of unplanned readmissions of cancer patients for non-PCH short–term acute care hospitals (i.e., short-term acute care PPS hospitals and CAHs).

S.4. **Numerator Statement:** This outcome measure demonstrates the rate at which adult cancer patients have an unplanned readmissions at an acute care hospital within 30 days of discharge from an eligible index admission. The numerator includes all eligible unplanned readmissions to an acute care hospital within 30 days of the discharge date from an index admission that is included in the measure denominator. Readmissions with an admission type of "emergency" or "urgent" are considered unplanned readmissions within this measure.
Additional details are provided in S.5 Numerator Details.
S.6. **Denominator Statement:** The denominator includes inpatient admissions for all adult Fee-for-Service Medicare beneficiaries where the patient is discharged from an acute care hospital with a principal or secondary diagnosis (i.e., not admitting diagnosis) of malignant cancer within the defined measurement period.
S.8. **Denominator Exclusions:** The following index admissions are excluded from the measure denominator:
1) Less than 18 years of age;
2) Patients who died during the index admission;
3) Patients discharged AMA;
4) Patients transferred to another acute care hospital during the index admission;
5) Patients discharged with a planned readmission;
6) Patients having missing or incomplete data; and,

7) Patients not admitted to an inpatient bed.

De.1. **Measure Type:** Outcome
S.17. **Data Source:** Claims (Only)
S.20. **Level of Analysis:** Facility

IF Endorsement Maintenance – Original Endorsement Date: Most Recent Endorsement Date:

Preliminary Analysis

To maintain NQF endorsement endorsed measures are evaluated periodically to ensure that the measures still meets the NQF endorsement criteria ("maintenance"). The emphasis for maintaining endorsement is focused on how effective the measure is for promoting improvements in quality. Endorsed measures should have some experience from the field to inform the evaluation.

Criteria 1: Importance to Measure and Report

1a. Evidence

1a. Evidence. The evidence requirements for a health outcomes measure include providing rationale that supports the relationship of the health outcome to processes or structures of care. The guidance for evaluating the clinical evidence asks if the relationship between the measured health outcome and at least one clinical action is identified and supported by the stated rationale.

- As a rationale for measuring this health outcome, the developer lists several studies from peer-reviewed journals explaining that cancer is the second cause of death in the United States, with nearly 600,000 cancer-related deaths expected this year.
- Developers explain that this measure intends to reflect the unique clinical aspects of oncology patients and to yield readmission rates that may be obscured by a broader readmission measure, such as the Hospital-Wide All-Cause Unplanned Readmission Measure (HWR).
- The developer notes that there are several clinical actions that can be taken by the accountable entity to improve the outcome of 30-day readmissions. Specifically, the logic model notes that providers can ensure that patients are clinically ready for discharge with clear and appropriate follow-up care planned. These actions will help foster improved patient care, better population health, and reduce readmission risk.

Summary of prior review in All-Cause Admissions and Readmissions 2015-2017 Project

- Measure 2884, the previous version of this measure, was included in the Admissions and Readmissions 2015-2017 project.
- During the prior review of the measure, the Standing Committee recommended expanding the measure definition to include cancer readmissions all acute care hospital, and not limit to PPS-exempt cancer hospitals.
- Standing Committee Members agreed unanimously the measure met the evidence criterion.

Changes to evidence from last review

☐ **The developer attests that there have been no changes in the evidence since the measure was last evaluated.**
☒ **The developer provided updated evidence for this measure:**

- Updates: Seven new references added that detail unplanned readmissions for cancer patients as well as hospital-wide all-cause readmissions.

Questions for the Committee:

- *Is there at least one intervention that the provider can do to achieve a change in the measure results?*

Guidance from the Evidence Algorithm

Box 1: The measure assesses performance on a health outcome → Box 2: There is a relationship between the heath outcome and healthcare action → Pass

Preliminary rating for evidence: ☒ **Pass** ☐ **No Pass**

1b. Gap in Care/Opportunity for Improvement and 1b. Disparities

1b. Performance Gap. The performance gap requirements include demonstrating quality problems and opportunity for improvement.

- The developers updated performance gap data using the Medicare 100% standard analytic file.
- A total of 4,975 short-term acute care hospitals (defined as PCHs, short-term acute care PPS hospitals, and CAHs) were included across 2013-2015.

	2013-2015
Mean (SD)	16.54% (8.24%)
Range	0-100%
Quartile Range	8.30%
25th percentile	12.50%
50th percentile	17.32%
75th percentile	20.80%

- These data generally represent a range of performance among hospitals

Disparities

- The developer provided descriptive statistics for several patient-level demographic characteristics including gender, age, beneficiary race code, and dual eligibility status. Developer provides frequency and percent distribution by strata of demographic categories. Readmission performance scores by strata of demographic categories is not provided by the developer in this section.
- In testing the SDS factors in the risk adjustment model, the developers noted that there was a conceptual and empirical rationale for adjustment based on dual-eligibility status. The developers note that dual-eligibility can serve as a proxy for low income status and other measures of SDS. Several studies were referenced that note that low SDS factors are a risk factor for later-state cancer diagnosis, delayed health care receipt, and higher utilization of hospital-based care.
- The patient-level observed 30-Day Unplanned Readmissions for Dual-Eligible Cancer Patients rate was 22.49%, compared with an 18.32% observed rate for all other patients.

Questions for the Committee:

- *Is there a gap in care for this area of measurement that warrants a national performance measure?*

Preliminary rating for opportunity for improvement: ☒ **High** ☐ **Moderate** ☐ **Low** ☐ **Insufficient**

Committee pre-evaluation comments

Criteria 1: Importance to Measure and Report (including 1a, 1b, 1c)

1a. Evidence to Support Measure Focus

If measuring a structure, process, or intermediate outcome: How does the evidence relate to the specific structure, process, or intermediate outcome being measured? Does it apply directly or is it tangential? How does the structure, process, or intermediate outcome relate to desired outcomes?

If measuring a health outcome or PRO: is the relationship between the measured outcome/PRO and at least one healthcare action (structure, process, intervention, or service) identified AND supported by the stated rationale?

Comments:

** There is direct evidence to support this outcome measure. There are numerous healthcare actions to improve this measure and improve patient care.

** Pass

** Cancer is a leading cause of death in 40 to 79 year old population. 86% of cancers are diagnosed in 50+. In 2010, cancer related health care accounted for $125 billion in health care spending. This measure which is tied to eligible index admissions and admission types that are emergency or urgent will help to move along cancer related measures which have lagged behind. There appears to be evidence that when patients are clinically ready for discharge and there is appropriate follow up care and management of co-morbidities, unnecessary readmissions in a 30 day post-discharge period can be reduced. Could there be greater clarity on meaning of emergency and urgent in this context?

** Pass

** Acceptable rationale and evidence exist to support measure.

** The evidence strongly relates to the health outcome measured. Additionally, healthcare actions such as discharge planning are identified and supported in the rationale.

** Updated by developer to include additional references

** There is sufficient evidence to support the measure with more than one intervention identified that could potentially reduce readmissions in cancer patients.

** The desired outcome identified by the measure developer is lower healthcare costs related the treatment of cancer patients. By encouraging fewer unplanned readmissions for patients with principle or secondary diagnoses of malignant cancer, the developer cites several studies that maintain that fewer unplanned readmissions will reduce overall, system-wide costs associated with cancer treatment.

** Yes

** Provided updated evidence
Clinical measures can be done prior to discharge to impact readmissions"

1b. Performance Gap

Was performance data on the measure provided? How does it demonstrate a gap in care (variability or overall less than optimal performance) to warrant a national performance measure? Disparities: Was data on the measure by population subgroups provided? How does it demonstrate disparities in the care?

Comments:

** Used a large sample of hospital to evaluate the gap. Significant variability and a range of performance among hospitals. Dual eligibility served as a proxy for SDS and there is evidence to support this. There is a significant performance gap which demonstrates the importance of the measure.

** Performance gap: yes; Opportunity for improvement: yes

** This measure developed by ADCC was reviewed in 2016 by a NQF TEP. It was recommended that it be expanded to include all short term acute care hospitals and that additional testing be done using Medicare claims data. This was undertaken.

There was considerable attention to risk factors. Readmission rates for dual eligibles was 22.49% compared to 18.32% for other patients with considerable variability. Dual Eligible status was regarded as a proxy for low income and other SDS measures and included in the risk adjustment model. (Low SDS is a factor for later stage cancer diagnosis, delayed health care and higher utilization of hospital-based care.) Apparently, while there is some evidence that racial minorities have higher readmission rates, the studies are conflicting and it is difficult to discern what is attribute to patient's race v. site of care.

** Acceptable- high

** Based on provided data, there appears to be a performance gap. Re: disparities, developers elected to use dual

eligibility as a proxy for SDS and report on a higher rate of readmissions for dual eligible pts.

** Performance data was provided which demonstrates variability in performance sufficient to warrant a performance measure. Performance by strata of demographic categories was not provided.

** Large performance gap offered by developer as compared to non-cancer patients. Dual eligible pts may be diagnosed later in disease and represent delay in treatment as opposed to preventable readmissions.

** Performance data was provided for a large data set with race, sex, age and dual eligibility status identified. Would like to find a way of determining and incorporating patient-level SDS in the data set.

** The developer cites studies that identify costs/waste in the treatment of cancer patients that could be avoided via fewer unplanned readmissions.

** Yes, a gap exists

** Higher readmission for dual -eligible 22.49% as compared to 18.32% for all other patients

1c. Composite Performance Measure – Quality Construct

Are the following stated and logical: overall quality construct, component performance measures, and their relationships; rationale and distinctive and additive value; and aggregation and weighting rules?

N/A

Criteria 2: Scientific Acceptability of Measure Properties
2a. Reliability
2a1. Reliability Specifications **Maintenance measures – no change in emphasis – specifications should be evaluated the same as with new measures**

2a1. Specifications requires the measure, as specified, to produce consistent (reliable) and credible (valid) results about the quality of care when implemented.

Data source(s):

Medicare Administrative Claims
Medicare 100% Standard Analytic File

Specifications:

- This outcome measure demonstrates the rate at which adult cancer patients have unplanned readmissions within 30 days of discharge from an eligible index admission.
- The numerator includes all eligible unplanned readmissions to any short-term acute care hospital—defined as admission to a PPS-Exempt Cancer Hospital (PCH), a short-term acute care Prospective Payment (PPS) hospital, or Critical Access Hospital (CAH)—within 30 days of the discharge date from an index admission that is included in the measure denominator. Readmissions with an admission type (UB-04 Uniform Bill Locator 14) of "emergency = 1" or "urgent = 2" are considered unplanned readmissions within this measure. Readmissions for patients with progression of disease (using a principal diagnosis of metastatic disease as a proxy) and for patients with planned admissions for treatment (defined as a principal diagnosis of chemotherapy or radiation therapy) are excluded from the measure numerator.
- The denominator includes inpatient admissions for all adult Fee-for-Service Medicare beneficiaries where the patient is discharged from a short-term acute care hospital (PCH, short-term acute care PPS hospital, or CAH) with a principal or secondary diagnosis (i.e., not admitting diagnosis) of malignant cancer within the defined measurement period.
- The following index admissions are excluded from the measure denominator:
  1) Less than 18 years of age;
  2) Patients who died during the index admission;
  3) Patients discharged AMA;
  4) Patients transferred to another acute care hospital during the index admission;
  5) Patients discharged with a planned readmission;
  6) Patients having missing or incomplete data; and,
  7) Patients not admitted to an inpatient bed.
- The following numerator exclusions are noted:
  - Readmissions for patients with progression of disease, defined as Primary Claim Diagnosis Code of metastatic disease (ICD-9-CM range: 196-198.89, 209.70 - 209.79; ICD-10-CM range: C77.0 – C79.9, C7B.0-C7B.8)
    - Developer Rationale: A primary (or principal) diagnosis of metastatic disease serves as a proxy for disease progression. Readmissions for conditions or symptoms associated with disease progression are not reflective of poor clinical care but, rather, advanced disease.
  - Readmissions for patients with planned admissions for treatment, defined as Primary Claim Diagnosis Code of chemotherapy or radiation encounter (ICD-9-CM range: V58.00-V58.12; ICD-10-CM range: Z51.00 – Z51.12).
    - Developer Rationale: Readmissions are expected and planned for some patients who require additional cancer treatment in the inpatient setting. These readmissions reflects high-quality care that is focused on patient safety and are reliably distinguishable in claims data.
- The measure is specified for a facility level of analysis and the hospital setting.
- The statistical risk adjustment model includes 11 risk factors with 15 values.
  - The developers use a logistic regression to estimate the probability of an unplanned readmission.
  - The probability of unplanned readmission is summed over the index admissions for each hospital to calculate the expected unplanned readmission rate.
  - The developers sum the actual or observed unplanned readmissions for each hospital and calculated the ratio of observed unplanned readmissions to expected unplanned readmissions for each hospital.
  - Each hospital's ratio was then multiplied by the national or standard unplanned readmissions rate to generate the risk-adjusted 30-Day Unplanned Readmissions for Cancer Patients rate (see formula below). Lower risk-adjusted rates (observed/expected ratios) are interpreted as better quality while higher risk-adjusted rates (observed/expected ratios) indicate poorer quality.

$$Risk - Adjusted\ Rate = \frac{observed\ rate}{expected\ rate}$$

Questions for the Committee:

- *Are the specifications clear?*
- *Are all the data elements clearly defined? Are all appropriate codes included?*
- *Is the logic and calculation algorithm clear?*
- *Is it likely this measure can be consistently implemented?*

2a2. Reliability Testing **Testing attachment**

2a2. Reliability testing demonstrates if the measure data elements are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period and/or that the measure score is precise enough to distinguish differences in performance across providers.

SUMMARY OF TESTING

Reliability testing level ☒ **Measure score** ☐ **Data element** ☐ **Both**

Reliability testing performed with the data source and level of analysis indicated for this measure ☒ **Yes** ☐ **No**

Method(s) of reliability testing

- To test reliability, the developer used data obtained from 3,502 hospitals between 2013-2015.
- *Measure score reliability*
  - To demonstrate measure score reliability, the developer conducted a test/retest analysis to evaluate the measure's ability to generate consistent results with randomly selected subset of patients over time.
  - The developers calculated two metrics of agreement – the intraclass correlation coefficient (ICC) and the Spearman-Brown Prophecy Formula (S-B). The ICC is estimated from a random effects model producing risk adjusted rates. The S-B formal projects correlation as if the full sample is used and not spilt randomly.

Results of reliability testing

- The reliability testing results for the three-year period (CY2013-CY2015) produced an ICC of 0.570 (95% CI: 0.567, 0.572) and 0.482 (95% CI: 0.479, 0.485), for unadjusted and risk-adjusted values, respectively. The developer notes that this result may be interpreted as "fair" reliability.
- The mean S-B for the same period was 0.726 (95% CI: 0.724, 0.728) for unadjusted rates and 0.650 (95% CI: 0.648, 0.653) for risk-adjusted rates. The developer notes that both of these values are significantly higher than the 0.5 that indicates a large effect size with p-values < 0.001. When applied to each year individually, the S-B analysis exceeded 0.50 (p-values<0.001) in 2013 and 2014 but not 2015.

Questions for the Committee:

- *Is the test sample adequate to generalize for widespread implementation?*
- *Do the results demonstrate sufficient reliability so that differences in performance can be identified?*

Guidance from the Reliability Algorithm:

1. Specifications are precise (YES) → 2. Empirical Reliability testing conducted (YES) → 3. Testing was computed at the performance score level (YES) → 5. The testing method appropriate (YES) → 6b. Testing results demonstrate moderate confidence in measure score reliability → Rating: Moderate

Preliminary rating for reliability: ☐ **High** ☒ **Moderate** ☐ **Low** ☐ **Insufficient**

2b. Validity
Maintenance measures – less emphasis if no new testing data provided

2b1. Validity: Specifications

2b1. Validity Specifications. This section should determine if the measure specifications are consistent with the evidence.

Specifications consistent with evidence in 1a. ☒ **Yes** ☐ **Somewhat** ☐ **No**

Question for the Committee:

- *Are the specifications consistent with the evidence?*

2b2. Validity testing

2b2. Validity Testing should demonstrate the measure data elements are correct and/or the measure score correctly reflects the quality of care provided, adequately identifying differences in quality.

Describe any updates to validity testing:

For this updated submission, the developer conducted additional validity testing by examining the measure score's correlation with other endorsed measures of readmissions.

SUMMARY OF TESTING

Validity testing level ☒ **Measure score** ☒ **Data element testing against a gold standard** ☐ **Both**

Method of validity testing of the measure score:

- ☐ **Face validity only**
- ☒ **Empirical validity testing of the measure score**

Validity testing method:

- The developer conducted two new analyses to test the validity of the measure score. These analyses were:
  1. evaluating the sensitivity and specificity of the UB-04 inpatient admission type code. This analysis was previously conducted using a manual chart review.
  2. correlation between this measure and NQF #1789 CMS Hospital-Wide All-Cause Readmissions measure.

Validity testing results:

- The results of the two analysis are as follows:
  1. The previous data element validity testing generated a global sensitivity and specificity score of 0.879 and 0.896, respectively.
  2. The overall correlation between NQF #1789 and NQF #3188 was 0.2769 with a p-value of <0.001. This is a statistically significant positive correlation between the two measures.

Questions for the Committee:

- *Do the results demonstrate sufficient validity so that conclusions about quality can be made?*
- *Do you agree that the score from this measure as specified is an indicator of quality?*

2b3-2b7. Threats to Validity

2b3. Exclusions:

- The following index admissions are excluded from the measure denominator:
  1) Less than 18 years of age (N=117, 0%);
  2) Patients who died during the index admission (N=200,855, 5.97%);
  3) Patients discharged AMA (N=12,612, 0.37%);
  4) Patients transferred to another acute care hospital during the index admission (N=78,692, 2.34%);
  5) Patients discharged with a planned readmission (N=3,970, 0.12%);
  6) Patients having missing or incomplete data (N=123, 0%) ; and,
  7) Patients not admitted to an inpatient bed (N=0, 0%).
- The following numerator exclusions are noted:
  - Readmissions for patients with progression of disease, defined as Primary Claim Diagnosis Code of metastatic disease (ICD-9-CM range: 196-198.89, 209.70 - 209.79; ICD-10-CM range: C77.0 – C79.9, C7B.0-C7B.8) (N=30,642, 4.18%)
    - Developer Rationale: A primary (or principal) diagnosis of metastatic disease serves as a proxy for

disease progression. Readmissions for conditions or symptoms associated with disease progression are not reflective of poor clinical care but, rather, advanced disease.
    - Readmissions for patients with planned admissions for treatment, defined as Primary Claim Diagnosis Code of chemotherapy or radiation encounter (ICD-9-CM range: V58.00-V58.12; ICD-10-CM range: Z51.00 – Z51.12). (N=19,028, 2.60%)
        - Developer Rationale: Readmissions are expected and planned for some patients who require additional cancer treatment in the inpatient setting. These readmissions reflects high-quality care that is focused on patient safety and are reliably distinguishable in claims data.
    - Adjust numerator to remove duplicate counts for multiple readmissions within the 30 day period (N=95,064, 12.98%)
- The developer provides frequency distributions and written rationale to justify exclusions. Information on performance results for patients excluded is not provided.

Questions for the Committee:

- *Are the exclusions consistent with the measure intent?*
- *Are any patients or patient groups inappropriately excluded from the measure?*
- *Are the exclusions/exceptions of sufficient frequency and variation across providers to be needed?*
- *Is there any concern that exclusions may create distortion of performance results across measured entities?*

2b4. Risk adjustment: **Risk-adjustment method** ☐ **None** ☒ **Statistical model** ☐ **Stratification**

Conceptual rationale for SDS factors included ? ☒ **Yes** ☐ **No**

SDS factors included in risk model? ☒ **Yes** ☐ **No**

Risk adjustment summary

- The statistical risk adjustment model includes 11 risk factors with 15 values.
- The developers use a logistic regression to estimate the probability of an unplanned readmission, based on the measure specifications and risk factors below:

Parameter-redo all numbers	Model Coefficients		Odds Ratio Estimates		
	Estimate	P-Value	Point Estimate	95% Wald Confidence Limits	
Intercept	-2.966	<.0001			
ICU Stay	0.055	<.0001	1.117	1.106	1.127
Male	0.046	<.0001	1.097	1.088	1.106
Dual-Eligible Status	0.069	<.0001	1.147	1.135	1.159
Surgical Admission	-0.226	<.0001	0.637	0.631	0.643
Multiple Comorbidities	0.123	<.0001	1.279	1.266	1.293
Solid Tumor *(excluding Metastatic Disease)*	-0.079	<.0001	0.854	0.847	0.861
Length of Stay Greater than 3 Days	0.149	<.0001	1.347	1.335	1.360
Age: < 65	*Reference Age*				
Age: 65-69	-0.075	<.0001	0.861	0.849	0.874
Age: 70-74	-0.068	<.0001	0.873	0.860	0.885
Age: 75-79	-0.078	<.0001	0.856	0.844	0.869
Age: 80-84	-0.101	<.0001	0.818	0.805	0.831
Age: 85+	-0.162	<.0001	0.723	0.712	0.735
Hospitalization in the Prior 60 Days	0.239	<.0001	1.612	1.597	1.627

Discharged to Home	-0.109	<.0001	0.804	0.797	0.811
Discharged to Hospice	-1.277	<.0001	0.078	0.075	0.080

Empirical Summary of SDS

- The developers noted that there was a conceptual and empirical rationale for adjustment based on dual-eligibility status. Dual-eligibility can serve as a proxy for low income status and other measures of SDS. Several studies were referenced that note that low SDS factors are a risk factor for later-state cancer diagnosis, delayed health care receipt, and higher utilization of hospital-based care.
- The patient-level observed 30-Day Unplanned Readmissions for Cancer Patients rate was 22.49%, compared with an 18.32% observed rate for all other patients.
- "Dual-Eligible Status" was associated with a Chi-Square of 5547.9628 ($p<0.001$).
- "Dual-Eligible Status" was included in the risk adjustment model.

Risk Model Discrimination and Calibration

- The developer provides a c-statistic and a Hosmer-Lemeshow statistic to assess risk adjustment model performance. The c-statistic measures how well the model discriminates between patients with and without the outcome, when compared with random assignment. A c-statistic of 0.5 suggests that the model has poor predictive power, while a c-statistic of 1.0 implies that the outcome is solely related to patient-level factors. The c-statistic provided by the developer 0.6607 (95% CI: 0.6597, 0.6618), indicating fair discrimination for the development and validation models.
- The H-L Goodness-of-Fit test yielded a significant value ($p<0.001$), which indicates potential fit issues.
- The developer notes that this is not uncommon with models that are overpowered due to large datasets, as is the case here. A significant value for the H-L test suggests that we reject the assumption of perfect fit between the models. However, with large datasets, the H-L statistic can magnify relatively small differences between observed and expected rates and imply a statistically significant degree of miscalibration.
- The developer notes that the risk decile plots demonstrate that the model performs adequately, with similar observed and predicted values in each decile.

Questions for the Committee:

- *Is an appropriate risk-adjustment strategy included in the measure?*
- *Are the candidate and final variables included in the risk adjustment model adequately described for the measure to be implemented?*
- *Are all of the risk adjustment variables present at the start of care? If not, describe the rationale provided.*
- *Do you agree with the developer's rationale that there is a conceptual basis for adjusting this measure for SDS factors?*
- *Do you agree with the developer's decision, based on their analysis, to include SDS factors in their risk-adjustment model?*

2b5. Meaningful difference *(can statistically significant and clinically/practically meaningful differences in performance measure scores can be identified)*:

- To demonstrate the measure's ability to identify meaningful differences, the developer compared hospital unadjusted and adjusted rates compared to the mean national performance rates.
- Half of the hospitals fell within the interquartile range of 12.50% to 20.80%
- The developers note that in their analysis of total and for CY2015 individually, they observed that over half of all index claims had performance of "no better or worse than the national average" – demonstrating that there are opportunities for improvement by providers.
-

Question for the Committee:

- *Does this measure identify meaningful differences about quality?*

2b6. Comparability of data sources/methods:

N/A

2b7. Missing Data

- The developer states that all required data are readily available and retrievable. Missing data does not appear to be an issue for this measure.

Guidance from the Validity Algorithm
Precise specifications (Box 1) → Empirical testing conducted with measure as specified (Box 2) → Score-level testing conducted (Box 4) → Method of testing appropriate (Box 5) → moderate certainty that the scores are reliable

Preliminary rating for validity: ☐ **High** ☒ **Moderate** ☐ **Low** ☐ **Insufficient**

Committee pre-evaluation comments

Criteria 2: Scientific Acceptability of Measure Properties (including all 2a, 2b, and 2d)

2a1. & 2b1. Specifications

Which data elements, if any, are not clearly defined? Which codes with descriptors, if any, are not provided? Which steps, if any, in the logic or calculation algorithm or other specifications (e.g., risk/case-mix adjustment, survey/sampling instructions) are not clear? What concerns do you have about the likelihood that this measure can be consistently implemented?

Comments:

** Used 3502 hospitals between 2013-2015. Did test-retest, ICC and S-B. producing unadjusted and risk-adjusted values. Moderate reliability. This measure can be consistently implemented.

** Specifications clear: yes; Elements well defined: yes; logic clear: yes;

** Reliability specs acceptable

** Specs appear reasonable. Question: has there been reliability testing re: use of metastatic disease as a primary diagnosis as a proxy for disease progression? Might posit that some percentage of patients have metastatic disease at d/c from the index hospitalization and exclusion might obscure transitional care issues in these patients.

** As data specs are electronically abstractable from claims, likely no issues with implementation.

** Clearly defined.

Unplanned readmission not by coding, rather exclude urgent/emergent admission types. These may not accurately describe unplanned readmissions and does not follow current methodology used by similar measures

** Recognizing that some of the risk factors identified were removed from consideration because they were not well-defined in the claims data, many of these are significant contributors to patients' ability to follow through on their post hospitalization care. For example, history of substance abuse and psychological services are major contributors to readmissions and by removing these, hospitals that serve high numbers of these patients are placed at a significant disadvantage in accurately measuring risk.

** No issues

** Included readmission for emergency or urgent. Unclear if included observation

2b.1 Validity

In what ways, if any, are the specifications inconsistent with the evidence? If a PRO-PM: In what ways, if any, are the specifications inconsistent with what the target population values and finds meaningful?

Comments:

** Empirical testing done using 2 new analyses (as compared to previous submission with measure 2884?). Sensitivity

and specificity of UB-04 IP admissions type code and correlation of measure with CMS all cause HW readmissions (NQF 1789). Global sensitivity and specificity high and found a significant correlation with NQF 1789. No specifications inconsistent with the evidence.

** Consistent with evidence: yes

** Validity specs consistent

** No identified issues

**Moderate

** No issues noted

** No issues

2a.2 Reliability

Was reliability tested with an adequate scope (number of entities and patients) to generalize for widespread implementation and with an appropriate method? Describe how the results either do or do not demonstrate sufficient reliability. If a PRO-PM: Was testing conducted at both the data element and score levels? If a composite: Was testing conducted at the score level?

Comments:

** Appropriate method and large number of hospitals. Moderate reliability, appropriate method and generalizable.

** Sample adequate: yes; Differences in performance can be identified: yes; Reliability rating: pass

** Testing was at facility level for 4QCY2012 to 1QCY2016 encompassing 4,974 short term acute care hospitals. There was a minimum threshold of 50 index admissions needed for inclusion. On page 29, there appear to have been few PPS exempt hospitals included in testing group.

** Reliability testing acceptable- moderate

** Sample size for some hospitals is small--probably useful to exclude hospitals without the minimum number of index admits.
Split half testing, ICC scores were in the fair range.

** No issues noted.

** The developer states that data from 3,502 hospitals was used in their reliability testing. No mention is made about total number of patients/records, however.

2b2. Validity

Was validity tested with an adequate scope (number of entities and patients) to generalize for widespread implementation and with an appropriate method? Describe how the results either do or do not demonstrate sufficient validity so that conclusions about quality can be made? Why do you agree (or not agree) that the score from this measure as specified is an indicator of quality? If a PRO-PM: Was testing conducted at both the data element and score levels?

Comment:

** Sufficient validity for conclusions regarding quality of care and readmissions.

** Sufficient validity: yes; sensitivity and specificity: good; positive correlation with similar measures: good

** Validity testing acceptable- moderate

** Interesting use of performance on NQF 1789 as a measure of validity for the identification of type of admission: sens/spec in good ranges.

** Adequate

** No issues.

** OK

2b3.-2b7. Threats to Validity

2b3. Exclusions: Are the exclusions consistent with the evidence? Are any patients or patient groups inappropriately excluded from the measure? Are the exclusions/exceptions of sufficient frequency and variation across providers to be needed (and outweigh the data collection burden)?

2b4. Risk Adjustment: If outcome (intermediate, health, or PRO-based) or resource use performance measure: Is there a conceptual relationship between potential SDS variables and the measure focus? How well do SDS variables that were available and analyzed align with the conceptual description provided? Are all of the risk-adjustment variables present at the start of care (if not, do you agree with the rationale provided)?. Was the risk adjustment (case-mix adjustment) appropriately developed and tested? Do analyses indicate acceptable results? Is an appropriate risk-adjustment strategy included in the measure?

2b5. Meaningful Differences: How do analyses indicate this measure identifies meaningful differences about quality?

2b6. Comparability of performance scores: If multiple sets of specifications: Do analyses indicate they produce comparable results? If risk-adjustment approach includes SDS factors: Did the developer compare performance scores with and without SDS factors in the risk-adjustment approach? Did the results support the risk-adjustment approach?

2b7. Missing data/no response: Does missing data constitute a threat to the validity of this measure?

Comments:

** No

** Exclusions consistent with intent: yes; patients are appropriately excluded: yes; Exclusions needed: yes; Potential distortion from exclusions: no; Appropriate risk adjustment strategy: yes; Variable adequately described: yes; Variables present: yes; Agree with developer's rationale for SDS adjustment: yes; Agree with decision to include SDS: yes; Meaningful differences in quality: yes; Missing data problem: no

** There were no comparable measures that could be used for comparison due to gap.

** Acceptable

** 2b3: understanding the developers' point re: metastatic dz as a proxy for disease progression, what percentage of index hospitalizations included diagnoses for metastatic dz--is it always a measure of disease progression vs disease acuity at dx? Exclusions for death, missing data, AMA, transfer seemed reasonable; frequency of denominator exclusions seemed low.

2b4: developers allude to a possible conceptual relationship between low SES and readmissions; used dual eligibility as a proxy for SDS factors. Also, race was removed as a variable 2/2 potential to mask disparities in care, also developers did not think they could articulate a causal relationship between race and readmissions.

2b5: narrow IQR, majority of performance in test sample was around national average. Histograms seemed to indicate some outliers and potential for quality improvement.

** Missing data is listed as potential exclusion

** No

**No

** Narrow focus

** Fair reliability based on ICC

2d. Composite Performance Measure

Do analyses demonstrate the component measures fit the quality construct and add value? Do analyses demonstrate the aggregation and weighting rules fit the quality construct and rationale?

N/A

Criterion 3. Feasibility
Maintenance measures – no change in emphasis – implementation issues may be more prominent

3. Feasibility is the extent to which the specifications including measure logic, require data that are readily available or could be captured without undue burden and can be implemented for performance measurement.

- This measure is calculated using administrative claims data from established data fields. Thus, the measure's required data elements are routinely generated as part of the facilities billing process.
- There are no fees, licensing, or other requirements to use any aspect of the measure as specified.

Questions for the Committee:
Are the required data elements routinely generated and used during care delivery?

Preliminary rating for feasibility: ☒ **High** ☐ **Moderate** ☐ **Low** ☐ **Insufficient**

Committee pre-evaluation comments
Criteria 3: Feasibility

3. Feasibility

Which of the required data elements are not routinely generated and used during care delivery? Which of the required data elements are not available in electronic form (e.g., EHR or other electronic sources)? What are your concerns about how the data collection strategy can be put into operational use?

Comments:

** This is a highly feasible measure given the source of data.

** Feasible: yes

** I think data can be collected since it is Medicare claims data.

** High

** Administrative claims data: no issues with feasibility

** Data routinely available. increase in coding around "planned" readmission

** The majority of the data elements are readily available and documented in the electronic medical record. Should not

be difficult to replicate to use on an operational level.

** None

** OK

** Administrative data

Criterion 4: Usability and Use
Maintenance measures – increased emphasis – much greater focus on measure use and usefulness, including both impact /improvement and unintended consequences

4. Usability and Use evaluate the extent to which audiences (e.g., consumers, purchasers, providers, policymakers) use or could use performance results for both accountability and performance improvement activities.

Current uses of the measure [from OPUS]
Publicly reported? ☒ **Yes** ☐ **No**

Current use in an accountability program? ☒ **Yes** ☐ **No** ☐ **UNCLEAR**

Quality Improvement

- The measure is publically reported by Vizient, Inc. with external benchmarking to multiple organizations.
- The developer notes that the measure is also used in quality improvement applications at the City of Hope Comprehensive Care Center, University of Miami Sylvester Comprehensive Cancer Care, Seattle Cancer Care Alliance

Accountability Applications

- The measure is used in the Annual Hospital Ratings for Colon and Lunch Cancer Surgery.
- The measure is used in an ACO payment program at Moffitt Cancer Center with Florida Blue.

Improvement results N/A

Unexpected findings (positive or negative) during implementation N/A

Potential harms N/A

Vetting of the measure [vetting] N/A

Feedback:

- The All-Cause Admission and Readmissions Standing Committee reviewed #2884 (the measure from which #3188 is adapted) during the 2015-2016 evaluation cycle. #2884 was not recommended for endorsement due to limitations related to care setting and measure testing. #3188 addresses the Standing Committee's recommendation by broadening the measure to capture cancer patient readmissions to any short-term acute care PPS hospital and by conducting additional testing using Medicare claims data.
- This measure was included in CMS' 2014 Measures Under Consideration (MUC) list and received conditional support from the Measure Applications Partnership (MAP) Hospital Work Group, pending NQF endorsement. The developer expects the measure to be included in future rule-making; potentially as early as the FY 2018 Hospital Inpatient PPS Proposed Rule.

***Questions for the Committee**:*

- *How can the performance results be used to further the goal of high-quality, efficient healthcare?*
- *Do the benefits of the measure outweigh any potential unintended consequences?*

Preliminary rating for usability and use: ☒ **High** ☐ **Moderate** ☐ **Low** ☐ **Insufficient**

Committee pre-evaluation comments

Criteria 4: Usability and Use

4. Usability and Use

How is the measure being publicly reported? For maintenance measures – which accountability applications is the measure being used for? How can the performance results be used to further the goal of high-quality, efficient healthcare? Describe any actual unintended consequences and note how you think the benefits of the measure outweigh them.

Comments:

** At this time being used 3 institutions for QI and 2 accountability applications.

** Currently in use: yes; Unintended consequences: Hospitals that reduce cancer readmissions may increase post discharge mortality; Measures of readmission and mortality should be monitored and reported in tandem; Validity testing of readmission measure should include mortality as a variable.

** it appears the Hospital-wide All-Cause Unplanned Readmission measure excludes non-surgical cancer admissions and PCHs.

I would like to better understand the size of the exclusion group since patients readmitted for chemotherapy, radiation therapy treatment or with disease progression are excluded. It is important to note that most common reason for readmissions appear to be infections, fever and gastro-intestinal complications."

** Moderate

** Similar measures already being used internally by a variety of cancer hospitals and at least 1 ACO.

** Measure is improved as compared to previously submitted by including readmissions beyond only cancer hospitals

** As with other readmission measures, SDS factors are not appropriately measured leaving inner city hospitals at a disadvantage when publicly reporting readmission rates. Although dual-eligibility status is a proxy, there are many factors that contribute and are not taken into account using a proxy. Availability of community services, such as a robust public transportation system as one example, significantly impacts patients' ability to obtain follow up care including medications. This creates a high use of the 911 system for those patients needing care. Although significant effort may be taken to safely discharge a patient out of the hospital, the lack of available resources often leads to non-adherence in the treatment plan.

** The measure is at least as feasible as existing readmissions measures. Assuming the committee agrees with the rationale to report readmissions data for cancer patients independent from broader, all-cause readmissions measures, feasibility isn't a concern of mine.

** OK

** Publically reported by Vizient, Inc.
Used by 3 comprehensive cancer centers for quality improvement applications

Criterion 5: Related and Competing Measures

Related or competing measures
N/A

Harmonization

N/A

Endorsement + Designation

The "Endorsement +" designation identifies measures that exceed NQF's endorsement criteria in several key areas. After a Committee recommends a measure for endorsement, it will then consider whether the measure also meets the "Endorsement +" criteria.

This measure is a candidate for the "Endorsement +" designation IF the Committee determines that it: meets evidence for measure focus without an exception; is reliable, as demonstrated by score-level testing; is valid, as demonstrated by score-level testing (not via face validity only); and has been vetted by those being measured or other users.

Eligible for Endorsement + designation: ☐ **Yes** ☒ **No**

RATIONALE IF NOT ELIGIBLE:

The measure has not been in use or broadly vetted by those being measured or other users.

Pre-meeting public and member comments

-

NATIONAL QUALITY FORUM—Evidence (subcriterion 1a)

Measure Number (*if previously endorsed*)**:** Click here to enter NQF number

Measure Title: 30-Day Unplanned Readmissions for Cancer Patients

IF the measure is a component in a composite performance measure, provide the title of the Composite Measure here: Click here to enter composite measure #/ title

Date of Submission: 1/13/2017

Instructions

- *Complete 1a.1 and 1a.12 for all measures.*
- *Complete **EITHER 1a.2, 1a.3 or 1a.4** as applicable for the type of measure and evidence.*
- *For composite performance measures:*
  - *A separate evidence form is required for each component measure unless several components were studied together.*
  - *If a component measure is submitted as an individual performance measure, attach the evidence form to the individual measure submission.*
- All information needed to demonstrate meeting the evidence subcriterion (1a) must be in this form. An appendix of *supplemental* materials may be submitted, but there is no guarantee it will be reviewed.
- If you are unable to check a box, please highlight or shade the box for your response.
- Contact NQF staff regarding questions. Check for resources at Submitting Standards webpage.

Note: The information provided in this form is intended to aid the Standing Committee and other stakeholders in understanding to what degree the evidence for this measure meets NQF's evaluation criteria.

1a. Evidence to Support the Measure Focus

The measure focus is evidence-based, demonstrated as follows:

- Health outcome: [3] a rationale supports the relationship of the health outcome to processes or structures of care. Applies to patient-reported outcomes (PRO), including health-related quality of life/functional status, symptom/symptom burden, experience with care, health-related behavior.
- Intermediate clinical outcome: a systematic assessment and grading of the quantity, quality, and consistency of the body of evidence [4] that the measured intermediate clinical outcome leads to a desired health outcome.
- Process: [5] a systematic assessment and grading of the quantity, quality, and consistency of the body of evidence [4] that the measured process leads to a desired health outcome.
- Structure: a systematic assessment and grading of the quantity, quality, and consistency of the body of evidence [4] that the measured structure leads to a desired health outcome.
- Efficiency: [6] evidence not required for the resource use component.

Notes

3. Generally, rare event outcomes do not provide adequate information for improvement or discrimination; however, serious reportable events that are compared to zero are appropriate outcomes for public reporting and quality improvement.

4. The preferred systems for grading the evidence are the U.S. Preventive Services Task Force (USPSTF) grading definitions and methods, or Grading of Recommendations, Assessment, Development and Evaluation (GRADE) guidelines.

5. Clinical care processes typically include multiple steps: assess → identify problem/potential problem → choose/plan intervention (with patient input) → provide intervention → evaluate impact on health status. If the measure focus is one step in such a multistep process, the step with the strongest evidence for the link to the desired outcome should be selected as the focus of measurement. Note: A measure focused only on collecting PROM data is not a PRO-PM.

6. Measures of efficiency combine the concepts of resource use and quality (see NQF's Measurement Framework: Evaluating Efficiency Across

Episodes of Care; AQA Principles of Efficiency Measures).

1a.1.This is a measure of: (*should be consistent with type of measure entered in De.1*)

Outcome

☒ Health outcome: 30 Day Unplanned Readmissions for Cancer Patients

☐Patient-reported outcome (PRO): Click here to name the PRO

PROs include HRQoL/functional status, symptom/symptom burden, experience with care, health-related behaviors. (A PRO-based performance measure is not a survey instrument. Data may be collected using a survey instrument to construct a PRO measure.)

☐ Intermediate clinical outcome (*e.g., lab value*): Click here to name the intermediate outcome

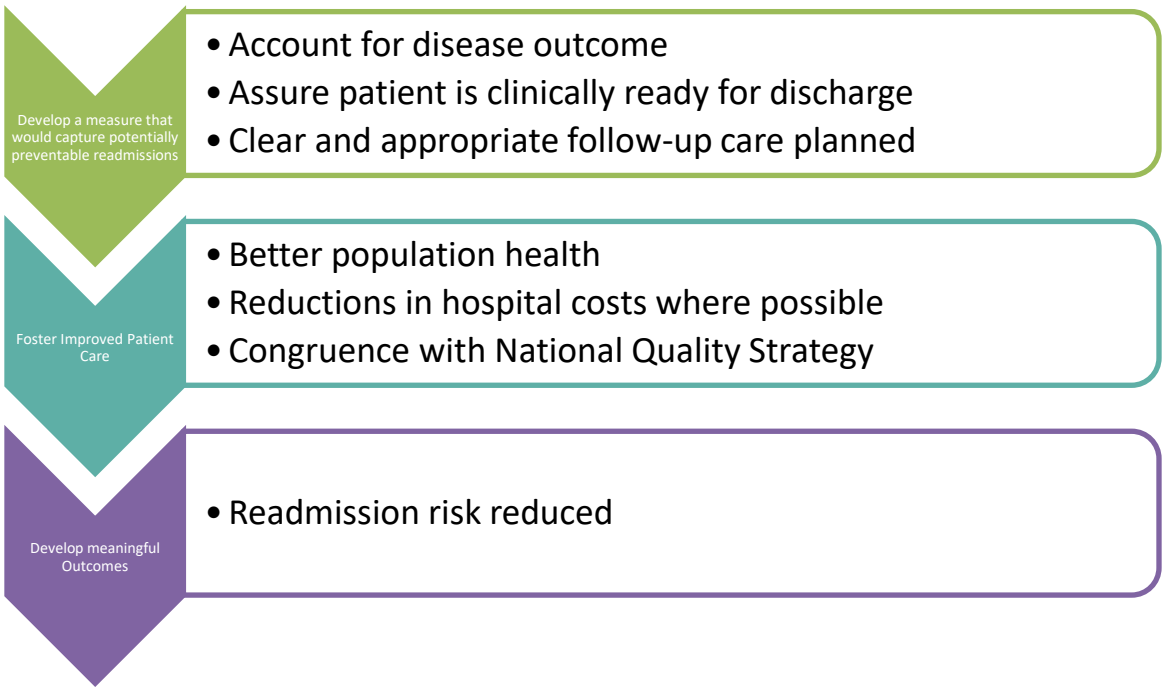
☐ Process: Click here to name what is being measured

☐ Appropriate use measure: Click here to name what is being measured

☐ Structure: Click here to name the structure

☐ Composite: Click here to name what is being measured

1a.12 LOGIC MODEL Diagram or briefly describe the steps between the healthcare structures and processes (e.g., interventions, or services) and the patient's health outcome(s). The relationships in the diagram should be easily understood by general, non-technical audiences. Indicate the structure, process or outcome being measured.



This measure was developed to yield risk-adjusted, hospital-level rates of unplanned readmissions that:

1) Are valid and reliable for cancer care;
2) Address cancer measurement gaps in existing readmissions measures;

3) Are capable of differentiating quality of care;
4) Are useful for quality improvement; and,
5) May be used in public reporting programs to inform patients, payers, and policymakers regarding the quality of hospital-based cancer care.

Using a broad Medicare claims set, patients with a Type of Admission/Visit of "emergency" or "urgent" within 30 days of an index admission are considered unplanned readmissions in the measure. The measure excludes readmissions for patients readmitted for chemotherapy or radiation therapy treatment or with disease progression.

By providing an accurate and comprehensive assessment of unplanned readmissions within 30 days of discharge, hospitals can better identify and address preventable readmissions. Through routine use, this measure can be used to improve patient outcomes and quality of care. The measure is intended to identify institutions that are performing better or worse than expected and to support improved care delivery and quality of life for this complex patient population.

While measure testing has focused on producing a measure that can be applied to PPS-Exempt Cancer Hospitals (PCH), we believe that the measure has broad applicability to cancer patients treated in any short-term acute care hospital. Accordingly, this measure could be adopted for the PPS-Exempt Cancer Hospitals Quality Reporting Program (PCHQR) and other public reporting programs for purposes of accountability and to support performance improvement.

****RESPOND TO ONLY ONE SECTION BELOW -EITHER 1a.2, 1a.3 or 1a.4) ****

1a.2 FOR OUTCOME MEASURES including PATIENT REPORTED OUTCOMES- State the rationale supporting the relationship between the health outcome (or PRO) to at least one healthcare structure, process (e.g., intervention, or service).

Cancer is the second leading cause of death in the United States, with nearly 600,000 cancer-related deaths expected this year.[1] It is now the leading cause of death among adults aged 40 to 79 years as well and in 21 states.[2] It is estimated roughly 1.7 million Americans will be diagnosed with cancer in 2016, and nearly 14.5 million Americans with a history of cancer were alive in 2014. Cancer disproportionately affects older Americans, with 86% of all cancers diagnosed in people 50 years of age and older.[1] Oncology care contributes greatly to Medicare spending and accounted for an estimated $125 billion in healthcare spending in 2010. This figure is projected to rise to between $173 billion and $207 billion by 2020.[3] Given the current and projected increases in cancer prevalence and costs of care, it is essential that healthcare providers look for opportunities to lower the costs of cancer care.

Reducing readmissions after hospital discharge has been proposed as an effective means of lowering healthcare costs and improving the outcomes of care. Research suggests that between 9% and 48% of all hospital readmissions are preventable, owing to inadequate treatment during the patient's original (index) admission or after discharge.[4] Jencks, et al. estimated that unplanned readmissions cost the Medicare program $17.4 billion in 2004.[5]

Unnecessary hospital readmissions negatively impact cancer patients by compromising their quality of life, by placing them at risk for health-acquired infections, and by increasing the costs of their care. Furthermore,

unplanned readmissions during treatment can delay treatment completion and, potentially, worsen patient prognosis.

Preventing these readmissions improves the quality of care for cancer patients. Numerous studies have examined all-cause readmissions and readmissions for specific conditions, such as orthopedic surgery. Existing studies in cancer have largely focused on post-operative readmissions, reporting readmission rates between 6.5% and 25%. Patient factors, including age, comorbidities, cancer stage, and socioeconomic status, were identified as risk factors in these patients. Surgical complications, surgery duration, and hospital length of stay also increased readmission risk in these studies. Finally, hospital factors (e.g., hospital size) and practice patterns, such as inadequate discharge planning, comorbidity management, and follow-up care, were associated with preventable readmissions.[6-17] Moya, et al. observed a 20% readmission rate in hematopoietic cell transplantation (HCT) recipients along with an extended length of stay during the readmission (25 ± 21 days). Infections (some associated with the graft), graft failure, coagulation disorders, and a second neoplasm were the most frequent causes of readmission.[18] Bejanyan, et al. examined readmissions in patients with myeloablative allogeneic HCT and observed a 39% readmission rate in these patients. Infections, fever, gastrointestinal complications, and graft-versus-host disease (GVHD) were the most frequent reasons for readmission.[19] Less is known about other readmissions in medical cancer admissions, though Ji, et al. noted that surgical patients were most often readmitted for surgical complications while medical patients were typically readmitted for the same condition treated during the index admission.[6] Together, these studies suggest that certain readmissions in cancer patients are preventable and should be routinely measured for purposes of quality improvement and accountability.

All-cause and disease-specific unplanned readmissions rates have been adopted by the Centers for Medicare & Medicaid Services (CMS) as key indicators of inpatient quality care. Additionally, Medicare began reducing payments to hospitals with excess readmissions in October 2012, as mandated in the Patient Protection and Affordable Care Act of 2010. Benbassat, et al. concluded that global readmission rates are not useful indicators of healthcare quality and, instead, recommended measuring readmissions at the condition level.[4] Readmission rates have been developed for pneumonia, acute myocardial infarction, and heart failure. However, cancer has lagged behind these conditions in the development of validated readmission rates. In 2012, the Comprehensive Cancer Center Consortium for Quality Improvement, or C4QI (a group of eighteen academic medical centers that collaborate to measure and improve the quality of cancer in their centers), began development of a cancer-specific unplanned readmissions measure: *30-Day Unplanned Readmissions for Cancer Patients*. The Alliance of Dedicated Cancer Centers, or ADCC (an organization of eleven comprehensive cancer centers that are reimbursed differently by Medicare), identified this ongoing work as a potential accountability measure for the PCHQR. Both groups recognize the importance of measuring unplanned readmissions as an indicator of the quality of hospital-based oncology care and have designed the *30-Day Unplanned Readmissions for Cancer Patients* measure accordingly.[5,6] This measure is intended to reflect the unique clinical aspects of oncology patients and to yield readmission rates that more accurately reflect the quality of cancer care delivery, when compared with broader readmissions measures. Likewise, this measure addresses cancer measurement gaps in existing readmissions measures, such as the *Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)*, stewarded by CMS. The *30-Day Unplanned Readmissions for Cancer Patients* measure can be used by individual hospitals to inform local quality improvement efforts. Through adoption in public reporting programs (e.g., PCHQR), it can increase transparency around the quality of care delivered to patients with cancer.

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1a.3. SYSTEMATIC REVIEW(SR) OF THE EVIDENCE (for INTERMEDIATE OUTCOME, PROCESS, OR STRUCTURE PERFORMANCE MEASURES) If the evidence is not based on a systematic review go to section 1a.4) If you wish to include more than one systematic review, add additional tables.

What is the source of the systematic review of the body of evidence that supports the performance measure? A systematic review is a scientific investigation that focuses on a specific question and uses explicit, prespecified scientific methods to identify, select, assess, and summarize the findings of similar but separate studies. It may include a quantitative synthesis (meta-analysis), depending on the available data. (IOM)

☐Clinical Practice Guideline recommendation (with evidence review)

☐US Preventive Services Task Force Recommendation

☐Other systematic review and grading of the body of evidence (*e.g., Cochrane Collaboration, AHRQ Evidence Practice Center*)

☐Other

Source of Systematic Review: • **Title** • **Author** • **Date** • **Citation, including page number** • **URL**	
Quote the guideline or recommendation verbatim about the process, structure or intermediate outcome being measured. If not a guideline, summarize the conclusions from the SR.	
Grade assigned to the **evidence** associated with the recommendation with the definition of the grade	
Provide all other grades and definitions from the evidence grading system	
Grade assigned to the **recommendation** with definition of the grade	

Provide all other grades and definitions from the recommendation grading system	
Body of evidence: • Quantity – how many studies? • Quality – what type of studies?	
Estimates of benefit and consistency across studies	
What harms were identified?	
Identify any new studies conducted since the SR. Do the new studies change the conclusions from the SR?	

1a.4 OTHER SOURCE OF EVIDENCE

If source of evidence is NOT from a clinical practice guideline, USPSTF, or systematic review, please describe the evidence on which you are basing the performance measure.

1a.4.1 Briefly SYNTHESIZE the evidence that supports the measure. A list of references without a summary is not acceptable.

1a.4.2 What process was used to identify the evidence?

1a.4.3. Provide the citation(s) for the evidence.

1. Evidence, Performance Gap, Priority – Importance to Measure and Report
Extent to which the specific measure focus is evidence-based, important to making significant gains in healthcare quality, and improving health outcomes for a specific high-priority (high-impact) aspect of healthcare where there is variation in or overall less-than-optimal performance. ***Measures must be judged to meet all sub criteria to pass this criterion and be evaluated against the remaining criteria.***
1a. Evidence to Support the Measure Focus – See attached Evidence Submission Form 2017_01_13_UnplannedReadm_Cancer_NQF_evidence_attachment_Final.docx **1a.1 For Maintenance of Endorsement: Is there new evidence about the measure since the last update/submission?** Please update any changes in the evidence attachment in red. Do not remove any existing information. If there have been any changes to evidence, the Committee will consider the new evidence. If there is no new evidence, no updating of the evidence information is needed.
1b. Performance Gap Demonstration of quality problems and opportunity for improvement, i.e., data demonstrating: • considerable variation, or overall less-than-optimal performance, in the quality of care across providers; and/or

- Disparities in care across population groups.

1b.1. Briefly explain the rationale for this measure *(e.g., how the measure will improve the quality of care, the benefits or improvements in quality envisioned by use of this measure)*
IF a PRO-PM (e.g. HRQoL/functional status, symptom/burden, experience with care, health-related behaviors), provide evidence that the target population values the measured PRO and finds it meaningful. (Describe how and from whom their input was obtained.)
IF a COMPOSITE (e.g., combination of component measure scores, all-or-none, any-or-none), SKIP this question and provide rationale for composite in question 1c.3 on the composite tab.
For many cancer patients, readmission following hospitalization may be preventable and should be addressed to potentially lower costs and improve patient outcomes. The Alliance of Dedicated Cancer Centers, or ADCC (an organization of the eleven National Cancer Institute-designated comprehensive cancer centers that are exempt from the Prospective Payment System), recognizes the need for oncology-specific efficiency measures, including unplanned readmissions because planned readmissions are often used in clinical pathways for cancer patients. In 2014, the ADCC identified the 30-Day Unplanned Readmissions for Cancer Patients measure as a potential accountability measure for the PPS-Exempt Cancer Hospitals Quality Reporting Program (PCHQR). The measure was initially developed by the Comprehensive Cancer Centers for Quality Improvement (C4QI), a group of twenty-one academic medical centers that collaborate to measure and improve the quality of cancer care in their institutions. C4QI's 21 members (11 ADCC hospitals/PCHs and 10 other academic medical centers, or AMC) have utilized this claims-based, cancer-specific unplanned readmissions measure since 2012. It is designed to reflect the unique clinical aspects of oncology and to provide a more comprehensive measurement of unplanned readmissions in cancer patients, when compared with existing measures (e.g., the HWR measure). It considers patients with an admission type of "emergency" or "urgent" within 30 days of an index admission as an unplanned readmission. It excludes readmissions for patients readmitted for chemotherapy or radiation therapy treatment or with disease progression. Using this measure, hospitals can better identify and address preventable readmissions for cancer patients.

An earlier version of this measure (NQF #2884) was reviewed by the NQF All-Cause Admissions and Readmissions Project 2015-2017 Technical Expert Panel (TEP) in June 2016. Following the recommendation of the TEP, the ADCC broadened the measure to capture readmissions of cancer patients from and to any short-term acute care PPS hospital and pursued additional testing of the measure using Medicare claims data (i.e., the Standard Analytical Files). This expansion produced unplanned readmissions rates of patients discharged from PCHs and readmitted to any short-term acute care hospital (defined as PCHs, short-term acute care Prospective Payment System, or PPS, hospitals, and Critical Access Hospitals, or CAH). Additionally, it provided comparative rates of unplanned readmissions of cancer patients for non-PCH short–term acute care hospitals (i.e., short-term acute care PPS hospitals and CAHs).

1b.2. Provide performance scores on the measure as specified (current and over time) at the specified level of analysis. *(This is required for maintenance of endorsement. Include mean, std dev, min, max, interquartile range, scores by decile. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include.) This information also will be used to address the sub-criterion on improvement (4b) under Usability and Use.*
30-Day Unplanned Readmissions for Cancer Patients
All Short-Term Acute Care Hospitals
CY2013-2015 Summary Statistics-Unadjusted Rates

	2013-15	2013	2014	2015
Number of Hospitals		4,974	4,736	4,722	4,688
Number of Admissions (Denominator)		3,067,675		1,037,916	1,016,301	1,013,458
Number of Unplanned Readmissions (Numerator)		587,915	198,039	194,993	194,883	
30-Day Unplanned Readmission Rate		19.16%	19.08%	19.19%	19.23%	
Mean (Standard Deviation)		16.54% (8.24%)		16.53% (10.36%)	16.47% (10.71%)	16.64% (11.01%)
Range (Min-Max)	0.00%-100.00%		0.00%-100.00%		0.00%-100.00%	0.00%-100.00%
Quartile Range	8.30%	10.32%	10.32%	10.53%		
Minimum	0.00%	0.00%	0.00%	0.00%		
25th percentile	12.50%	11.11%	11.11%	11.11%		
50th percentile	17.32%	17.20%	17.23%	17.35%		
75th percentile	20.80%	21.43%	21.43%	21.64%		
Maximum	100.00%	100.00%	100.00%	100.00%		

Table 1: Summary-level statistics for the 30-Day Unplanned Readmissions for Cancer Patients measure—shows unadjusted results of the 30-Day Unplanned Readmissions for Cancer Patients measure, when applied to 1Q CY2013-4Q CY2015 index admissions for short-term acute care hospitals (i.e., PCHs, short-term acute care PPS hospitals, and CAHs). Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

1b.3. If no or limited performance data on the measure as specified is reported in 1b2, then provide a summary of data from the literature that indicates opportunity for improvement or overall less than optimal performance on the specific focus of measurement.

1b.4. Provide disparities data from the measure as specified (current and over time) by population group, e.g., by race/ethnicity, gender, age, insurance status, socioeconomic status, and/or disability. *(This is required for maintenance of endorsement. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included.) For measures that show high levels of performance, i.e., "topped out", disparities data may demonstrate an opportunity for improvement/gap in care for certain sub-populations. This information also will be used to address the sub-criterion on improvement (4b) under Usability and Use.*

Measure testing produced the following descriptive statistics for patient-level demographic variables, which were evaluated in our risk adjustment model:

For the denominator:

Sex

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Unknown	5,560	0.18%	5,560	0.18%
Male	1,616,259	52.69%	1,621,819	52.87%
Female	1,445,856	47.13%	3,067,675	100.00%

Table 2: "Sex" variable distribution for the 30-Day Unplanned Readmissions for Cancer Patients measure—includes the distribution of the "Sex" variable for the denominator population when the 30-Day Unplanned Readmissions for Cancer Patients measure is applied to 1Q CY2013-4Q CY2015 index admissions for all 4,974 short-term acute care hospital (defined as PCHs, short-term acute care PPS hospitals, and CAHs). Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

Age at Beginning of Reference Year

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Unknown	5,560	0.18%	5,560	0.18%
Under 65	409,844	13.36%	415,404	13.54%
65-69	618,508	20.16%	1,033,912	33.70%
70-74	606,147	19.76%	1,640,059	53.46%
75-79	529,837	17.27%	2,169,896	70.73%
80-84	424,681	13.84%	2,594,577	84.58%
85+	473,098	15.42%	3,067,675	100.00%

Table 3: "Age " variable distribution for the 30-Day Unplanned Readmissions for Cancer Patients measure—includes the distribution of the "Age" variable for the denominator population when the 30-Day Unplanned Readmissions for Cancer Patients measure is applied to 1Q CY2013-4Q CY2015 index admissions for all 4,974 short-term acute care hospital (defined as PCHs, short-term acute care PPS hospitals, and CAHs). The "Age" variable is populated by adding one year to the "Age" field in the Medicare SAF (1Q2013-4Q2015), which is reported as the beneficiary's age at the end of the prior year. Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

Beneficiary Race Code

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Unknown	28,494	0.93%	28,494	0.93%
White	2,535,852	82.66%	2,564,346	83.59%
Black	354,140	11.54%	2,918,486	95.14%
Other	39,428	1.29%	2,957,914	96.42%
Asian	42,990	1.40%	3,000,904	97.82%
Hispanic	52,158	1.70%	3,053,062	99.52%

North American Native	14,613	0.48%	3,067,675	100.00%

Table 4: "Race" variable distribution for the 30-Day Unplanned Readmissions for Cancer Patients measure—includes the distribution of the "Race" (or "Beneficiary Race Code") variable for the denominator population when the 30-Day Unplanned Readmissions for Cancer Patients measure is applied to 1Q CY2013-4Q CY2015 index admissions for all 4,974 short-term acute care hospital (defined as PCHs, short-term acute care PPS hospitals, and CAHs). Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

Dual-Eligible Status

Value	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Never dual eligible	2,448,890	79.83%	2,448,890	79.83%
Dual eligible at some point	618,785	20.17%	3,067,675	100.00%

Table 5: "Dual-Eligible Status" variable distribution for the 30-Day Unplanned Readmissions for Cancer Patients measure—includes the distribution of dual-eligible Medicare beneficiaries for the denominator population when the 30-Day Unplanned Readmissions for Cancer Patients measure is applied to 1Q CY2013-4Q CY2015 index admissions for all 4,974 short-term acute care hospital (defined as PCHs, short-term acute care PPS hospitals, and CAHs). The "Dual-Eligible Status" variable is used as a proxy for socioeconomic status and is populated by analyzing the Buyin field in the Medicare SAF (1Q2013-4Q2015). Patients with any claims with a value of "A", "B", or "C" in the Buyin field in the 1Q2013-4Q2015 data set are coded as "Dual-Eligible" in this variable. All other patients are coded as "Never Dual-Eligible" in this variable. Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

1b.5. **If no or limited data on disparities from the measure as specified is reported in 1b.4, then provide a summary of data from the literature that addresses disparities in care on the specific focus of measurement. Include citations. Not necessary if performance data provided in 1b.4**

2. Reliability and Validity—Scientific Acceptability of Measure Properties

Extent to which the measure, as specified, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. ***Measures must be judged to meet the sub criteria for both reliability and validity to pass this criterion and be evaluated against the remaining criteria.***

2a.1. Specifications The measure is well defined and precisely specified so it can be implemented consistently within and across organizations and allows for comparability. eMeasures should be specified in the Health Quality Measures Format (HQMF) and the Quality Data Model (QDM).

De.5. **Subject/Topic Area** *(check all the areas that apply):*

De.6. **Cross Cutting Areas** *(check all the areas that apply):*
«crosscutting_area»

De.7. **Target Population Category** *(Check all the populations for which the measure is specified and tested if any):*

S.1. **Measure-specific Web Page** *(Provide a URL link to a web page specific for this measure that contains current detailed specifications including code lists, risk model details, and supplemental materials. Do not enter a URL linking to a home page or to general information.)*

S.2a. **If this is an eMeasure**, HQMF specifications must be attached. Attach the zipped output from the eMeasure authoring tool (MAT) - if the MAT was not used, contact staff. (Use the specification fields in this online form for the plain-language description of the specifications)
This is not an eMeasure **Attachment:**

S.2b. **Data Dictionary, Code Table, or Value Sets** *(and risk model codes and coefficients when applicable) must be attached. (Excel or csv file in the suggested format preferred - if not, contact staff)*
Attachment **Attachment:** 2017_01_13_UnplannedReadm_Cancer_DataDictv1.0.xls

S.3.1. **For maintenance of endorsement:** Are there changes to the specifications since the last updates/submission. If yes, update the specifications for S1-2 and S4-22 and explain reasons for the changes in S3.2.

S.3.2. **For maintenance of endorsement,** please briefly describe any important changes to the measure specifications since last measure update and explain the reasons.

S.4. **Numerator Statement** *(Brief, narrative description of the measure focus or what is being measured about the target population, i.e., cases from the target population with the target process, condition, event, or outcome) DO NOT include the rationale for the measure.*
IF an OUTCOME MEASURE, state the outcome being measured. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).
This outcome measure demonstrates the rate at which adult cancer patients have unplanned readmissions within 30 days of discharge from an eligible index admission. The numerator includes all eligible unplanned readmissions to any short-term acute care hospital—defined as admission to a PPS-Exempt Cancer Hospital (PCH), a short-term acute care Prospective Payment (PPS) hospital, or Critical Access Hospital (CAH)—within 30 days of the discharge date from an index admission that is included in the measure denominator. Readmissions with an admission type (UB-04 Uniform Bill Locator 14) of "emergency = 1" or "urgent = 2" are considered unplanned readmissions within this measure. Readmissions for patients with progression of disease (using a principal diagnosis of metastatic disease as a proxy) and for patients with planned admissions for treatment (defined as a principal diagnosis of chemotherapy or radiation therapy) are excluded from the measure numerator.

S.5. **Numerator Details** *(All information required to identify and calculate the cases from the target population with the target process, condition, event, or outcome such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b)*
IF an OUTCOME MEASURE, describe how the observed outcome is identified/counted. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).
The numerator includes readmissions of the following patients with an eligible index admission in the measure denominator:
1) Readmitted to a short-term acute care hospital (PCHs, short-term acute care PPS hospitals, and CAHs) within 30 days of the discharge date of an index admission; and,
2) Readmitted with a Claim Inpatient Admission Type Code of "Emergency" or "Urgent" ("1" or "2").

The following readmissions are excluded from the measure numerator:
1) Primary Claim Diagnosis Code of metastatic disease (ICD-9-CM range: 196-198.89, 209.70-209.79; ICD-10-CM range: C77.0 – C79.9, C7B.0-C7B.8).
Rationale: A primary (or principal) diagnosis of metastatic disease serves as a proxy for disease progression. Readmissions for conditions or symptoms associated with disease progression are not reflective of poor clinical care but, rather, advanced disease.

2) Patients with a Primary Claim Diagnosis Code of chemotherapy or radiation encounter (ICD-9-CM range: V58.00-V58.12; ICD-10-CM range: Z51.00 – Z51.12) as these are considered planned admissions.
Rationale: Readmissions are expected and planned for some patients who require additional cancer treatment in the inpatient setting. These readmissions reflects high-quality care that is focused on patient safety and are reliably distinguishable in claims data.

Of note, if a patient has more than one unplanned admission within 30 days of discharge from the index admission, each readmission is only counted once in the numerator.

S.6. **Denominator Statement** *(Brief, narrative description of the target population being measured)*
The denominator includes inpatient admissions for all adult Fee-for-Service Medicare beneficiaries where the patient is discharged from a short-term acute care hospital (PCH, short-term acute care PPS hospital, or CAH) with a principal or secondary diagnosis (i.e., not admitting diagnosis) of malignant cancer within the defined measurement period.

S.7. **Denominator Details** *(All information required to identify and calculate the target population/denominator such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b.)*
IF an OUTCOME MEASURE, describe how the target population is identified. Calculation of the risk-adjusted outcome should be described in the calculation algorithm (S.14).
The denominator includes index admissions at acute care hospitals (PCHs, short-term acute care PPS hospitals, and CAHs) for patients with a discharge date during the measurement period that meet the following criterion:
1) Primary Claim Diagnosis Code or Claim Diagnosis Code I-XXV of malignant cancer (ICD-9-CM range: 140.00-209.36, 209.70-209.79, 511.81, 789.51; ICD-10-CM range: C00 – C96.9, J91.0, R18.0).

Of note, a readmission that meets the denominator criteria is included as an index admission within this measure if it meets all other eligibility criteria.

S.8. **Denominator Exclusions** *(Brief narrative description of exclusions from the target population)*
The following index admissions are excluded from the measure denominator:
1) Less than 18 years of age;
2) Patients who died during the index admission;
3) Patients discharged AMA;
4) Patients transferred to another acute care hospital during the index admission;
5) Patients discharged with a planned readmission;
6) Patients having missing or incomplete data; and,
7) Patients not admitted to an inpatient bed.

S.9. **Denominator Exclusion Details** *(All information required to identify and calculate exclusions from the denominator such as definitions, time period for data collection, specific data collection items/responses, code/value sets – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format at S.2b.)*
The following index admissions are excluded from the measure denominator:
1) Age less than 18 years of age (based on the beneficiary's age at the end of the prior year).
Rationale: Pediatric patients represent a very small and distinct Medicare population with different characteristics and outcomes.

2) Patient Discharge Status Code indicating "Expired" (20).
Rationale: Patients that die during the index admission cannot be readmitted.

3) Patient Discharge Status Code indicating "Left Against Medical Advice" (07).
Rationale: The hospital had limited opportunity to ensure the patient was prepared for discharge and had appropriate follow-up care.

4) Patient Discharge Status Code indicating transfer to an acute care facility (02, 05, 09, 30, 43, 66, 69).
Rationale: Responsibility for any unplanned readmissions is assigned to the final discharging hospital. Intermediate index admissions within a single episode of care are ineligible for inclusion.

5) Patient Discharge Status Code indicating discharge with a planned readmission (81-95).
Rationale: The patient was discharged with a planned readmission, which is ineligible for the measure numerator.

6) Patient Discharge Status Code indicating "Unknown Value" (0, 40-42) or Organization NPI Number = "".
Rationale: Admissions without a valid discharge status cannot be evaluated for measure exclusions. Admissions with a discharge status reserved for hospice claims only are not admissions for acute care or to acute care hospitals. Claims without an Organizational NPI Number cannot be evaluated for inclusion in the measure.

7) NCH Claim Type Code indicating a claim record type is not an "Inpatient Claim" (all values except 60).
Rationale: These admissions are not for acute care or to acute care hospitals.

S.10. **Stratification Information** *(Provide all information required to stratify the measure results, if necessary, including the stratification variables, definitions, specific data collection items/responses, code/value sets, and the risk-model covariates and coefficients for the clinically-adjusted version of the measure when appropriate – Note: lists of individual codes with descriptors that exceed 1 page should be provided in an Excel or csv file in required format with at S.2b.)*

Measure is not stratified.

S.11. **Risk Adjustment Type** (Select type. Provide specifications for risk stratification in measure testing attachment)
Statistical risk model
If other:

S.12. **Type of score:**
Rate/proportion
If other:

S.13. **Interpretation of Score** *(Classifies interpretation of score according to whether better quality is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score)*
Better quality = Lower score

S.14. **Calculation Algorithm/Measure Logic** (*Diagram or describe the calculation of the measure score as an ordered sequence of steps including identifying the target population; exclusions; cases meeting the target process, condition, event, or outcome; time period for data, aggregating data; risk adjustment; etc.)*
Please refer to the measure flow logic in the data dictionary.

S.15. **Sampling** *(If measure is based on a sample, provide instructions for obtaining the sample and guidance on minimum sample size.)*
IF a PRO-PM, identify whether (and how) proxy responses are allowed.
This outcome measure is based on the full population of eligible patients; sampling is not applied.

S.16. **Survey/Patient-reported data** *(If measure is based on a survey or instrument, provide instructions for data collection and guidance on minimum response rate.)*
IF a PRO-PM, specify calculation of response rates to be reported with performance measure results.
N/A

S.17. **Data Source** *(Check ONLY the sources for which the measure is SPECIFIED AND TESTED).*
If other, please describe in S.18.
Claims (Only)

S.18. **Data Source or Collection Instrument** *(Identify the specific data source/data collection instrument (e.g. name of database, clinical registry, collection instrument, etc., and describe how data is collected.)*
IF a PRO-PM, identify the specific PROM(s); and standard methods, modes, and languages of administration.
The Medicare 100% Standard Analytic File (SAF) covering CY2013 through CY2016Q1 was used for testing purposes. This contains 100% of the claims for the Fee-for-Service population. The specific files used were the Inpatient file containing information on inpatient claims and the Denominator file containing information on the enrollment and demographics. As these data are released in separate files, the data files were combined by a statistician at Watson Policy Analysis for purposes of measure testing.

S.19. **Data Source or Collection Instrument** *(available at measure-specific Web page URL identified in S.1 OR in attached appendix at A.1)*
No data collection instrument provided

S.20. **Level of Analysis** *(Check ONLY the levels of analysis for which the measure is SPECIFIED AND TESTED)*
Facility

S.21. **Care Setting** *(Check ONLY the settings for which the measure is SPECIFIED AND TESTED)*
Hospital : Acute Care Facility
If other:

S.22. **COMPOSITE Performance Measure** - Additional Specifications *(Use this section as needed for aggregation and weighting rules, or calculation of individual performance measures if not individually endorsed.)*
N/A

2. Validity – See attached Measure Testing Submission Form
2017_01_13_UnplannedReadm_Cancer_NQF_testing_attachment_Final.docx

2.1 For maintenance of endorsement
Reliability testing: If testing of reliability of the measure score was not presented in prior submission(s), has reliability testing of the measure score been conducted? If yes, please provide results in the Testing attachment. (Do not remove prior testing information – include date of new information in red.)

2.2 For maintenance of endorsement
Has additional empirical validity testing of the measure score been conducted? If yes, please provide results in the Testing attachment. (Do not remove prior testing information – include date of new information in red.)

2.3 For maintenance of endorsement
Risk adjustment: For outcome, resource use, cost, and some process measures, risk-adjustment that includes SDS factors is no longer prohibited during the SDS Trial Period (2015-2016). Please update sections 1.8, 2a2, 2b2, 2b4, and 2b6 in the Testing attachment and S.14 and S.15 in the online submission form in accordance with the requirements for the SDS Trial Period. NOTE: These sections must be updated even if SDS factors are not included in the risk-adjustment strategy. If yes, and your testing attachment does not have the additional questions for the SDS Trial please add these questions to your testing attachment:

What were the patient-level sociodemographic (SDS) variables that were available and analyzed in the data or sample used? For example, patient-reported data (e.g., income, education, language), proxy variables when SDS data are not collected from each patient (e.g. census tract), or patient community characteristics (e.g. percent vacant housing, crime rate).

Describe the conceptual/clinical and statistical methods and criteria used to select patient factors (clinical factors or sociodemographic factors) used in the statistical risk model or for stratification by risk (e.g., potential factors identified in the literature and/or expert panel; regression analysis; statistical significance of p<0.10; correlation of x or higher; patient factors should be present at the start of care)

What were the statistical results of the analyses used to select risk factors?

Describe the analyses and interpretation resulting in the decision to select SDS factors (e.g. prevalence of the factor across measured entities, empirical association with the outcome, contribution of unique variation in the outcome, assessment of between-unit effects and within-unit effects)

NATIONAL QUALITY FORUM—Measure Testing (subcriteria 2a2, 2b2-2b7)

Measure Number (*if previously endorsed*)**:** Click here to enter NQF number
Measure Title: 30-Day Unplanned Readmissions for Cancer Patients
Date of Submission: 1/13/2017
Type of Measure:

☒ Outcome (*including PRO-PM*)	☐ Composite – ***STOP – use composite testing form***
☐Intermediate Clinical Outcome	☐ Cost/resource
☐ Process	☐ Efficiency
☐ Structure	

Instructions

- Measures must be tested for all the data sources and levels of analyses that are specified. ***If there is more than one set of data specifications or more than one level of analysis, contact NQF staff*** about how to present all the testing information in one form.

- **For <u>all</u> measures, sections 1, 2a2, 2b2, 2b3, and 2b5 must be completed.**
- **For <u>outcome and resource use</u> measures**, section **2b4** also must be completed.
- If specified for **<u>multiple data sources/sets of specificaitons</u>** (e.g., claims and EHRs), section **2b6** also must be completed.
- Respond to <u>all</u> questions as instructed with answers immediately following the question. All information on testing to demonstrate meeting the subcriteria for reliability (2a2) and validity (2b2-2b6) must be in this form. An appendix for *supplemental* materials may be submitted, but there is no guarantee it will be reviewed.
- If you are unable to check a box, please highlight or shade the box for your response.
- Maximum of 20 pages (*incuding questions/instructions;* minimum font size 11 pt; do not change margins). ***Contact NQF staff if more pages are needed.***
- Contact NQF staff regarding questions. Check for resources at Submitting Standards webpage.
- For information on the most updated guidance on how to address sociodemographic variables and testing in this form refer to the release notes for version 6.6 of the Measure Testing Attachment.

<u>Note</u>: The information provided in this form is intended to aid the Steering Committee and other stakeholders in understanding to what degree the testing results for this measure meet NQF's evaluation criteria for testing.

2a2. Reliability testing [10] demonstrates the measure data elements are repeatable, producing the same results a high proportion of the time when assessed in the same population in the same time period and/or that the measure score is precise. For **PRO-PMs and composite performance measures**, reliability should be demonstrated for the computed performance score.

2b2. Validity testing [11] demonstrates that the measure data elements are correct and/or the measure score correctly reflects the quality of care provided, adequately identifying differences in quality. For **PRO-PMs and composite performance measures**, validity should be demonstrated for the computed performance score.

2b3. Exclusions are supported by the clinical evidence; otherwise, they are supported by evidence of sufficient frequency of occurrence so that results are distorted without the exclusion; [12]

AND

If patient preference (e.g., informed decisionmaking) is a basis for exclusion, there must be evidence that the exclusion impacts performance on the measure; in such cases, the measure must be specified so that the information about patient preference and the effect on the measure is transparent (e.g., numerator category computed separately, denominator exclusion category computed separately). [13]

2b4. For outcome measures and other measures when indicated (e.g., resource use):

- **an evidence-based risk-adjustment strategy** (e.g., risk models, risk stratification) is specified; is based on patient factors (including clinical and sociodemographic factors) that influence the measured outcome and are present at start of care; [14,15] and has demonstrated adequate discrimination and calibration

OR

- rationale/data support no risk adjustment/ stratification.

2b5. Data analysis of computed measure scores demonstrates that methods for scoring and analysis of the specified measure allow for **identification of statistically significant and practically/clinically meaningful** [16] **differences in performance**;

OR

there is evidence of overall less-than-optimal performance.

2b6. If multiple data sources/methods are specified, there is demonstration they produce comparable results.

2b7. For **eMeasures, composites, and PRO-PMs** (or other measures susceptible to missing data), analyses identify the extent and distribution of missing data (or nonresponse) and demonstrate that performance results are not biased due to systematic missing data (or differences between responders and nonresponders) and how the specified handling of missing data minimizes bias.

Notes

10. Reliability testing applies to both the data elements and computed measure score. Examples of reliability testing for data elements include, but are not limited to: inter-rater/abstractor or intra-rater/abstractor studies; internal consistency for multi-item scales; test-retest for survey items. Reliability testing of the measure score addresses precision of measurement (e.g., signal-to-noise).

11. Validity testing applies to both the data elements and computed measure score. Validity testing of data elements typically analyzes agreement with another authoritative source of the same information. Examples of validity testing of the measure score include, but are not limited to: testing hypotheses that the measures scores indicate quality of care, e.g., measure scores are different for groups known to have differences in quality assessed by another valid quality measure or method; correlation of measure scores with another valid indicator of quality for the specific topic; or relationship to conceptually related measures (e.g., scores on process measures to scores on outcome measures). Face validity of the measure score as a quality indicator may be adequate if accomplished through a systematic and transparent process, by identified experts, and explicitly addresses whether performance scores resulting from the measure as specified can be used to distinguish good from poor quality.

12. Examples of evidence that an exclusion distorts measure results include, but are not limited to: frequency of occurrence, variability of exclusions across providers, and sensitivity analyses with and without the exclusion.
13. Patient preference is not a clinical exception to eligibility and can be influenced by provider interventions.

14. Risk factors that influence outcomes should not be specified as exclusions
15. With large enough sample sizes, small differences that are statistically significant may or may not be practically or clinically meaningful. The substantive question may be, for example, whether a statistically significant difference of one percentage point in the percentage of patients who received smoking cessation counseling (e.g., 74 percent v. 75 percent) is clinically meaningful; or whether a statistically significant difference of $25 in cost for an episode of care (e.g., $5,000 v. $5,025) is practically meaningful. Measures with overall less-than-optimal performance may not demonstrate much variability across providers.

1. DATA/SAMPLE USED FOR ALL TESTING OF THIS MEASURE

Often the same data are used for all aspects of measure testing. In an effort to eliminate duplication, the first five questions apply to all measure testing. If there are differences by aspect of testing,(e.g., reliability vs. validity) be sure to indicate the specific differences in question 1.7.

1.1. What type of data was used for testing? (*Check all the sources of data identified in the measure specifications and data used for testing the measure. Testing must be provided for all the sources of data specified and intended for measure implementation.* ***If different data sources are used for the numerator and denominator, indicate N [numerator] or D [denominator] after the checkbox.***)

Measure Specified to Use Data From: (***must be consistent with data sources entered in S.23***)	**Measure Tested with Data From:**
☐ abstracted from paper record	☐ abstracted from paper record
☒ administrative claims	☒ administrative claims
☐ clinical database/registry	☐ clinical database/registry

☐ abstracted from electronic health record	☐ abstracted from electronic health record
☐ eMeasure (HQMF) implemented in EHRs	☐ eMeasure (HQMF) implemented in EHRs
☐ other: Click here to describe	☐ other: Click here to describe

1.2. If an existing dataset was used, identify the specific dataset (*the dataset used for testing must be consistent with the measure specifications for target population and healthcare entities being measured; e.g., Medicare Part A claims, Medicaid claims, other commercial insurance, nursing home MDS, home health OASIS, clinical registry*).

Medicare 100% Standard Analytic File (SAF), Inpatient file and Denominator file.

1.3. What are the dates of the data used in testing?

4Q CY2012 – 1Q CY2016

1.4. What levels of analysis were tested? (*testing must be provided for <u>all</u> the levels specified and intended for measure implementation, e.g., individual clinician, hospital, health plan*)

Measure Specified to Measure Performance of: (***must be consistent with levels entered in item S.26***)	**Measure Tested at Level of:**
☐ individual clinician	☐ individual clinician
☐ group/practice	☐ group/practice
☒ hospital/facility/agency	☒ hospital/facility/agency
☐ health plan	☐ health plan
☐ other: Click here to describe	☐ other: Click here to describe

1.5. How many and which <u>measured entities</u> were included in the testing and analysis (by level of analysis and data source)? (*identify the number and descriptive characteristics of measured entities included in the analysis (e.g., size, location, type); if a sample was used, describe how entities were selected for inclusion in the sample*)

Testing of the measure, as currently specified, was performed at the facility level using the Medicare 100% SAF covering 4Q CY2012 through 1Q CY2016 claims. The Inpatient file containing information on inpatient claims, and the Denominator file containing information on the enrollment and demographics were used for purposes of testing and analysis. We included patients with an eligible index admission (denominator) between 1Q CY2013 and 4Q CY2015. An additional quarter of data (4Q CY2012) was included in the analysis to ensure that all risk adjustment factors were accurate. An additional quarter of data (1Q CY2016) was also included in the analysis to ensure that all eligible unplanned readmissions were captured. This dataset was used without modification for the following testing activities: generating performance rates and descriptive statistics for the measure submission; evaluating measure exclusions; and, evaluating sociodemographic (SDS) variables for potential inclusion.

A total of 4,974 short-term acute care hospitals were included. Short-term acute care hospitals were defined as: PPS-Exempt Cancer Hospitals (PCH); short-term acute care Prospective Payment System (PPS) hospitals; and, Critical Access Hospitals (CAH). Hospitals from Maryland were included in this analysis. All other acute hospital types were excluded, such as: Long-Term Care Hospitals (LTCHs), Inpatient Rehabilitation Facilities

(IRFs), and Inpatient Psychiatric Hospitals. The hospital was the level of analysis, as defined by National Provider Identifier (NPI).

Below are descriptive statistics for the 4,974 short-term acute care hospitals included in the measure denominator:

	All Short-Term Acute Care Hospitals	PPS-Exempt Cancer Hospitals	Short-Term Acute Care PPS Hospitals	Critical Access Hospitals
Number of Hospitals	4,974	11	3,617	1,346
% of Hospitals in Full Dataset	*100.00%*	*0.22%*	*72.72%*	*27.06%*
Number of Admissions (Denominator)	3,067,675	73,159	2,934,917	59,599
% of Admissions in Full Dataset	*100.00%*	*2.38%*	*95.67%*	*1.94%*
Mean Admissions per Hospital (Standard Deviation)	616.74 (1,151.06)	6,650.82 (7,861.36)	811.42 (1,174.69)	44.28 (42.89)
Range (Min-Max)	1-22,300	291-22,300	1-12,998	1-308
Quartile Range	713	7,242	951	951
Minimum	1	291	1	1
25th percentile	37	1,071	107	13
50th percentile	159	3,364	388	31
75th percentile	750	8,313	1,058	61
Maximum	22,300	22,300	12,998	308

Table 1: Shows unadjusted denominator population (1Q2013-4Q2015) for short-term acute care hospitals (i.e., PCHs, short-term acute care PPS hospitals, and CAHs) included in measure testing for the *30-Day Unplanned Readmissions for Cancer Patients* measure. Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

Exceptions

- Reliability testing of the performance measure score used a subset of the dataset above, as described in Section 1.7.
- Empirical validity testing of the performance measure score used a subset of the dataset above, as described in Section 1.7.
- Risk adjustment testing of the performance measure score used a development and a split sample of the dataset above, as described in Section 2b4.5.
- Evaluating meaningful differences of the performance scores used a subset of the dataset above, as described in Section 2b5.1.
- In 2015, we examined the validity of the Type of Admission/Visit reported via the *UB-04 Uniform Bill Locator 14* (Claim Inpatient Admission Type Code in the Medicare SAF) to accurately identify planned and unplanned readmissions in this measure. We summarize the results of this data element validity testing in Sections 2b2.2-2b2.4 of testing attachment. This testing was performed using a mix of administrative claims data and manually-abstracted data. For simplicity purposes, this dataset is not described in this testing attachment. A complete description of the testing dataset and testing results is included in the Appendix.

1.6. How many and which <u>patients</u> were included in the testing and analysis (by level of analysis and data source)? (*identify the number and descriptive characteristics of patients included in the analysis (e.g., age, sex, race, diagnosis); if a sample was used, describe how patients were selected for inclusion in the sample*)

Testing and analysis were performed at the facility level. All testing activities were based on 100% of claims with no sampling applied, excepted as noted above. Below are descriptive statistics for the patients included in the measure denominator and numerator, along with unadjusted *30-Day Unplanned Readmissions for Cancer Patients* rates:

Variable	Value	Denominator		Numerator		*30-Day Unplanned Readmission Rate- Unadjusted*
		N	% of Total	N	% of Total	
Total		3,067,675	100.00%	587,915	100.00%	19.16%
Sex	Unknown	5,560	0.18%	1,043	0.18%	18.76%
	Male	1,616,259	52.69%	317,592	54.02%	19.65%
	Female	1,445,856	47.13%	269,280	45.80%	18.62%
Race	Unknown	28,494	0.93%	5,328	0.91%	18.70%
	White	2,535,852	82.66%	469,232	79.81%	18.50%
	Black	354,140	11.54%	82,120	13.97%	23.19%
	Other	39,428	1.29%	8,062	1.37%	20.45%
	Asian	42,990	1.40%	9,087	1.55%	21.14%
	Hispanic	52,158	1.70%	11,182	1.90%	21.44%
	North American Native	14,613	0.48%	2,904	0.49%	19.87%
Age	Unknown	5,560	0.18%	1,043	0.18%	18.76%
	Under 65	409,844	13.36%	95,759	16.29%	23.36%
	65-69	618,508	20.16%	116,829	19.87%	18.89%
	70-74	606,147	19.76%	116,729	19.85%	19.26%
	75-79	529,837	17.27%	102,143	17.37%	19.28%
	80-84	424,681	13.84%	78,297	13.32%	18.44%
	85+	473,098	15.42%	77,115	13.12%	16.30%
Dual-Eligible Status	Never Dual Eligible	2,448,890	79.83%	448,721	76.32%	18.32%
	Dual Eligible at Some Point	618,785	20.17%	139,194	23.68%	22.49%

<u>Table 2</u>: Includes the distribution of four patient-level variables for the measure denominator and numerator populations (along with unadjusted *30-Day Unplanned Readmissions for Cancer Patients* rates) when the *30-Day Unplanned Readmissions for Cancer Patients* measure is applied to 1Q CY2013-4Q CY2015 index admissions for all 4,974 short-term acute care hospitals (defined as PCHs, short-

term acute care PPS hospitals, and CAHs). Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017. Variables are defined as follows:

- "Sex" variable—defined in the Medicare SAF;
- "Race" variable—defined in the Medicare SAF;
- "Age" variable—populated by adding one year to the "Age" field in the Medicare SAF (1Q2013-1Q2016), which is reported as the beneficiary's age at the end of the prior year; and,
- "Dual-Eligible Status" variable—used as a proxy for socioeconomic status and is populated by analyzing the Buyin field in the Medicare SAF (1Q2013-1Q2016). Patients with any claims with a value of "A", "B", or "C" in the Buyin field in the 1Q2013-1Q2016 dataset are coded as "Dual-Eligible" in this variable. All other patients are coded as "Never Dual-Eligible" in this variable.

1.7. If there are differences in the data or sample used for different aspects of testing (e.g., reliability, validity, exclusions, risk adjustment), identify how the data or sample are different for each aspect of testing reported below.

Performance Score Reliability Dataset

Reliability of the performance score was tested using a subset of the dataset described in Section 1.5. First, we limited the dataset to hospitals with a minimum of 50 eligible index admissions for the CY2013-CY2015 period. Then, we randomly split the dataset into two equal and distinct patient subsets to calculate risk-adjusted performance scores at the hospital level. Finally, we compared the performance scores for each hospital. We then repeated the analysis by year for CY2013, CY2014, and CY2015 to examine measure stability over time.

Below is summary-level information for these datasets, with the minimum case count of 50 eligible index admissions applied:

	2013-15	2013	2014	2015
Sample Size Cutoff: 50 Index Admissions/Hospital (25/Sample Set)				
Number of Hospitals	3,502	2,575	2,559	2,511
% of Hospitals in Full Testing Dataset	*70.41%*	*54.37%*	*54.19%*	*53.56%*
Number of Admissions (Denominator)	3,038,015	1,000,165	980,725	977,975
% of Admissions in Full Testing Dataset	*99.03%*	*96.36%*	*96.50%*	*96.50%*

Table 3: Includes summary-level information for the datasets used for performance score reliability testing for the *30-Day Unplanned Readmissions for Cancer Patients* measure when applied to 1Q CY2013-4Q CY2015 index admissions for short-term acute care hospitals (defined as PCHs, short-term acute care PPS hospitals, and CAHs). The dataset was limited to hospitals with a minimum of 50 eligible index admissions (in total and by year), then randomly split into two equal subsets. Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

Performance Score Empirical Validity Dataset

Empirical validity of the performance score was tested using a subset of the dataset described in Section 1.5. We limited the dataset to eligible index admissions for the 3Q CY2014-2Q CY2015 period. Below is summary-level information for this dataset:

	3Q CY2014-2Q CY2015
Number of Hospitals	4,720
% of Hospitals in Full Testing Dataset	*94.89%*
Number of Admissions (Denominator)	1,018,500

% of Admissions in Full Testing Dataset	*33.20%*

Table 4: Includes summary-level information for the dataset used for performance score empirical validity testing for the *30-Day Unplanned Readmissions for Cancer Patients* measure when applied to 1Q CY2013-4Q CY2015 index admissions for short-term acute care hospitals (defined as PCHs, short-term acute care PPS hospitals, and CAHs). The dataset was limited to hospitals with eligible index admissions in 3Q2014-2Q2015. Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

1.8 What were the patient-level sociodemographic (SDS) variables that were available and analyzed in the data or sample used? For example, patient-reported data (e.g., income, education, language), proxy variables when SDS data are not collected from each patient (e.g. census tract), or patient community characteristics (e.g. percent vacant housing, crime rate).

We considered the NQF's guidelines for patient-level SDS risk adjustment in evaluating potential risk factors for our measure. We found that only "Race" and "Dual-Eligible Status" were readily available in the dataset we used for measure testing. We selected both variables for potential inclusion in our risk adjustment model. Several peer-review publications have suggested disparities in readmissions across conditions [1-5] and in cancer,[6-13] though the results were at times conflicting or not significant.

We utilized the "Race" variable, as defined in the Medicare SAF. The "Dual-Eligible Status" variable was used as a proxy for socioeconomic status and was populated by analyzing the Buyin field in the Medicare SAF. Patients with any claims with a value of "A" ("Part A, State Buy-In"), "B" ("Part A, State Buy-In"), or "C" ("Parts A and B, State Buy-in") in the Buyin field are coded as "Dual-Eligible" in this variable. All other patients are coded as "Never Dual-Eligible" in this variable.

2a2. RELIABILITY TESTING

***Note**: If accuracy/correctness (validity) of data elements was empirically tested, separate reliability testing of data elements is not required – in 2a2.1 check critical data elements; in 2a2.2 enter "see section 2b2 for validity testing of data elements"; and skip 2a2.3 and 2a2.4.*

2a2.1. What level of reliability testing was conducted? (*may be one or both levels*)

☐ **Critical data elements used in the measure** (*e.g., inter-abstractor reliability; data element reliability must address ALL critical data elements*)

☒ **Performance measure score** (e.g., *signal-to-noise analysis*)

2a2.2. For each level checked above, describe the method of reliability testing and what it tests (*describe the steps—do not just name a method; what type of error does it test; what statistical analysis was used*)

In developing this measure, we aimed to produce a reliable measure that yielded similar repeat measurements for each facility and that is stable over time. Accordingly, we evaluated the measure's ability to generate consistent results through split-half correlations when randomly selected subsets of patients were measured in total and over time. Through this test-retest approach, we randomly split the dataset into two equal and distinct patient subsets to calculate risk-adjusted performance scores at the hospital level. As metrics of agreement, we calculated both the Intraclass Correlation Coefficient (ICC) and Spearman-Brown Prophecy Formula (S-B) for each of the iterations.[14] The ICC is estimated from the random effects model, which produces risk-adjusted rates.[15] The S-B formula effectively projects the correlation as if the full sample was used and not split randomly. This analysis was conducted over 100 iterations to evaluate the measure's reliability using CY2013-CY2015 eligible index admissions, Further, the S-B value was calculated for each year for the unadjusted data which allowed us to assess any bias that may occur from randomly splitting the data.

By combining multiple years of data, we were able to include more cases to confirm the measure's reliability. We tested the hypothesis that the S-B statistics from each year were greater than 0.5, indicating strong reliability and large effect size.[16,17] Confidence intervals based on the 100 simulations were calculated for the unadjusted and risk-adjusted rates based on the split-half samples.

Because hospitals with fewer cases were expected to have less reliable estimates, we established a minimum volume threshold to reduce potential "noise" associated with calculating performance rates for smaller-volume hospitals. We modeled minimum case counts of 22, 50, and 75 index admissions per hospital (in total and by year) in performing the split half correlation analysis. We found that a minimum case count of 50 index admissions (25 per subset) per hospital produced consistent and stable results, while limiting the number of hospitals excluded from the analysis. Therefore, we limited reliability testing of performance scores to hospitals with a minimum of 50 eligible index admissions during each measurement period—in total and then by year for CY2013, CY2014, and CY2015.

2a2.3. For each level of testing checked above, what were the statistical results from reliability testing? (e.g., *percent agreement and kappa for the critical data elements; distribution of reliability statistics from a signal-to-noise analysis*)

In applying the test-retest approach to establish measure reliability, we set a minimum case count of 50 index admissions (25 per subset) per hospital. There were 3,502 facilities included in the 100 split-half simulations for CY2013-CY2015. For the three-year period, the ICC for the unadjusted rates was 0.570 (95% CI: 0.567, 0.572), while the ICC for the risk-adjusted rates was 0.482 (95% CI: 0.479, 0.485).

The S-B statistic allows us to project what the reliability would be if the entire sample were used instead of the split sample. For the three-year period (CY2013-CY2015), the mean S-B was 0.726 (95% CI: 0.724, 0.728) and 0.650 (95% CI: 0.648, 0.653) for unadjusted and risk-adjusted values, respectively.

We also examined the stability of the measure, testing the hypothesis that our mean S-B from each year are greater than 0.5. We applied a minimum case count of 50 index admissions (25 per subset) per hospital for each year. Below are the results of that testing, including S-B statistics for unadjusted and risk-adjusted rates:

	2013	2014	2015
Sample Size Cutoff: 50 Index Admissions/Hospital (25/Sample Set)			
Number of Hospitals	2,575	2,559	2,511
Number of Admissions (Denominator)	1,000,165	980,725	977,975
Unadjusted Rates			
Mean S-B Score	0.635 (0.012)	0.620 (0.014)	0.608 (0.013)
95% Confidence Interval	(0.632, 0.637)	(0.618, 0.623)	(0.605, 0.610)
t-test of H_0: S-B <= 0.5 (p-value)	113.98 (<0.001)	87.32 (<0.001)	80.18 (<0.001)
Risk-Adjusted Rates			
Mean S-B Score (Standard Deviation)	0.543 (0.015)	0.530 (0.017)	0.502 (0.017)
95% Confidence Interval	(0.540, 0.546)	(0.526, 0.533)	(0.499, 0.506)
t-test of H_0: S-B <= 0.5 (p-value)	29.31 (<0.001)	17.62 (<0.001)	1.281 (0.203)

Table 5: Shows statistical results of reliability testing by year for the *30-Day Unplanned Readmissions for Cancer Patients* measure when applied to 1Q CY2013-4Q CY2015 index admissions for short-term acute care hospitals (defined as PCHs, short-term acute care

PPS hospitals, and CAHs). Includes mean S-B scores with standard deviation and 95% confidence interval along with measures of significance (t-test and p-value), when applied to unadjusted and risk-adjusted rates. Each dataset was limited to hospitals with a minimum of 50 eligible index admissions (in total and by year). Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

2a2.4 What is your interpretation of the results in terms of demonstrating reliability? (i.*e., what do the results mean and what are the norms for the test conducted?*)

When examining the reliability testing results for the three-year period (CY2013-CY2015) and the minimum case count of 50 index admissions (25 per subset) per hospital, we observed reliability scores that could be interpreted as "fair" or "strong" depending on the statistical test. The ICC was 0.570 (95% CI: 0.567, 0.572) and 0.482 (95% CI: 0.479, 0.485), for unadjusted and risk-adjusted values, respectively. This result may be interpreted as "fair" reliability.[18] The mean S-B for the same period was 0.726 (95% CI: 0.724, 0.728) for unadjusted rates and 0.650 (95% CI: 0.648, 0.653) for risk-adjusted rates. Both of these values are significantly higher than the 0.5 that indicates a large effect size with p-values < 0.001.[16,17]

Similarly, the S-B values for each year individually (CY2013, CY2014, and CY2015) demonstrated that the reliability measures were stable and consistent over time, producing bell-shaped distributions across all years. The S-B analysis of unadjusted rates by year generated mean S-B exceeding 0.60 with p-values < 0.001, indicating strong reliability and large effect size based on accepted conventional interpretation. When applied to risk-adjusted rates, the S-B analysis generated mean S-B values exceeding 0.50 (p-values < 0.001) in 2013 and 2014, indicating strong reliability and large effect size based on accepted conventional interpretation.[16,17] Overall, the consistent calculations between the two data randomly-split subsets for each period provided evidence that performance variations between hospitals were attributable to hospital-level factors, rather than patient-level factors.

2b2. VALIDITY TESTING

2b2.1. What level of validity testing was conducted? (*may be one or both levels*)

☒ **Critical data elements** (*data element validity must address ALL critical data elements*)

☐ **Performance measure score**

☒ **Empirical validity testing**

☐ **Systematic assessment of face validity of performance measure score as an indicator** of quality or resource use (*i.e., is an accurate reflection of performance on quality or resource use and can distinguish good from poor performance*)

2b2.2. For each level of testing checked above, describe the method of validity testing and what it tests (*describe the steps—do not just name a method; what was tested, e.g., accuracy of data elements compared to authoritative source, relationship to another measure as expected; what statistical analysis was used)*

Data Element Validity

In developing this measure, we aimed to utilized data elements within administrative claims data that have face validity and reliability. Previous measure testing utilized manual chart review to assess the validity of the Type of Admission/Visit reported via the *UB-04 Uniform Bill Locator 14* (Claim Inpatient Admission Type Code in the Medicare SAF) to accurately identify planned and unplanned readmissions. Sensitivity and specificity of the claims-based indicator were evaluated across the participating facilities and in the aggregate to establish data element validity. Please see the Appendix for testing details and results.

Performance Measure Score Empirical Validity Testing

As a test of empirical validity, similar facility-level performance should be observed among measures that evaluate similar healthcare processes. Thus, in testing this measure, we aimed to compare the relative

performance of hospitals under the *30-Day Unplanned Readmissions for Cancer Patients* measure with another measure that is conceptually related. Due to significant cancer measurement gaps, we did not identify NQF-endorsed cancer-specific process or outcome measures suitable for this purpose. However, we determined that CMS' *Hospital-Wide All-Cause Readmission Measure (HWR)* (NQF #1789) could be used for empirical validity testing.

While the two measures have different target populations, they both utilize Medicare claims administrative claims data and assess unplanned readmissions within thirty days of hospital discharge. Additionally, the *30-Day Unplanned Readmissions for Cancer Patients* measure was modeled after the *HWR (NQF #1789)* measure where possible (e.g., a readmission can be counted as both as readmission and an eligible index admission under both measures). Third, both measures are adjusted for patient-level risk factors. Finally, performance score reliability of both measures has been established through measure testing. Thus, within each measure, performance variations between hospitals can be attributed to hospital-level factors (e.g., practice patterns that lead to treatment complications, inadequate discharge planning, comorbidity management, and follow-up care) rather than patient-level factors.

The hypothesized relationship is that better performance (i.e., lower hospital-level rates) on the *HWR (NQF #1789)* measure should be associated with better performance (i.e., lower hospital-level rates) on the *30-Day Unplanned Readmissions for Cancer Patients* measure. To test this hypothesis, we compared hospital-level performance rates for both measures for the 3Q2014-2Q2015 period, the latest period for which *HWR (NQF #1789)* rates are available on Hospital Compare. We calculated the correlation coefficient between rates as an indicator of the strength of the associations. Moderate positive correlation is expected, given that the measures assess similar healthcare practices related to patient care. We limited this analysis to short-term acute care PPS hospitals, as *HWR (NQF #1789)* rates are not reported on Hospital Compare for PCHs and CAHs.

2b2.3. What were the statistical results from validity testing? (*e.g., correlation; t-test*)

Data Element Validity
Previous data element validity testing of the Type of Admission/Visit reported via the UB-04 Uniform Bill Locator 14 (Claim Inpatient Admission Type Code in the Medicare SAF), which utilized manual chart review, generated global sensitivity and specificity scores of 0.879 and 0.896, respectively.

Performance Measure Score Empirical Validity Testing
An overall correlation of 0.2769 ($p<0.001$) was observed for the 4,719 hospitals included in the analysis.

2b2.4. What is your interpretation of the results in terms of demonstrating validity? (i*.e., what do the results mean and what are the norms for the test conducted?*)

Data Element Validity
Global sensitivity and specificity scores of 0.879 and 0.896, respectively, confirmed the validity of the Type of Admission/Visit reported via the *UB-04 Uniform Bill Locator 14* (Claim Inpatient Admission Type Code in the Medicare SAF) to accurately identify planned and unplanned readmissions, as validated by chart review.

Performance Measure Score Empirical Validity Testing
As expected, we observed a statistically significant, moderate positive correlation (0.2769) between the *30-Day Unplanned Readmissions for Cancer Patients* measure and the *HWR (NQF #1789)* measure. This confirms our hypothesis that better performance on the *HWR (NQF #1789)* measure is associated with better performance on the *30-Day Unplanned Readmissions for Cancer Patients* measure.

2b3. EXCLUSIONS ANALYSIS
NA ☐ no exclusions — *skip to section 2b4*

2b3.1. Describe the method of testing exclusions and what it tests (*describe the steps—do not just name a method; what was tested, e.g., whether exclusions affect overall performance scores; what statistical analysis was used*)

In developing this measure, we aimed to establish a cohort of patients with cancer that have unplanned readmissions due to potentially avoidable treatment complications or inadequate discharge instructions or coordination with follow-up outpatient care. Thus, for the denominator population, we applied the following exclusions for patients: 1) Less than 18 years of age; 2) who died during the index admission; 3) discharged Against Medical Device (AMA); 4) transferred to another acute care hospital; 5) discharged with a planned readmission; 6) having missing or incomplete data; and, 7) not admitted to an inpatient bed.
Readmissions for patients with progression of disease (using a principal diagnosis of metastatic disease as a proxy) and for patients with planned admissions for treatment (defined as a principal diagnosis of chemotherapy or radiation therapy) are excluded from the measure numerator.

All exclusions were determined by careful review with our workgroup along with guidance from data and coding experts. They reflect clinically-relevant decisions and alignment with coding practices to ensure accurate performance rates. We examined the frequency of the exclusions to assess their impact on the measurement cohort and performance rates using the dataset described in Sections 1.2-1.6. The rationale for each numerator exclusion is provided in Section S.5 (Numerator Details) of the Measure Information Form. The rationale for each denominator exclusion is provided in Section S.9 (Denominator Exclusion Details) of the Measure Information Form.

To assess the potential impact of each exclusion, we examined the overall number and percentage of each denominator and numerator exclusion in our dataset.

2b3.2. What were the statistical results from testing exclusions? (*include overall number and percentage of individuals excluded, frequency distribution of exclusions across measured entities, and impact on performance measure scores*)

To assess the potential impact of each exclusion, we examined the overall frequency of each denominator and numerator exclusion in our dataset. The diagram below shows the overall number and percentage of eligible index admissions excluded from the denominator:

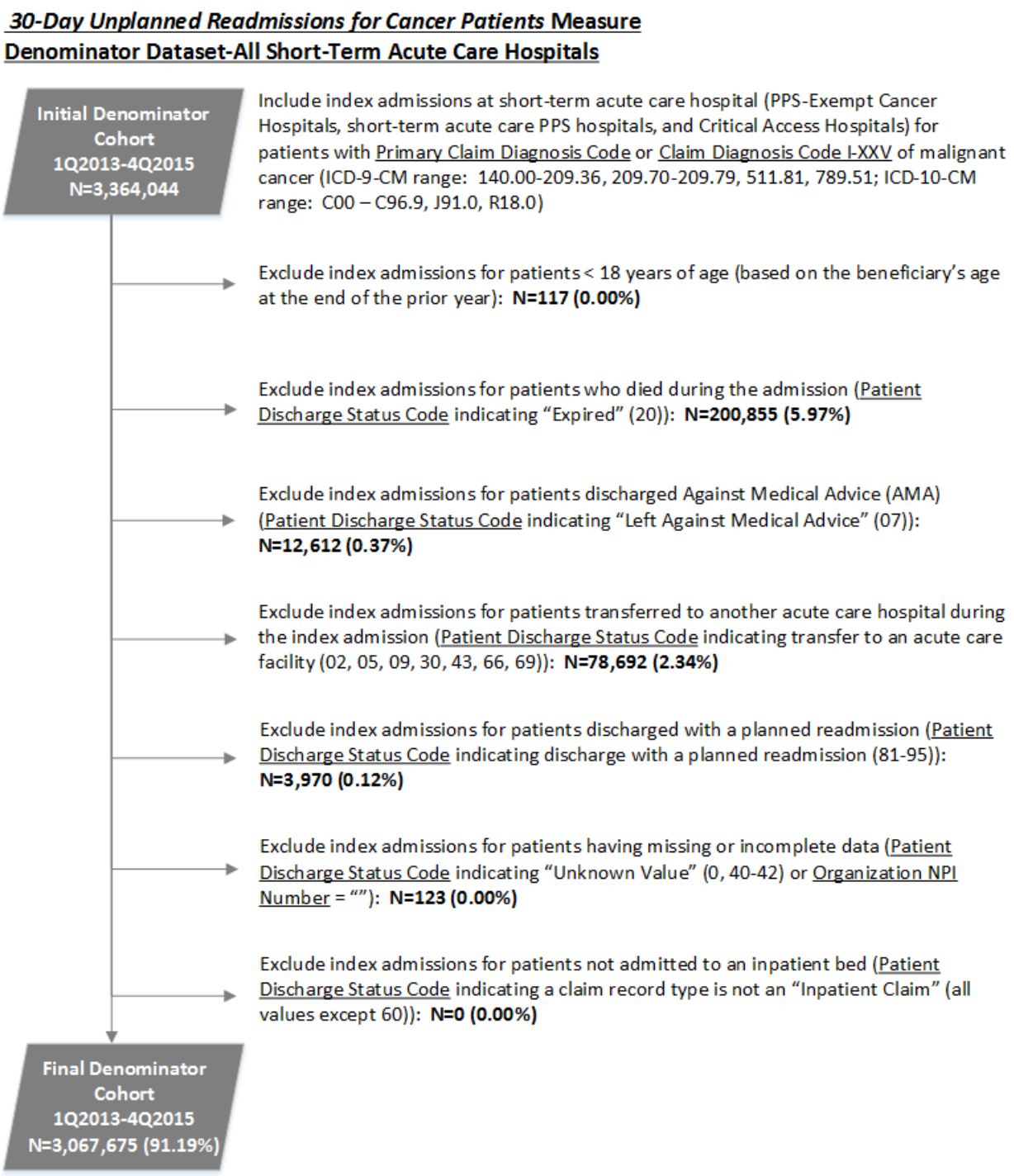

Figure 1: Shows the overall number and distribution of each denominator exclusion for the *30-Day Unplanned Readmissions for Cancer Patients* measure when applied to 1Q CY2013-4Q CY2015 index admissions for short-term acute care hospitals (defined as PCHs, short-term acute care PPS hospitals, and CAHs). Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

The diagram below shows the overall number and percentage of eligible index admissions excluded from the denominator:

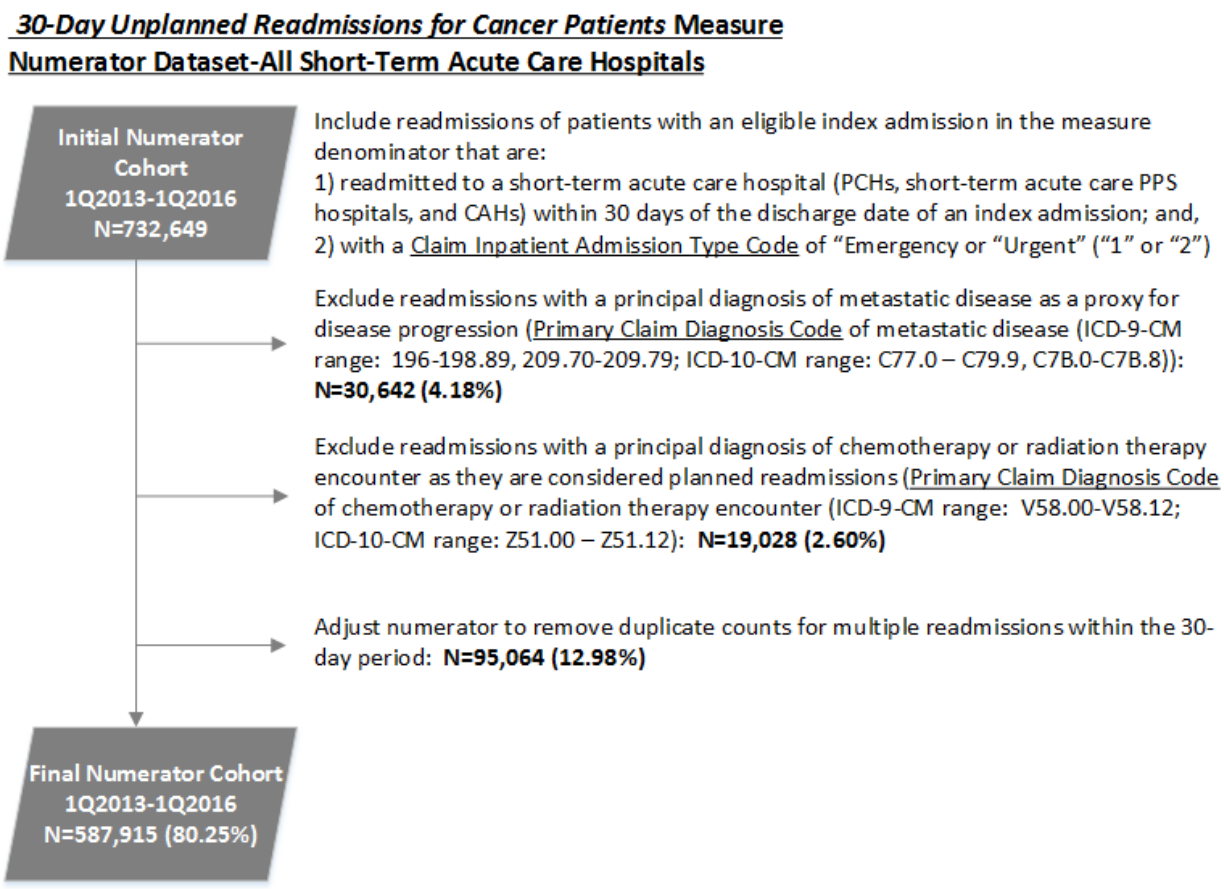

Figure 2: Shows the overall number and distribution of each numerator exclusion for the *30-Day Unplanned Readmissions for Cancer Patients* measure when applied to 1Q CY2013-4Q CY2015 index admissions for short-term acute care hospitals (defined as PCHs, short-term acute care PPS hospitals, and CAHs). Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

2b3.3. What is your interpretation of the results in terms of demonstrating that exclusions are needed to prevent unfair distortion of performance results? (*i.e., the value outweighs the burden of increased data collection and analysis. Note: **If patient preference is an exclusion**, the measure must be specified so that the effect on the performance score is transparent, e.g., scores with and without exclusion*)

Denominator Exclusions

The overall frequency of the denominator exclusions is low, reducing the initial denominator cohort by less than 10%. Patients who died during the index admission yielded the highest exclusions (N=200,855, 5.97%), while patients not admitted to an inpatient bed yielded no exclusions. Based on our review of these exclusions, we think they should be retained for the following reasons:

- Age less than 18 years of age, based on the beneficiary's age at the end of the prior year.

  Rationale: Pediatric patients represent a very small and distinct Medicare population with different characteristics and outcomes.

- Patients who died during the index admission, defined as *Patient Discharge Status Code* indicating "Expired" (20).

  Rationale: Patients that die during the index admission cannot be readmitted.

- Patients discharged AMA, defined as *Patient Discharge Status Code* indicating "Left Against Medical Advice" (07).

Rationale: The hospital had limited opportunity to ensure the patient was prepared for discharge and had appropriate follow-up care.

- Patients transferred to another acute care hospital during the index admission, defined as *Patient Discharge Status Code* indicating transfer to an acute care facility (02, 05, 09, 30, 43, 66, 69).

  Rationale: Responsibility for any unplanned readmissions is assigned to the final discharging hospital. Intermediate index admissions within a single episode of care are ineligible for inclusion.

- Patients discharged with a planned readmission, defined as *Patient Discharge Status Code* indicating discharge with a planned readmission (81-95).

  Rationale: The patient was discharged with a planned readmission, which is ineligible for the measure numerator.

- Patients having missing or incomplete data, defined as *Patient Discharge Status Code* indicating "Unknown Value" (0, 40-42) or Organization NPI Number = "".

  Rationale: Admissions without a valid discharge status cannot be evaluated for measure exclusions. Admissions with a discharge status reserved for hospice claims only are not admissions for acute care or to acute care hospitals. Claims without an Organizational NPI Number cannot be evaluated for inclusion in the measure.

- Patients not admitted to an inpatient bed, defined as *NCH Claim Type Code* indicating a claim record type is not an "Inpatient Claim" (all values except 60).

  Rationale: These admissions are not for acute care or to acute care hospitals.

Numerator Exclusions

The overall frequency of the numerator exclusions is low, reducing the initial numerator cohort by less than 7%. Patients with readmissions for progression of disease yielded the highest exclusions (N=30,642, 4.18%), while patients with planned admissions for treatment yielded the lowest exclusions (N=19,028, 2.60%). Based on our review of these exclusions, we think they should be retained for the following reasons:

- Readmissions for patients with progression of disease, defined as *Primary Claim Diagnosis Code* of metastatic disease (ICD-9-CM range: 196-198.89, 209.70-209.79; ICD-10-CM range: C77.0 – C79.9, C7B.0-C7B.8).

  Rationale: A primary (or principal) diagnosis of metastatic disease serves as a proxy for disease progression. Readmissions for conditions or symptoms associated with disease progression are not reflective of poor clinical care but, rather, advanced disease.

- Readmissions for patients with planned admissions for treatment, defined as *Primary Claim Diagnosis Code* of chemotherapy or radiation encounter (ICD-9-CM range: V58.00-V58.12; ICD-10-CM range: Z51.00 – Z51.12).

  Rationale: Readmissions are expected and planned for some patients who require additional cancer treatment in the inpatient setting. These readmissions reflects high-quality care that is focused on patient safety and are reliably distinguishable in claims data.

2b4. RISK ADJUSTMENT/STRATIFICATION FOR OUTCOME OR RESOURCE USE MEASURES

If not an intermediate or health outcome, or PRO-PM, or resource use measure, skip to section 2b5.

2b4.1. What method of controlling for differences in case mix is used?

☐ **No risk adjustment or stratification**

☒ **Statistical risk model with 11 risk factors with 15 values**

☐ **Stratification by** Click here to enter number of categories **risk categories**

☐ **Other,** Click here to enter description

2b4.1.1 If using a statistical risk model, provide detailed risk model specifications, including the risk model method, risk factors, coefficients, equations, codes with descriptors, and definitions.

Statistical Risk Model Method

We developed a statistical risk model based on a comparison of observed vs. expected rates, as is commonly used in healthcare outcomes. We used logistic regression to estimate the probability of an unplanned readmission, based on the measure specifications and risk factors described herein. The probability of unplanned readmission was then summed over the index admissions for each hospital to calculate the *expected* unplanned readmission rate. We then summed the actual or *observed* unplanned readmissions for each hospital and calculated the ratio of *observed* unplanned readmissions to *expected* unplanned readmissions for each hospital. Each hospital's ratio was then multiplied by the national or standard unplanned readmissions rate to generate the risk-adjusted *30-Day Unplanned Readmissions for Cancer Patients* rate (see formula below). Lower risk-adjusted rates (observed/expected ratios) are interpreted as better quality while higher risk-adjusted rates (observed/expected ratios) indicate poorer quality.

$$Risk - Adjusted\ Rate = \frac{observed\ rate}{expected\ rate} \times national\ or\ standard\ rate$$

Figure 3: Risk-adjusted rate formula for the *30-Day Unplanned Readmissions for Cancer Patients* measure. A lower observed/expected ratio is interpreted as better quality, while a higher ratio indicates poorer quality.

Risk Factors with Coefficients

Below are the risk factors included in the risk adjustment methodology, with coefficients and odds ratio estimates:

Parameter-redo all numbers	Model Coefficients		Odds Ratio Estimates		
	Estimate	P-Value	Point Estimate	95% Wald Confidence Limits	
Intercept	-2.966	<.0001			
ICU Stay	0.055	<.0001	1.117	1.106	1.127
Male	0.046	<.0001	1.097	1.088	1.106
Dual-Eligible Status	0.069	<.0001	1.147	1.135	1.159
Surgical Admission	-0.226	<.0001	0.637	0.631	0.643
Multiple Comorbidities	0.123	<.0001	1.279	1.266	1.293
Solid Tumor *(excluding Metastatic Disease)*	-0.079	<.0001	0.854	0.847	0.861
Length of Stay Greater than 3 Days	0.149	<.0001	1.347	1.335	1.360
Age: < 65	*Reference Age*				
Age: 65-69	-0.075	<.0001	0.861	0.849	0.874
Age: 70-74	-0.068	<.0001	0.873	0.860	0.885
Age: 75-79	-0.078	<.0001	0.856	0.844	0.869
Age: 80-84	-0.101	<.0001	0.818	0.805	0.831
Age: 85+	-0.162	<.0001	0.723	0.712	0.735
Hospitalization in the Prior 60 Days	0.239	<.0001	1.612	1.597	1.627
Discharged to Home	-0.109	<.0001	0.804	0.797	0.811
Discharged to Hospice	-1.277	<.0001	0.078	0.075	0.080

Table 6: Shows model coefficients and odds ratio estimates for risk variables included in the risk adjustment model for the *30-Day Unplanned Readmissions for Cancer Patients* measure. Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

Risk Factor Definitions and Codes

Below are the definitions and code lists (where applicable) for the risk factors included in the logistic regression model:

- ICU Stay: Index admissions for patients with an ICU stay during the index admission, as indicated by a *Revenue Center Code* (Code Range: 0200-0209) in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable. *Please see the data dictionary for the complete code list with descriptions.*
- Male: Index admissions for patients listed as "Male" in the "Sex" field in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable.
- Dual-Eligible Status: Index admissions for dual-eligible Medicare beneficiaries, as indicated by a value of "A", "B", or "C" in the Buyin field in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable. *Please see the data dictionary for the complete code list with descriptions.*
- Surgical Admission: Index admissions for patients that had surgery during the index admission, as indicated by a surgical Medicare Severity-Diagnosis Related Groups (MS-DRG) in the *Claim Diagnosis Related Group Code* in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in

this variable. Surgical MS-DRGs are commonly used in the Agency for Healthcare Research and Quality (AHRQ) Patient Safety Indicators (PSI) and, therefore, were used in this risk adjustment model.[19]

- Multiple Comorbidities: Index admissions for patients with 2 or more comorbidities, as defined within the Elixhauser Comorbidity Index and indicated by a corresponding *Primary Claim Diagnosis Code* and *Claim Diagnosis Code I-XXV*, are coded as "1" in this variable. The Elixhauser comorbidity categories are commonly used in AHRQ PSIs and, therefore, were used in this risk adjustment model.[19] We excluded from the comorbidity count the comorbidities for "Tumor," "Lymph," and "Mets" since they would be common in the cancer population and a separate indicator variable was constructed for metastatic disease. All other index admissions are coded as "0" in this variable. *Please see the https://www.hcup-us.ahrq.gov/toolssoftware/comorbidity/comformat2012-2015.txt for the complete code list with descriptions.*
- Solid Tumor *(Excluding Metastatic Disease)*: Index admissions for patients with non-metastatic, non-hematologic cancer, as indicated by a *Primary Claim Diagnosis Code* or *Claim Diagnosis Code I-XXV* (ICD-9-CM range: 140.00-195.89, 199.00-199.99, 209.00-209.36, 511.81, 789.51; ICD-10-CM range: C00.0 – C76.9, C80.0-C80.2, J91.0, R18.0) in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable. *Please see the data dictionary for the complete code list with descriptions.*
- Length of Stay Greater than 3 Days*:* Index admissions for patients with a length of stay greater than 3 days during the index admission, calculated as *Claim Through Date* – *Claim Admission Date* ≥ 3 in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable.
- Age < 65: Index admissions for patients aged < 65 years at the end of the prior year, based on the "Age" field in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable. **Note, Age < 65 is included in the risk adjustment model as the baseline age category or reference point only.*
- Age 65-69: Index admissions for patients aged 65-69 years at the end of the prior year, based on the "Age" field in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable.
- Age 70-74: Index admissions for patients aged 70-74 years at the end of the prior year, based on the "Age" field in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable.
- Age 75-79: Index admissions for patients aged 75-79 years at the end of the prior year, based on the "Age" field in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable.
- Age 80-84: Index admissions for patients aged 80-84 years at the end of the prior year, based on the "Age" field in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable.
- Age 85+: Index admissions for patients aged 85 years and older at the end of the prior year, based on the "Age" field in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable.
- Hospitalization in the Prior 60 Days: Index admissions for patients discharged from a hospitalization at a short-term acute care hospital within 60 days of the admission date of the index admission, calculated as *Claim Through Date* (of any prior hospitalizations) – *Claim Admission Date* (of the index admission) ≤ 60 in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable.

- Discharged to Home: Index admissions for patients that are discharged to home/self care, as indicated by a value of "01" in the *Patient Discharge Status Code* in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable.
- Discharged to Hospice: Index admissions for patients that are discharged to hospice – home or hospice – medical facility, as indicated by a value of "50" or "51"in the *Patient Discharge Status Code* in the Medicare SAF, are coded as "1" in this variable. All other index admissions are coded as "0" in this variable.

2b4.2. If an outcome or resource use component measure is not risk adjusted or stratified, provide rationale and analyses to demonstrate that controlling for differences in patient characteristics (case mix) is not needed to achieve fair comparisons across measured entities.
N/A

2b4.3. Describe the conceptual/clinical and statistical methods and criteria used to select patient factors (clinical factors or sociodemographic factors) used in the statistical risk model or for stratification by risk (*e.g., potential factors identified in the literature and/or expert panel; regression analysis; statistical significance of p<0.10; correlation of x or higher; patient factors should be present at the start of care*)

Conceptual/Clinical Review
We identified potential risk factors for the *30-Day Unplanned Readmissions for Cancer Patients* measure using the following methods:
- Review of the literature to determine which patient-level risk adjustors were included in risk- adjusted NQF-endorsed measures and measures included in CMS public reporting programs; and,
- Convening a multidisciplinary workgroup of:
  - Physician subject-matter experts from cancer hospitals to identify patient-level risk adjustors that are clinically-relevant for unplanned readmissions in patients with cancer;
  - Data analysts with experience in complex analyses of hospital data, quality measurement, and quality improvement, with a specific focus on cancer conditions;
  - Experienced coders to advise on the selection and completeness of code lists for the measure; and,
  - Analytics experts with experience in statistical testing methods and in creating predictive models for unplanned readmissions.

In total, 25 patient-level variables were evaluated for potential inclusion in the risk adjustment model. The list of potential risk adjustors was then compared to the data elements available in administrative claims data. Since this measure is to be implemented using claims data only, 7 clinical and SDS variables (Table 7, Group A) that are not well-defined in claims data were not included in this model. Additionally, 2 variables (Table 7, Group B) were unavailable in our measure testing dataset. The list of potential risk adjustors was then refined to include only variables *not* in the control of the hospital, as the goal of this model is to adjust for patient-specific factors only. This eliminated 1 variable (Table 7, Group C). Finally, 1 SDS variable ("Race") was removed (Table 7, Group D). While there is evidence that racial minorities have higher readmission rates, the evidence is, at times, conflicting or non-significant.[1,3,4,6-12] Moreover, Joynt, et al. found that racial disparities in readmissions were related to patient race *and* the site of care, suggesting an opportunity to reduce disparities in care.[2] In view of these findings and because we could not articulate a causal relationship between race and readmission, we removed the variable to ensure that the risk adjustment model would not mask disparities in care. This process yielded 14 risk factors (Table 7, Group E) to be evaluated for fit in the risk adjustment model. Throughout this process, all potential risk factors were determined by careful review with workgroup members. They reflect clinically-relevant decisions and alignment with coding practices and analytical standards to ensure accurate assessments of patient-level risk factors present at the index admission and outside the control of the hospital.

Below is the complete list of potential risk factors identified through the workgroup's review, with the workgroup's assessment:

Potential Risk Adjustors Evaluated for This Measure
A. Risk Factors Removed from Consideration-*Not Well-Defined in Claims Data* (7)
Severity of Illness
Local vs. Regional vs. Distant Disease
High-Risk Medication Use
Psychological Services
Early Palliative Care/Hospice
History of Substance Abuse
Nutritional Status
B. Risk Factors Removed from Consideration-*Not Available in Measure Testing Dataset* (2)
Marital Status
Geographic Distance from Hospital
C. Risk Factors Removed from Consideration-*Within Hospital's Control* (1)
Weekday vs. Weekend Discharge
D. Risk Factors Removed from Consideration-*Potential to Mask Disparities in Care* (1)
Race
E. Risk Factors Evaluated for Fit in the Risk Adjustment Model (14)
Age
Gender
Dual-Eligible Status *(Proxy for Socioeconomic Status)*
Number of Comorbidities, as Defined within Elixhauser Comorbidity Index
Hematologic Cancer vs. Solid Tumor *(Non-Metastatic Only)*
Metastatic Disease
Surgical vs. Non-Surgical Admission
ICU vs. Non-ICU Admission
Length of Stay
Admission via the Emergency Room vs. Other Location
Discharged to Home vs. Other Location
Discharged to Hospice vs. Other Location
Prior Hospitalization
Bone Marrow Transplant

Table 7: Shows 25 potential risk factors identified through the workgroup's review for the *30-Day Unplanned Readmissions for Cancer Patients* measure.

Statistical Methods

The logistic model was fit using SAS/STAT software, Version 9.4 (SAS Institute, Inc. 2017) using the "stepwise" option and maximum likelihood estimation (MLE). Prior to inclusion in the model, we assessed the potential association between the 14 remaining candidate risk adjustors (Table 7, Group E) by calculating the tetrachoric correlation. The potential risk factors were reviewed to identify any variables with correlations of more than 0.5 or less than -0.5, which would require exclusion from the model to avoid multicollinearity (i.e., highly-correlated risk factors).[20] We removed 3 potential model parameters due to high tetrachoric correlations (> 0.5 or < -0.5):

- One Comorbidity: due to high correlation (0.999) with Multiple Comorbidities;
- Admission via the Emergency Room: due to high inverse correlation (-0.6195) with Solid Tumor; and,
- Bone Marrow Transplant: due to high inverse correlation (-0.5027) with Solid Tumor.

We removed 1 potential model parameters due to non-significance:

- Metastatic disease: due to p>0.05.

All logistic model diagnostics, including the c-statistic, Receiver Operating Characteristic (ROC) curve, Hosmer-Lemeshow (H-L) goodness-of-fit test, the likelihood ratio test, and Akaike Information Criterion (AIC), were collected and analyzed prior to selecting the risk adjustment model.[21] Continuous variables, such as "Length of Stay" and "Prior Hospitalization," were analyzed to determine cut points where the rate of readmission increased or decreased. The model was constructed using only binary indicator variables to allow for an intuitive interpretation and application in practice. We calculated odds ratio for each variable (indicating the strength and direction of the association) and used associated confidence intervals to assess significance. An odds ratio > 1.0 or < -1.0, together with a confidence interval excluding 1.00, indicated a significant relationship with the outcome.

2b4.4a. What were the statistical results of the analyses used to select risk factors?

Below are the potential risk factors evaluated for fit in the risk adjustment model, with observed readmission rates:

Variable Type	Parameter	Readmission Rate		Included in Model?
		Present	Absent	
Factors Included in Model	ICU Stay	20.38%	18.69%	Yes
	Male	19.65%	18.62%	Yes
	Dual-Eligible Status	22.49%	18.32%	Yes
	Surgical Admission	14.91%	21.12%	Yes
	Multiple Comorbidities	20.40%	15.65%	Yes
	Solid Tumor *(Non-Metastatic Only)*	17.52%	20.39%	Yes
	Length of Stay Greater than 3 Days	21.22%	16.07%	Yes
	Age: < 65	*Reference Age*		
	Age: 65-69	18.89%	19.24%	Yes
	Age: 70-74	19.26%	19.14%	Yes
	Age: 75-79	19.28%	19.14%	Yes
	Age: 80-84	18.44%	19.28%	Yes
	Age: 85+	16.30%	19.69%	Yes
	Hospitalization in the Prior 60 Days	26.19%	16.75%	Yes
	Discharged to Home	18.41%	19.89%	Yes
	Discharged to Hospice	2.76%	20.91%	Yes
Factors Excluded from Model	Metastatic Disease	19.65%	18.96%	*No, p>0.05*
	One Comorbidity			*No, high tetrachoric correlation*
	Admission via the Emergency Room			*No, high tetrachoric correlation*
	Bone Marrow Transplant			*No, high tetrachoric correlation*

Table 8: Shows 14 potential risk adjustment variables evaluated for fit in the risk adjustment model for the *30-Day Unplanned Readmissions for Cancer Patients* measure. Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

2b4.4b. Describe the analyses and interpretation resulting in the decision to select SDS factors (e.g. prevalence of the factor across measured entities, empirical association with the outcome, contribution of unique variation in the outcome, assessment of between-unit effects and within-unit effects)

Following our conceptual/clinical review of potential risk factors, we further explored the rationale for including 1 SDS factor ("Dual-Eligible Status") in the risk adjustment model. Dual-eligible beneficiaries are, by definition, economically disadvantaged. Thus, "Dual-Eligible Status" can serve as a claims-based proxy for income and other measures of socioeconomic status. Low socioeconomic status is a recognized risk factor for later-stage cancer diagnoses, delayed healthcare receipt, and higher utilization of hospital-based care.[22-24] Moreover, while the evidence is still maturing, socioeconomic status indicators (including private vs. public insurance coverage) have been identified as important predictors of readmissions.[3,10,13]

These findings were further supported through our evaluation of prevalence and fit within the risk adjustment model. "Dual-Eligible Status" was present in 20.17% of index admissions (denominator) and in 23.58% of unplanned readmissions (numerator). The patient-level observed *30-Day Unplanned Readmissions for Cancer Patients* rate was 22.49%, compared with an 18.32% observed rate for all other patients. "Dual-Eligible Status"

was associated with a Chi-Square of 5547.9628 (p<0.001). At the hospital level, the median percentage of dual-eligible patients in the testing dataset was 19.74% (min-max: 0.00%-100.00%; interquartile rate 12.32%-31.25%). Thus, "Dual-Eligible Status" was included in the risk adjustment model.

2b4.5. Describe the method of testing/analysis used to develop and validate the adequacy of the statistical model or stratification approach (*describe the steps—do not just name a method; what statistical analysis was used*)

The risk adjustment model was tested for adequacy using the dataset described in Section 1.5. Claims were randomly assigned to development and validation samples, using the SAS ranuni function with a seed of "627" to split the data. We used logistic regression analysis to analyze the model's performance, computing c-statistic to evaluate model discrimination and H-L goodness-of-fit test and risk decile plots to evaluate model calibration.[21] Using these statistics, we compared the model performance between the development and validation samples as well as overall adequacy of the risk adjustment model.

Provide the statistical results from testing the approach to controlling for differences in patient characteristics (case mix) below.
If stratified, skip to 2b4.9

2b4.6. Statistical Risk Model Discrimination Statistics (*e.g., c-statistic, R-squared*)**:**

For the development sample (N=1,532,450), the c-statistic is 0.6607 (95% CI: 0.6597, 0.6618). For the validation sample (N=1,535,225), the c-statistic is 0.6609 (95% CI: 0.6588, 0.6630).

2b4.7. Statistical Risk Model Calibration Statistics (*e.g., Hosmer-Lemeshow statistic*):

The H-L Goodness-of-Fit test was X2(df = 8) = 1576.3968 (p<0.001).

2b4.8. Statistical Risk Model Calibration – Risk decile plots or calibration curves:

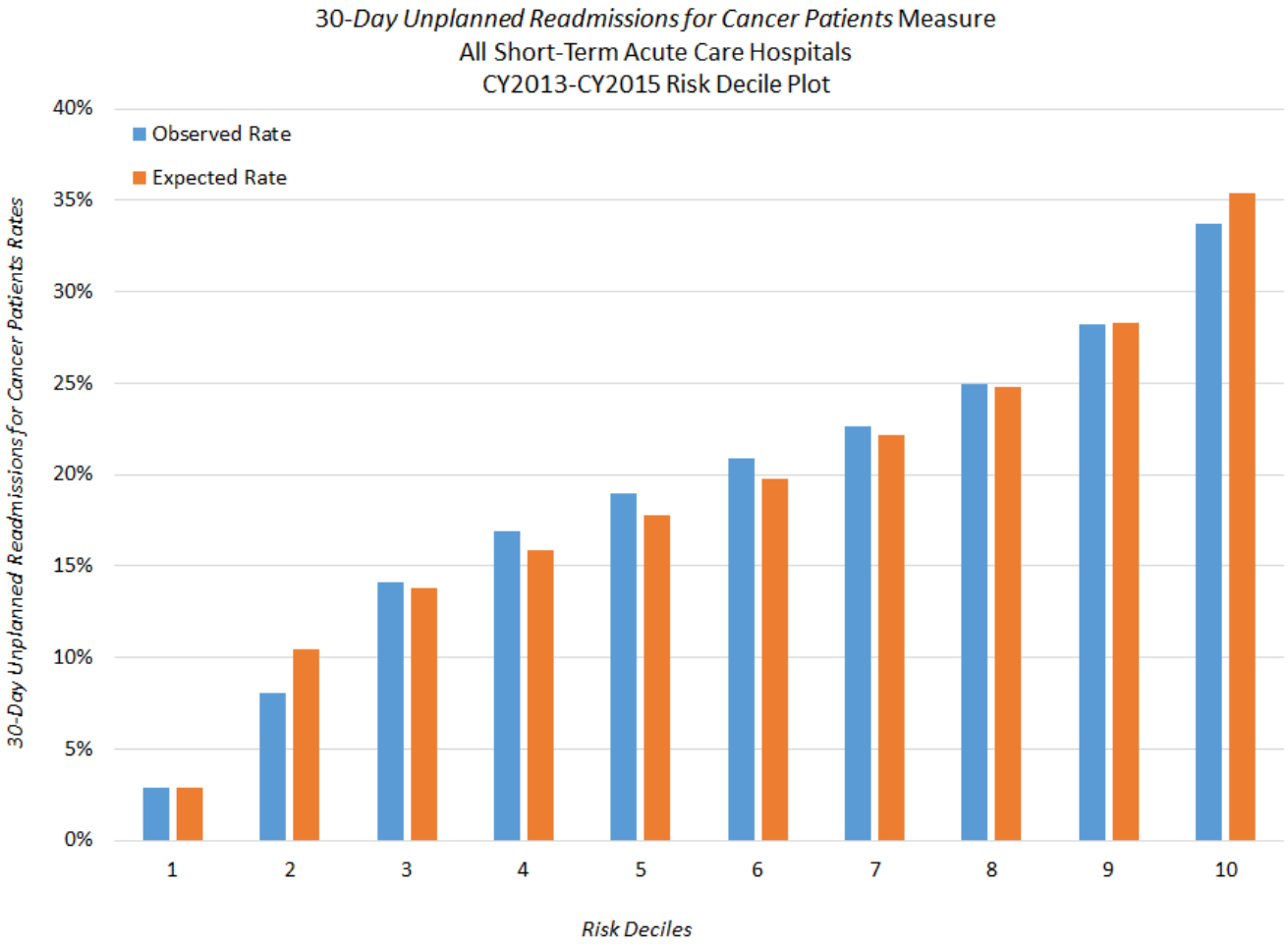

Figure 4: Risk decile plot comparing the observed and expected rates by decile for the risk-adjusted 30-*Day Unplanned Readmissions for Cancer Patients* measure, when applied to 1Q CY2013-4Q CY2015 index admissions for short-term acute care hospitals (i.e., PCHs, short-term acute care PPS hospitals, and CAHs). Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

2b4.9. Results of Risk Stratification Analysis:

N/A.

2b4.10. What is your interpretation of the results in terms of demonstrating adequacy of controlling for differences in patient characteristics (case mix)? (i.e., *what do the results mean and what are the norms for the test conducted*)

The c-statistic measures how well the model discriminates between patients with and without the outcome, when compared with random assignment. A c-statistic of 0.5 suggests that the model has poor predictive power, while a c-statistic of 1.0 implies that the outcome is solely related to patient-level factors. The c-statistic here is 0.6607 (95% CI: 0.6597, 0.6618), indicating fair discrimination for the development and validation models. Likewise, the wide range between the lowest and highest deciles indicates that the model discriminates between high- and low-risk patients.

The H-L Goodness-of-Fit test yielded a significant value ($p<0.001$), which indicates potential fit issues. This is not uncommon with models that are overpowered due to large datasets, as is the case here. A significant value for the H-L test suggests that we reject the assumption of perfect fit between the models. However, with large datasets, the H-L statistic can magnify relatively small differences between observed and expected rates and

imply a statistically significant degree of miscalibration. When viewed within the context of the c-statistic and the risk decile plots, the significant H-L statistic does not suggest that the model has poor calibration.[25,26]

The risk decile plots demonstrate that the model performs adequately, with similar observed and predicted values in each decile. Together, the discrimination and calibration tests confirm the adequacy of the risk adjustment model in controlling for differences in patient-level risk factors.

2b4.11. Optional Additional Testing for Risk Adjustment (*not required, but would provide additional support of adequacy of risk model, e.g., testing of risk model in another data set; sensitivity analysis for missing data; other methods that were assessed*)

2b5. IDENTIFICATION OF STATISTICALLY SIGNIFICANT & MEANINGFUL DIFFERENCES IN PERFORMANCE

2b5.1. Describe the method for determining if statistically significant and clinically/practically meaningful differences in performance measure scores among the measured entities can be identified (*describe the steps—do not just name a method; what statistical analysis was used? Do not just repeat the information provided related to performance gap in 1b)*

We applied the logistic regression model to the testing dataset as an assessment of statistical significance. The final unadjusted and risk-adjusted rates were calculated across all hospitals in the testing dataset and separately for 2015. To calculate risk-adjusted rates, we used the equation described in Section 2b4.1.1. First, we calculated observed (unadjusted) rates by hospital. We used the logistic regression model described in Section 2b4 to calculate the expected rate for each hospital. Then, we calculated observed/expected ratios for each hospital and multiplied those rates by the national observed rate to yield risk-adjusted rates by hospital. We calculated the confidence interval (CI) for each hospital's score to interpret each hospital's performance, when compared with the national observed rate. Performance scores were interpreted as follows:

- If the confidence interval contained the national average, the hospital's performance rate was interpreted as *no better or worse* than the national average;
- If the confidence interval was *lower* than the national average, the hospital's performance rate was interpreted as *better* than the national average; and,
- If the confidence interval was *higher* than the national average, the hospital's performance rate was interpreted as *worse* than the national average.

We also generated histograms to visualize the distribution of unadjusted and risk-adjusted scores for CY2013-CY2015.

2b5.2. What were the statistical results from testing the ability to identify statistically significant and/or clinically/practically meaningful differences in performance measure scores across measured entities? (e.g., *number and percentage of entities with scores that were statistically significantly different from mean or some benchmark, different from expected; how was meaningful difference defined*)

	All Short-Term Acute Care Hospitals	PPS-Exempt Cancer Hospitals	Short-Term Acute Care PPS Hospitals	Critical Access Hospitals
Number of Hospitals	4,974	11	3,617	1,346
Number of Admissions (Denominator)	3,067,675	73,159	2,934,917	59,599
Number of Unplanned Readmissions (Numerator)	587,915	15,724	563,701	8,490
National Rates				
Unadjusted 30-Day Unplanned Readmission Rate	19.16%	21.49%	19.21%	14.25%
Risk-Adjusted 30-Day Unplanned Readmission Rate	19.13%	20.20%	19.20%	14.13%
Hospital-Level Rates				
Mean (Standard Deviation)	16.61% (8.07%)	18.79% (3.06%)	17.78% (6.98%)	13.44% (9.79%)
Range (Min-Max)	0.00%-100.00%	12.22%-21.57%	0.00%-100.00%	0.00%-99.62%
Quartile Range	7.35%	2.97%	5.38%	11.39%
Minimum	0.00%	12.22%	0.00%	0.00%
25th percentile	13.21%	18.01%	15.44%	7.20%
50th percentile	17.68%	20.83%	18.45%	13.03%
75th percentile	20.56%	20.98%	20.82%	18.60%
Maximum	100.00%	21.57%	100.00%	99.62%

Table 9: Shows the results of the logistic regression model for the 30-*Day Unplanned Readmissions for Cancer Patients* measure, when applied to 1Q CY2013-4Q CY2015 index admissions for short-term acute care hospitals (i.e., PCHs, short-term acute care PPS hospitals, and CAHs). Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

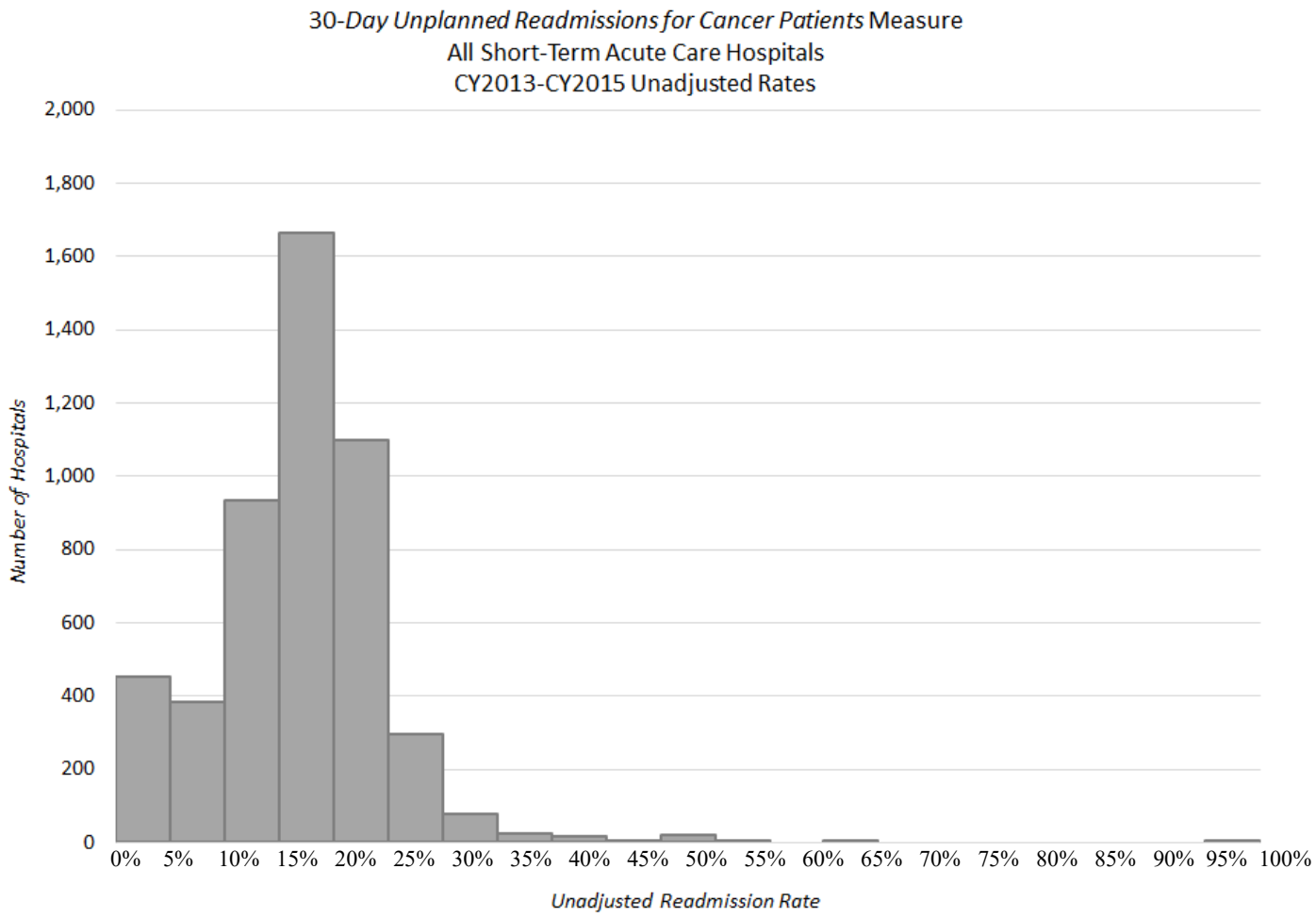

Figure 5: Histogram showing the distribution of unadjusted rates by hospital for the 30-*Day Unplanned Readmissions for Cancer Patients* measure, when applied to 1Q CY2013-4Q CY2015 index admissions for short-term acute care hospitals (i.e., PCHs, short-term acute care PPS hospitals, and CAHs). Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

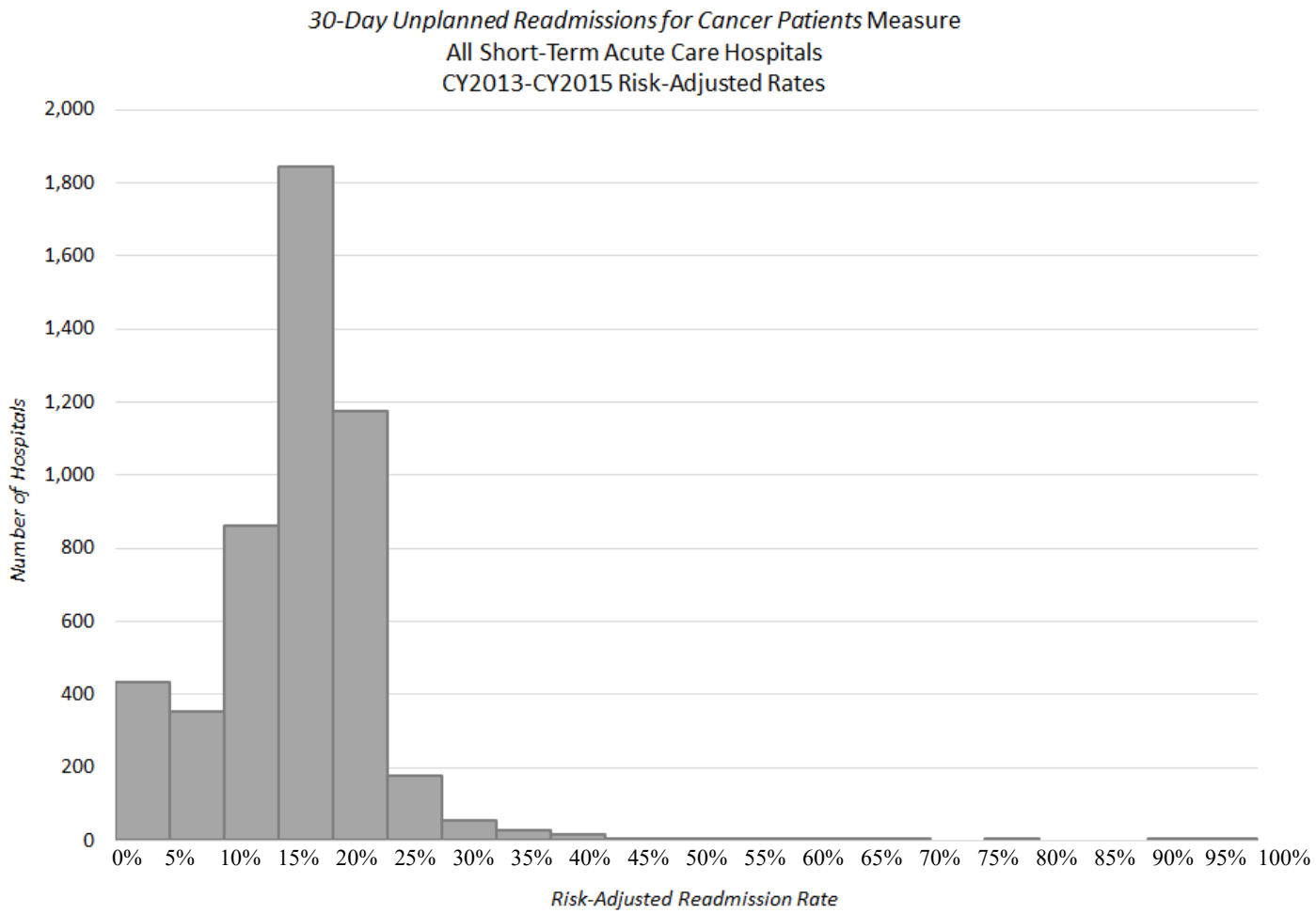

Figure 6: Histogram showing the distribution of risk-adjusted rates by hospital for the 30-*Day Unplanned Readmissions for Cancer Patients* measure, when applied to 1Q CY2013-4Q CY2015 index admissions for short-term acute care hospitals (i.e., PCHs, short-term acute care PPS hospitals, and CAHs). Data source: Analysis of Medicare SAF (4Q2012-1Q2016), based on data provided by Watson Policy Analysis, 01/13/2017.

2b5.3. What is your interpretation of the results in terms of demonstrating the ability to identify statistically significant and/or clinically/practically meaningful differences in performance across measured entities? (i.*e., what do the results mean in terms of statistical and meaningful differences?*)

The 30-*Day Unplanned Readmissions for Cancer Patients* measure was able to detect hospitals with better and worse than the national average performance rate. For CY2013-CY2015, the unadjusted readmission rates ranged from 0.00%-100%, with a median rate of 17.32%. Half of the hospitals fell within the interquartile range of 12.50%-20.80%. The mean unadjusted rate was 16.54% (SD=8.24%). The risk-adjusted rates had the same overall range and a narrower interquartile range (13.21%-20.56%). The mean risk-adjusted rate was 16.61% (SD=8.07%). The histograms for unadjusted and risk-adjusted rates showed performance rates skewed right and few high outliers, consistent with the statistics described above. Likewise, when analyzed in total and for CY2015 individually, we observed that over half of all index claims had performance *no better or worse* than the national average. This conforms with the narrow interquartile range we observed. Together, these statistics indicate that there are opportunities to utilize this measure to reduced unplanned readmissions in cancer patients, making it useful for performance improvement and public reporting.

2b6. COMPARABILITY OF PERFORMANCE SCORES WHEN MORE THAN ONE SET OF SPECIFICATIONS

If only one set of specifications, this section can be skipped.

Note: *This item is directed to measures that are risk-adjusted (with or without SDS factors)* ***OR*** *to measures with more than one set of specifications/instructions (e.g., one set of specifications for how to identify and compute the measure from medical record abstraction and a different set of specifications for claims or eMeasures). It does not apply to measures that use more than one source of data in one set of specifications/instructions (e.g., claims data to identify the denominator and medical record abstraction for the numerator).* ***Comparability is not required when comparing performance scores with and without SDS factors in the risk adjustment model. However, if comparability is not demonstrated for measures with more than one set of specifications/instructions, the different specifications (e.g., for medical records vs. claims) should be submitted as separate measures.***

2b6.1. Describe the method of testing conducted to compare performance scores for the same entities across the different data sources/specifications (*describe the steps—do not just name a method; what statistical analysis was used*)

N/A

2b6.2. What were the statistical results from testing comparability of performance scores for the same entities when using different data sources/specifications? (*e.g., correlation, rank order*)

N/A

2b6.3. What is your interpretation of the results in terms of the differences in performance measure scores for the same entities across the different data sources/specifications? (i.*e., what do the results mean and what are the norms for the test conducted*)

N/A

2b7. MISSING DATA ANALYSIS AND MINIMIZING BIAS

2b7.1. Describe the method of testing conducted to identify the extent and distribution of missing data (or nonresponse) and demonstrate that performance results are not biased due to systematic missing data (or differences between responders and nonresponders) and how the specified handling of missing data minimizes bias (*describe the steps—do not just name a method; what statistical analysis was used*)

N/A

2b7.2. What is the overall frequency of missing data, the distribution of missing data across providers, and the results from testing related to missing data? (*e.g., results of sensitivity analysis of the effect of various rules for missing data/nonresponse; if no empirical sensitivity analysis, identify the approaches for handling missing data that were considered and pros and cons of each*)

N/A

2b7.3. What is your interpretation of the results in terms of demonstrating that performance results are not biased due to systematic missing data (or differences between responders and nonresponders) and how the specified handling of missing data minimizes bias**?** (i.*e., what do the results mean in terms of supporting the selected approach for missing data and what are the norms for the test conducted; if no empirical analysis, provide rationale for the selected approach for missing data*)

N/A

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3. Feasibility

Extent to which the specifications including measure logic, require data that are readily available or could be captured without undue burden and can be implemented for performance measurement.

3a. Byproduct of Care Processes

For clinical measures, the required data elements are routinely generated and used during care delivery (e.g., blood pressure, lab test, diagnosis, medication order).

3a.1. **Data Elements Generated as Byproduct of Care Processes.**
Generated or collected by and used by healthcare personnel during the provision of care (e.g., blood pressure, lab value, diagnosis, depression score), Coded by someone other than person obtaining original information (e.g., DRG, ICD-9 codes on claims)
If other:

3b. Electronic Sources

The required data elements are available in electronic health records or other electronic sources. If the required data are not in electronic health records or existing electronic sources, a credible, near-term path to electronic collection is specified.

3b.1. **To what extent are the specified data elements available electronically in defined fields** (*i.e., data elements that are needed to compute the performance measure score are in defined, computer-readable fields*) Update this field for **maintenance of endorsement**.
ALL data elements are in defined fields in electronic claims

3b.2. **If ALL the data elements needed to compute the performance measure score are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources.** For **maintenance of endorsement**, if this measure is not an eMeasure (eCQM), please describe any efforts to develop an eMeasure (eCQM).

3b.3. **If this is an eMeasure, provide a summary of the feasibility assessment in an attached file or make available at a measure-specific URL. Please also complete and attach the NQF Feasibility Score Card.**
Attachment:

3c. Data Collection Strategy

Demonstration that the data collection strategy (e.g., source, timing, frequency, sampling, patient confidentiality, costs associated with fees/licensing of proprietary measures) can be implemented (e.g., already in operational use, or testing demonstrates that it is ready to put into operational use). For eMeasures, a feasibility assessment addresses the data elements and measure logic and demonstrates the eMeasure can be implemented or feasibility concerns can be adequately addressed.

3c.1. **Required for maintenance of endorsement. Describe difficulties (as a result of testing and/or operational use of the measure) regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues.**
IF a PRO-PM, consider implications for both individuals providing PRO data (patients, service recipients, respondents) and those whose performance is being measured.
N/A

3c.2. **Describe any fees, licensing, or other requirements to use any aspect of the measure as specified** *(e.g., value/code set, risk model, programming code, algorithm)*.
N/A

4. Usability and Use

Extent to which potential audiences (e.g., consumers, purchasers, providers, policy makers) are using or could use performance results for both accountability and performance improvement to achieve the goal of high-quality, efficient healthcare for individuals or populations.

4a. Accountability and Transparency

Performance results are used in at least one accountability application within three years after initial endorsement and are publicly reported within six years after initial endorsement (or the data on performance results are available). If not in use at the time of initial endorsement, then a credible plan for implementation within the specified timeframes is provided.

4.1. Current and Planned Use

NQF-endorsed measures are expected to be used in at least one accountability application within 3 years and publicly reported within 6 years of initial endorsement in addition to performance improvement.

Specific Plan for Use	Current Use (for current use provide URL)
	Public Reporting 2) Annual Hospital Ratings for Colon and Lung Cancer Surgery-US News&World Report http://health.usnews.com/health-news/blogs/second-opinion/articles/2016-07-07/methodology-updated-for-ratings-in-procedures-and-conditions Payment Program Accountable Care Program-Moffitt Cancer Center/Florida Blue https://www.moffitt.org/ Quality Improvement (external benchmarking to organizations) Vizient (neé University HealthSystem Consortium, or UHC) Clinical Data Base/Resource Manager https://www.vizientinc.com/ Quality Improvement (Internal to the specific organization) City of Hope Comprehensive Cancer Center http://www.cityofhope.org/homepage University of Miami Sylvester Comprehensive Cancer Center http://sylvester.org/ Seattle Cancer Care Alliance http://www.seattlecca.org/

4a.1. For each CURRENT use, checked above (update for maintenance of endorsement), provide:

- Name of program and sponsor
- Purpose
- Geographic area and number and percentage of accountable entities and patients included
- Level of measurement and setting

1) Accountable Care Program: Moffitt Cancer Center

Purpose: Moffitt has incorporated the 30-day Unplanned Readmissions for Cancer Patients measure in the first-ever cancer-specific accountable care program with Florida Blue. Moffitt is using this measure to identify opportunities to reduce unplanned readmissions for Florida Blue beneficiaries as part of broader efforts to improve individual patient care and decrease costs of care.
Geographic area: Florida.
Level of measurement and setting: Facility/hospital.

2) US News&World Report (USNWR): Annual Hospital Ratings for Lung and Colon Cancer Surgery

Purpose: USNWR adopted the 30-day Unplanned Readmissions for Cancer Patients measure for use in its annual hospital ratings for colon and lung cancer surgeries. The measure was empirically selected after reviewing as many as three candidate readmission measures for the cohort, and with the recommendation of a volunteer medical advisory panel convened to advise USNWR on approaches to evaluating cancer care.
Geographic area: This measure is applied to all hospitals included in USNWR's annual hospital ratings for colon and lung cancer surgeries.
Level of measurement and setting: Facility/hospital.

3) Vizient: Quality Improvement with Benchmarking

Purpose: PCHs and other comprehensive cancer centers actively use this measure to compare their performance against other

members' performance for purposes of benchmarking and identification of internal performance improvement opportunities.
Geographic area: This measure is available for use by Vizient members throughout the United States that submit data to the CDB/RM.
Level of measurement and setting: Facility/hospital, with stratification and drill-down capability for the reporting facility

4a) Quality Improvement: City of Hope Comprehensive Cancer Center
Purpose: City of Hope uses the measure in monthly quality improvement reports for hospital leadership.
Geographic area: Southern California (Los Angeles area).
Level of measurement and setting: Facility/hospital.

4b) Quality Improvement: University of Miami Sylvester Comprehensive Cancer Center
Purpose: Sylvester uses the measure to help guide care decisions in discharge planning.
Geographic area: Southern Florida (Miami area).
Level of measurement and setting: Facility/hospital.

4c) Quality Improvement: Seattle Cancer Care Alliance
Purpose: Seattle Cancer Care Alliance uses the measure as a comparison for the HWR measure (NQF #1789) to demonstrate sensitivity of treating cancer patients as a separate category for systems reporting.
Geographic area: Pacific Northwest (Seattle area).
Level of measurement and setting: Facility/hospital.

4a.2. If not currently publicly reported OR used in at least one other accountability application (e.g., payment program, certification, licensing) what are the reasons? (*e.g., Do policies or actions of the developer/steward or accountable entities restrict access to performance results or impede implementation?*)

4a.3. If not currently publicly reported OR used in at least one other accountability application, provide a credible plan for implementation within the expected timeframes -- any accountability application within 3 years and publicly reported within 6 years of initial endorsement. (*Credible plan includes the specific program, purpose, intended audience, and timeline for implementing the measure within the specified timeframes. A plan for accountability applications addresses mechanisms for data aggregation and reporting.*)
This measure was included in CMS' 2014 Measures Under Consideration (MUC) list and received conditional support from the Measure Applications Partnership (MAP) Hospital Work Group, pending NQF endorsement. It is our expectation this measure will be included in future rulemaking, potentially as early as the FY 2018 IPPS Proposed Rule.

Improvement
Progress toward achieving the goal of high-quality, efficient healthcare for individuals or populations is demonstrated. If not in use for performance improvement at the time of initial endorsement, then a credible rationale describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.

4b. Refer to data provided in 1b but do not repeat here. Discuss any progress on improvement (trends in performance results, number and percentage of people receiving high-quality healthcare; Geographic area and number and percentage of accountable entities and patients included.)
If no improvement was demonstrated, what are the reasons? If not in use for performance improvement at the time of initial endorsement, provide a credible rationale that describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.

4c. Unintended Consequences
The benefits of the performance measure in facilitating progress toward achieving high-quality, efficient healthcare for individuals or populations outweigh evidence of unintended negative consequences to individuals or populations (if such evidence exists).

4c.1. **Please explain any unexpected findings (positive or negative) during implementation of this measure including unintended impacts on patients.**
No unintended negative consequences were identified during testing. This is a passive surveillance approach with no attached intervention.

4c.2. **Please explain any unexpected benefits from implementation of this measure.**
The measure can serve as an impetus for quality improvement in discharge planning for cancer patients.

4d1.1. **Describe how performance results, data, and assistance with interpretation have been provided to those being measured or other users during development or implementation.**
How many and which types of measured entities and/or others were included? If only a sample of measured entities were included, describe the full population and how the sample was selected.
An earlier version of this measure, which examines unplanned readmissions to the discharging facility only, is readily available to any Vizient member. Many quality officers at PCHs institutions routinely access the data for purposes of internal quality reporting. With the revised measure specifications, it is anticipated that public reporting through the PCHQR will allow for greater access to performance data. Moreover, we believe that the measure has broad applicability to cancer patients treated in other short-term acute care hospitals and can, therefore, be adopted for other public reporting programs.

4d1.2. **Describe the process(es) involved, including when/how often results were provided, what data were provided, what educational/explanatory efforts were made, etc.**
This measure was developed principally for the PCHQR and has not yet been adopted for the program. Additional information is forthcoming following its adoption for public reporting.

4d2.1. **Summarize the feedback on measure performance and implementation from the measured entities and others described in 4d.1.**
Describe how feedback was obtained.
Please see comments above.

4d2.2. **Summarize the feedback obtained from those being measured.**
Please see comments above.

4d2.3. **Summarize the feedback obtained from other users**
Please see comments above.

4d.3. **Describe how the feedback described in 4d.2 has been considered when developing or revising the measure specifications or implementation, including whether the measure was modified and why or why not.**
Please see comments above.

5. Comparison to Related or Competing Measures

If a measure meets the above criteria and there are endorsed or new related measures (either the same measure focus or the same target population) or competing measures (both the same measure focus and the same target population), the measures are compared to address harmonization and/or selection of the best measure.

5. Relation to Other NQF-endorsed Measures
Are there related measures (conceptually, either same measure focus or target population) or competing measures (conceptually both the same measure focus and same target population)? If yes, list the NQF # and title of all related and/or competing measures.
Yes

5.1a. **List of related or competing measures (selected from NQF-endorsed measures)**
1789 : Hospital-Wide All-Cause Unplanned Readmission Measure (HWR)

5.1b. **If related or competing measures are not NQF endorsed please indicate measure title and steward.**

5a. Harmonization of Related Measures
The measure specifications are harmonized with related measures;

OR
The differences in specifications are justified

5a.1. **If this measure conceptually addresses EITHER the same measure focus OR the same target population as NQF-endorsed measure(s):**
Are the measure specifications harmonized to the extent possible?
No

5a.2. **If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden.**
The 30-Day Unplanned Readmissions for Cancer Patients measure has a different target population from the HWR measure (NQF #1789), which expressly excludes admissions to PCHs, noting that the PCHs care for a unique patient population that is challenging to compare to other hospitals. Moreover, the HWR measure excludes non-surgical admissions for cancer patients because the outcomes do not correlate well with outcomes for other admissions. Due to the different target populations for each measure, it does not require harmonization with the HWR measure (NQF #1789).

5b. Competing Measures
The measure is superior to competing measures (e.g., is a more valid or efficient way to measure);
OR
Multiple measures are justified.

5b.1. **If this measure conceptually addresses both the same measure focus and the same target population as NQF-endorsed measure(s):**
Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality); OR provide a rationale for the additive value of endorsing an additional measure. (Provide analyses when possible.)

Appendix

A.1 Supplemental materials may be provided in an appendix. All supplemental materials (such as data collection instrument or methodology reports) should be organized in one file with a table of contents or bookmarks. If material pertains to a specific submission form number, that should be indicated. Requested information should be provided in the submission form and required attachments. There is no guarantee that supplemental materials will be reviewed.
Attachment **Attachment:** 2016_12_22_UnplannedReadm_Cancer_Appendix.pdf

Contact Information

Co.1 **Measure Steward (Intellectual Property Owner):** Seattle Cancer Care Alliance
Co.2 **Point of Contact:** Barb, Jagels, bjagels@seattlecca.org, 206-288-2127-
Co.3 **Measure Developer if different from Measure Steward:** Alliance of Dedicated Cancer Centers
Co.4 **Point of Contact:** Tracy, Spinks, tespinks@mdanderson.org, 713-563-2198-

Additional Information

Ad.1 **Workgroup/Expert Panel involved in measure development**
Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.
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Stephanie Buia Amport, MBA, CPHQ Yale Cancer Center
Lisa Truini-Pittman, RN, MPH Yale Cancer Center

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.2 **Year the measure was first released:** 2015
Ad.3 **Month and Year of most recent revision:** 12, 2016
Ad.4 **What is your frequency for review/update of this measure?** Annual
Ad.5 **When is the next scheduled review/update for this measure?** 12, 2017

Ad.6 **Copyright statement:** N/A
Ad.7 **Disclaimers:** N/A

Ad.8 **Additional Information/Comments:** In January 2016, the ADCC submitted this measure for consideration by the NQF All-Cause Admissions and Readmissions Project 2015-2017 TEP. The TEP was convened June 8-9, 2016 to review all submitted measures and provide recommendations regarding measure endorsement. During the review, the TEP expressed enthusiasm for a cancer-specific readmissions measure but did not support endorsement of the measure, as submitted. The TEP noted concerns related to the limited testing population and the measure's focus on unplanned readmissions to the discharging hospital only.

Following the recommendation of the TEP, the ADCC broadened the measure to capture readmissions of cancer patients from and to any short-term acute care hospital (PCHs, short-term acute care PPS hospitals, and CAHs) and pursued additional testing of the measure using Medicare claims data. This expansion produced unplanned readmissions rates of patients discharged from PCHs and readmitted to any short-term acute care hospital (PCH, short-term acute care PPS hospital, or CAH). Additionally, it provided comparative rates of unplanned readmissions of cancer patients for non-PCH short-term acute care hospitals (i.e., short-term acute care PPS hospitals and CAHs). We believe that the measure has broad applicability to cancer patients treated in other short-term acute care hospitals and can be successfully adopted for the PCHQR and other public reporting programs.