NATIONAL QUALITY FORUM
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Memo

June 29-30, 2021

To: Consensus Standards Approval Committee (CSAC)

From: Cost and Efficiency Project Team

Re: Cost and Efficiency Fall 2020

CSAC Action Required

The CSAC will review recommendations from the Cost and Efficiency project at its June 29-30, 2021 meeting and vote on whether to uphold the recommendations from the Standing Committee.

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

1. **Cost and Efficiency Draft Report**. The draft report has been updated to reflect the changes made following the Standing Committee's discussion of public and member comments. The complete draft report and supplemental materials are available on the project webpage.
2. **Comment Table**. Staff has identified themes within the comments received. This table lists one comment received during the post-meeting comment period and the NQF/Standing Committee responses.

Background

In 2019, healthcare spending in the United States (U.S.) reached $3.8 trillion, or approximately $11,582 per person.[1] This total represented a 4.7 percent increase above 2018 spending levels.[1] Despite this high level of spending, the U.S. continues to rank below other developed countries for health outcomes, including lower life expectancy and greater prevalence of chronic diseases.[2] Healthcare quality is also an issue in which the U.S. falls behind other developed countries in the quality domains of effective, safe, coordinated, and patient-centered care.[2] The factors contributing to these concerning trends are as complex as the healthcare system itself and include physician practice patterns, regional market influences, and access to care. Improving efficiency has the potential to simultaneously reduce the rate of cost growth and improve the quality of care provided.

As reducing costs continues to be a focus of healthcare reform, it is important to understand the current use of resources in the healthcare system as it relates to quality—especially how resource use relates to health outcomes. Legislation, including the Improving Medicare Post-Acute Care Transformation Act (IMPACT) of 2014 and the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA), requires the use of resource use measures to support payment reform efforts. Identifying and providing incentives for healthcare providers (e.g., clinicians, hospitals, and post-acute care facilities) to deliver efficient care (i.e., high quality, lower cost) requires quality measures as well as cost and resource use measures. Such measures position the healthcare system to evaluate the efficiency of care and stimulate changes in practice to improve value.

For this project, the Cost and Efficiency Standing Committee evaluated one measure undergoing

maintenance endorsement consideration against the National Quality Forum's (NQF) evaluation criteria.

The Standing Committee recommended the following measure for continued endorsement:

- **NQF #2158** Medicare Spending per Beneficiary (MSPB) Hospital (Acumen, LLC./Centers for Medicare & Medicaid Services [CMS])

Draft Report

The Cost and Efficiency draft report presents the results of the evaluation of one measure considered under the Consensus Development Process (CDP). One measure is recommended for endorsement.

The measure was evaluated against the 2019 version of the measure evaluation criteria.

Status	Maintenance	New	Total
Measures under review	1	0	1
Measures recommended for endorsement	1	0	1
Measures not recommended for endorsement	0	0	0
Reasons for not recommending	Importance – 0 Scientific Acceptability – 0 Use – 0 Overall Suitability – 0 Competing Measure – 0	Importance – 0 Scientific Acceptability – 0 Use – 0 Overall Suitability – 0 Competing Measure – 0	

CSAC Action Required

Pursuant to the CDP, the CSAC is asked to consider endorsement of one candidate consensus measure.

Measures Recommended for Endorsement

- **NQF #2158** Medicare Spending per Beneficiary (MSPB) Hospital (Acumen, LLC./CMS)

Overall Suitability for Endorsement (total votes – 16): Yes-13; No-3

Comments and Their Disposition

NQF received one comment from one member organization and individuals pertaining to the draft report and to the measures under review.

A table of comments submitted during the comment period, with the responses to each comment and the actions taken by the Standing Committee and measure developers, is posted to the Cost and Efficiency project webpage.

Comment Themes and Committee Responses

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

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

Member Expression of Support

Throughout the 16-week continuous public commenting period, NQF members had the opportunity to express their support ('support' or 'do not support') for each measure submitted for endorsement consideration to inform the Committee's recommendations. No NQF members provided their expressions of support.

Appendix A: CSAC Checklist

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

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

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Appendix B: Measures Not Recommended for Endorsement

The one measure under review for this cycle was recommended for continued endorsement.

Appendix C: NQF Member Expression of Support Results

No NQF members provided their expression of support.

Appendix D: Details of Measure Evaluation

Rating Scale: H=High; **M**=Moderate; **L**=Low; **I**=Insufficient; **NA**=Not Applicable

Note*:* Vote totals may differ between measure criteria and between measures as Standing Committee members often have to join calls late or leave calls early. NQF ensures that quorum is maintained for all live voting. All voting outcomes are calculated using the number of Standing Committee members present for that vote as the denominator. One Standing Committee member was on inactive status for this cycle and a second Standing Committee member was recused from the discussions and voting due to their involvement on a developer-convened Technical Expert Panel (TEP) that informed the development of NQF #2158. Lastly, one Standing Committee member was recused from voting on the scientific acceptability (i.e., reliability and validity) due to their involvement with the SMP and having previously voted on this criterion.

During the measure evaluation meetings on February 11 and 26, 2021, voting quorum (14 out of 20 Standing Committee members) was not achieved. Therefore, the Standing Committee discussed all relevant criteria and voted after the meeting using an online voting tool.

Measures Recommended

NQF #2158 Medicare Spending per Beneficiary (MSPB) Hospital

Submission

Description: The MSPB Hospital measure evaluates hospitals' risk-adjusted episode costs relative to the risk-adjusted episode costs of the national median hospital. Specifically, the MSPB Hospital measure assesses the cost to Medicare for Part A and Part B services performed by hospitals and other healthcare providers during an MSPB Hospital episode, which is comprised of the periods 3-days prior to, during, and 30-days following a patient's hospital stay. The MSPB Hospital measure is not condition specific and uses standardized prices when measuring costs. Beneficiary populations eligible for the MSPB Hospital calculation include Medicare beneficiaries enrolled in Medicare Parts A and B who were discharged between January 1 and December 1 in a calendar year from short-term acute hospitals paid under the Inpatient Prospective Payment System (IPPS).

Numerator Statement: The numerator for a hospital's MSPB Hospital measure is the average ratio of observed episode cost to expected episode cost across all episodes from a hospital, multiplied by the average observed cost from all hospital episodes nationwide.

Denominator Statement: The denominator for a hospital's MSPB Hospital measure is the episode-weighted median MSPB Hospital Amount across all hospitals nationally.

Exclusions: Exclusions that are based on beneficiary or hospitalization characteristics are applied to promote episode comparability and completeness. Episodes are excluded from the MSPB Hospital measure if they meet any of the following conditions:

- The beneficiary has a primary payer other than Medicare during the episode window or in the 90-day lookback period.
- The beneficiary was not enrolled in Medicare Parts A and B or was enrolled in Part C during the 90-day lookback period and episode window.
- The beneficiary's death occurred during the episode.
- The index admission for the episode did not occur in a subsection (d) hospital paid under the Inpatient Prospective Payment System or occurred in a Maryland hospital.
- The index admission for the episode is involved in an acute-to-acute hospital transfer (i.e., the admission ends in a hospital transfer or begins because of a hospital transfer).
- The index admission inpatient claim indicates a $0 actual payment or a $0 standardized payment.

Adjustment/Stratification: Stratification by risk category/subgroup

Level of Analysis: Facility

Setting of Care: Inpatient/Hospital

Type of Measure: Cost/Resource Use

Data Source: Assessment Data, Claims, Enrollment Data, Other
Measure Steward/Developer: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING [February 11, 2021 & February 26, 2021]

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

(1a. High Impact or High Resource Use, 1b. se, 1b. Opportunity for Improvement)

1a. High Impact or High Resource Use & 1b. Opportunity for Improvement: **Total Votes-16; H-8; M-8; L-0; I-0**

Rationale:

- The Standing Committee acknowledged that this measure is undergoing maintenance endorsement consideration and was previously endorsed in 2017.
- From the 2017 endorsement review, the developer cited data indicating Medicare expenditures accounted for 3.6% ($647.6 billion) of the Gross Domestic Product (GDP) in 2015 and hospital benefits accounted for 30% ($188.3 billion) of those Medicare expenditures. The developer also cited data indicating Medicare expenditures will account for 6.0 to 9.1% of the GDP by 2090, if current trends continue.
- The Standing Committee considered new data cited in the Medicare Payment Advisory Commission (MedPAC) Report from July 2020 showing that approximately 3,200 general short-term acute care hospitals paid under the Inpatient Prospective Payment System (IPPS) received $189 billion in Medicare fee-for-service revenue in 2018, increasing at an average annual rate of 1.4 percent from 2014 to 2018.
- The Standing Committee also considered updated data from an analysis of all IPPS-eligible hospitals with at least 25 episodes for the 2018 performance period and measure score changes between 2017 and 2018.
    - Mean: 0.99; standard deviation: 0.08; median: 0.99; interquartile range: 0.94 to 1.03 with the minimum of 0.49 and maximum of 1.68.
    - The data on measure score changes between 2017 and 2018 showed that hospital scores do vary over time; 48.8% of providers evidenced improved (lower) scores. The distribution in score changed between these two years, with negative values indicating improvement with -1.76% and -2.01% as the 25th and 75th percentiles, respectively.
- The Standing Committee commented that the interquartile range was narrow. The developer responded that when looking at the change in improvement from 2017 to 2018, the tail end of the distribution had a difference of 0.09 (from 0.94 to 1.03). The developer stated that these changes were substantial due to the difference in associated costs. As the average episode cost was $22,000, the 9% change equated to almost $2,000. Therefore, the opportunity for improvement was around 12 billion, as represented throughout the quartiles.
- The Standing Committee ultimately agreed that this measure addresses a high resource area within healthcare and that there is room for improvement. Therefore, the Standing Committee passed the measure on the Importance to Measure and Report criterion.

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

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

2a. Reliability: **Total Votes-15 (due to SMP member recusal); H-8**; **M-6**; **L-1**; **I-0**; 2b. Validity: **Total Votes-15 (due to SMP member recusal); H-1**; **M-11**; **L-3**; **I-0**

Rationale:

Reliability

- The Standing Committee considered the reliability testing, which was conducted at the measure-score level. The developer conducted signal-to-noise and multi-sample (or split-sample) analyses.
- Mean (at least 25 episodes): 0.92; Median (at least 25 episodes): 0.96; IQR: 0.91-0.98

- The Pearson correlation coefficient was 0.83 for the 2018 split-sample and 0.79 for the 2017 and 2018 samples. The Shrout-Fleiss intraclass correlation coefficients were similar at 0.83 and 0.79 for the 2018 split-sample and the 2017 and 2018 samples.
- The Standing Committee acknowledged that this measure was reviewed by the SMP, which passed the measure with a high rating for reliability (H-7; M-0; L-0; I-0).
- The Standing Committee did not raise any major concerns and passed the measure on reliability.
- Since quorum was not achieved during the measure evaluation meetings, the Standing Committee was not asked whether they would like to uphold the SMP's rating. Voting occurred offline through a web-based tool, and the Standing Committee was asked to provide their own vote for reliability.

Validity

- The Standing Committee reviewed the validity testing data provided by the developer:
    - **Costing approach:** Costing approach is based on payments by Medicare for services within the identified resource use service categories; payments are based on agreed upon fee schedules for each setting.
    - **Testing:**
        - **Expert Panel:** Panelists "agreed" with the measure's "all-cost approach" and provided additional considerations for social risk factor testing.
        - **Empirical validity:** The developer reported that the correlations across all services categories averaged at 0.487, with procedure use having the strongest correlation of 0.721.
    - Roughly 37% of all episodes were excluded, with the largest contributor being episodes in which the initial inpatient stay was in a non-acute hospital or a critical access hospital (11.45%).
    - **Risk Adjustment:**
        - The developer used data from or based on the American Community Survey (ACS) and Common Medicare Environment (CME) in evaluating patient cohort and social risk factors in risk adjustment.
            - The developer did not include social risk factors in the model, reporting that including social risk factors in the risk adjustment model would mask provider differences based on the decomposition analysis conducted. The developer also reported minimal impact on measure scores from social risk factors.
        - The developer reports a range of R-squared values for the measure's risk models from 0.11 to 0.67, with an overall R-squared value of 0.457 and an overall adjusted R-squared value of 0.456.
    - **Meaningful Differences:** The developer reports a distribution of measure scores showing that the 90th percentile is over 21% greater than the 10th percentile with differences in rural versus urban areas and teaching hospitals vs. non-teaching hospitals.
- The Standing Committee acknowledged that this measure was reviewed by the SMP, which passed the measure with a moderate rating for validity (H-1; M-6; L-0; I-0).
- The Standing Committee had concerns about the exclusion of social risk factors from the risk adjustment model.
- The Standing Committee also acknowledged one public comment that was received for this measure, which raised a similar concern with the lack for social risk factors included in the model. The commenter also raised concern with the inadequacy of the current risk adjustment model due to the unadjusted and adjusted R-squared results ranging from 0.11 to 0.67.
- Standing Committee members commented that hospitals with more patients affected by social risk factors would have higher costs, which would have adverse effects on their measure performance. The Standing Committee recommended that the developer re-examine how risk factors are entered into their risk adjustment model to include hospital fixed effects, as the 109 risk factors that are included may not be precisely estimated. The developer stated that they attempted an alternative approach by examining a different model specification for social risk

factor testing with dual eligibility included, but this presented challenges that involved the inclusion of another 3,000 estimators of provider effects. The developer further stated that this led to precision error in the estimation prediction. Therefore, the developer did not include social risk factors.
- The Standing Committee also questioned how the developer would account for the cost variation from the effects of COVID-19. The Standing Committee noted that race was not a part of risk adjustment, and Black and Brown people have been disproportionately affected by COVID-19. The developer responded that they were working on monitoring 2020 data with CMS. They stated that all claims from January 1, 2020 to June 30, 2020 for a series of measures across certain hospital programs will be excluded.
- Ultimately, the Standing Committee passed the measure on validity.
- Since quorum was not achieved during the measure evaluation meetings, the Standing Committee was not asked whether they would like to uphold the SMP's rating. Voting occurred offline through a web-based tool, and the Standing Committee was asked to provide their own vote for validity.

3. Feasibility: Total Votes-16; H-12; M-4; L-0; I-0

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

Rationale:
- The Standing Committee considered that the data for this measure are both generated and used by healthcare personnel during the provision of care and are coded by someone other than the person obtaining the original information. All data elements are in defined fields in a combination of electronic data sources. No fees, licensing, or other requirements were associated with this measure.
- The Standing Committee did not raise any concerns and deemed this measure to be feasible.

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

(Used and useful to the intended audiences for 4a. Accountability and Transparency; 4b. Improvement; and 4c. Benefits outweigh evidence of unintended consequences)

4a. Use**: Total Votes-16; Pass-16; No Pass-0**; 4b. Usability: **Total Votes-16; H-1; M-11; L-4; I-0**

Rationale:
- The Standing Committee passed the measure on use, noting that it is reported publicly on CMS' Care Compare website.
- The Standing Committee considered data comparing the MSPB Hospital measure scores between 2017 and 2018, which demonstrated that 48.8% of all hospitals improved on the MSPB Hospital measure score.
- The Standing Committee stated that it was unclear as to what drives variation in public reports for this measure, as the data presented were very high level. In addition, the Standing Committee recommended that the reports be more granular.
- The Standing Committee also discussed whether there was a best practice example of a hospital or hospital-based accountable care organization with a performance improvement initiative that showed improvement in cost savings using NQF #2158. One Standing Committee member stated that the Medicare hip and knee replacement bundled program may be the most prominent example of an episode-based program showing cost savings. It was noted that cost savings were achieved by shifting from skilled nursing facilities to home or home health services and by considering costs in conjunction with other outcomes, such as readmission rates, to aid in the evaluation of quality of care.
- The Standing Committee did not raise any further questions or concerns and passed the measure on use and usability.

5. Related and Competing Measures
- This measure is related to the following measures:

    - NQF #3561 Medicare Spending per Beneficiary – Post-Acute Care Measure for Inpatient Rehabilitation Facilities
    - NQF #3562 Medicare Spending Per Beneficiary – Post-Acute Care Measure for Long-Term Care Hospitals
- The developers noted that the measure specifications have been harmonized to the extent possible with the related and competing measures. They stated that MSPB Hospital measure has been harmonized with MSPB Clinician and MSPB-PAC in the following ways: (1) change in risk-adjusted ratio calculation and (2) allowing readmissions to trigger an episode specific to MSPB Clinician. They also stated that the MSPB Hospital measure differs from MSPB Clinician and MSPB-PAC in that it captures all Medicare Part A and Part B costs associated with an episode that is triggered by an inpatient stay while MSPB Clinician, for example, excludes services that are unrelated to clinician care.
- The Standing Committee discussed related and competing measures during the post-comment web meeting on June 2, 2021. The Standing Committee did not raise any comments or concerns regarding the measure harmonization.

6. **Standing Committee Recommendation for Endorsement: Total Votes-16;** Yes-13**;** No-3

7. **Public and Member Comment**
    - One comment was submitted on this measure during the public and member commenting period. In the submitted comment, the commenter questioned whether the revisions to the measure specifications are appropriate and if the testing results produce performance scores that are reliable and valid for facility-level reporting. They were concerned with the risk adjustment approach for determining whether to include social risk factors to the risk adjustment model.
8. **Consensus Standards Approval Committee (CSAC) Endorsement Decision: Yes-X; No-X**

9. **Appeals**

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Cost and Efficiency Fall 2020 Review Cycle

CSAC Review

June 29-30, 2021

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

Standing Committee Recommendations

- One measure reviewed for fall 2020
  - One measure was reviewed by the Scientific Methods Panel *(SMP passed the measure on the Scientific Acceptability criterion)*
- One measure was recommended for endorsement
  - **NQF #2158** Medicare Spending per Beneficiary (MSPB) Hospital (maintenance) (Acumen, LLC./Centers for Medicare & Medicaid Services (CMS))

Public and Member Comment and Member Expressions of Support

- One comment was received
  - The comment was not supportive of the measure under review
- No NQF member expressions of support received

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Questions?

- NQF Project team:
  - Matthew Pickering, Senior Director
  - Janaki Panchal, Manager
  - Yemsrach Kidane, Project Manager
  - Sean Sullivan, Administrative Assistant
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Cost and Efficiency, Fall 2020 Cycle: CDP Report

DRAFT REPORT FOR CSAC REVIEW
JUNE 29, 2021

This report is funded by the Centers for Medicare & Medicaid Services under contract HHSM-500-2017-00060I Task Order HHSM-500-T0001.

http://www.qualityforum.org

Contents

Executive Summary

In 2019, healthcare spending in the United States (U.S.) reached $3.8 trillion, or approximately $11,582 per person.[1] This total represented a 4.7 percent increase above 2018 spending levels.[1] Despite this high level of spending, the U.S. continues to rank below other developed countries for health outcomes, including lower life expectancy and greater prevalence of chronic diseases.[2] Healthcare quality is also an issue in which the U.S. falls behind other developed countries in the quality domains of effective, safe, coordinated, and patient-centered care.[2] The factors contributing to these concerning trends are as complex as the healthcare system itself and include physician practice patterns, regional market influences, and access to care. Improving efficiency has the potential to simultaneously reduce the rate of cost growth and improve the quality of care provided.

As reducing costs continues to be a focus of healthcare reform, it is important to understand the current use of resources in the healthcare system as it relates to quality—especially how resource use relates to health outcomes. Legislation, including the Improving Medicare Post-Acute Care Transformation Act (IMPACT) of 2014 and the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA), requires the use of resource use measures to support payment reform efforts. Identifying and providing incentives for healthcare providers (e.g., clinicians, hospitals, and post-acute care facilities) to deliver efficient care (i.e., high quality, lower cost) requires quality measures as well as cost and resource use measures. Such measures position the healthcare system to evaluate the efficiency of care and stimulate changes in practice to improve value.

For this project, the Cost and Efficiency Standing Committee evaluated one measure undergoing maintenance endorsement consideration against the National Quality Forum's (NQF) evaluation criteria. The Standing Committee recommended the measure for continued endorsement. The recommended measure is listed below:

- **NQF #2158** Medicare Spending per Beneficiary (MSPB) Hospital (Acumen, LLC./Centers for Medicare & Medicaid Services (CMS))

A summary of the fall 2020 measure is included in the body of the report; a detailed summary of the Standing Committee's discussion and ratings of the criteria for the measure is in Appendix A.

Introduction

Healthcare spending in the U.S. increased by 4.7 percent in 2019 to reach $3.8 trillion.[1] Medicare spending grew by 6.7 percent to reach $799.4 billion in 2019, or 21 percent of total national health expenditures. Forecasts estimate that national health spending will grow at an average annual rate of 5.4 percent to reach $6.2 trillion by 2028.[1] These concerning trends can be attributed to many causes, including high costs for drugs, procedures, and administrative services, as well as poor coordination and overutilization of unnecessary health services. Physician and clinical services expenditures grew by 4.6 percent to reach $772.1 billion in 2019, a faster growth than the 4.0 percent in 2018. Likewise, hospital expenditures grew by 6.2 percent to reach $1.2 trillion in 2019, a faster growth than the 4.2 percent growth in 2018. This level of healthcare spending and growth has the potential to increase federal deficits and debt further or crowd out spending for other important national priorities.[3] Given this trend, healthcare cost measurement continues to be a critical component to assessing and improving the efficiency of the U.S. healthcare system.

Improving U.S. health system efficiency has the potential to simultaneously reduce cost growth and improve the quality of care provided. Cost measures are the building blocks to efficiency and value. For nearly a decade, NQF has been working to advance cost and resource use measurement. NQF, with the guidance and support of the Cost and Efficiency Standing Committee, continues to explore approaches and best practices for evaluating efficiency constructs. During this fall 2020 cycle, the Cost and Efficiency Standing Committee's evaluation was informed by inputs from the NQF Scientific Methods Panel (SMP), as well as other stakeholder comments. One measure was submitted to the project for maintenance endorsement consideration and was reviewed by the SMP.

NQF Portfolio of Performance Measures for Cost and Efficiency Conditions

The Cost and Efficiency Standing Committee (Appendix C) oversees NQF's portfolio of Cost and Efficiency measures (Appendix B), which includes both condition-specific and non-condition-specific measures. The Cost and Efficiency Standing Committee's charge is to assess cost and resource use measures and efficiency more broadly, including measures assessing the efficiency of healthcare delivery. The Standing Committee seeks to take a more holistic view of drivers of healthcare spending and identify sources of inefficiency and waste across the system. This portfolio contains 13 cost/resource use measures (see Table 1 below).

Table 1. NQF Cost and Efficiency Portfolio of Measures

Type	Cost/Resource Use
Condition-Specific	7
Non-Condition Specific	6
Total	13

Cost and Efficiency Measure Evaluation

On February 11 and 26, 2021, the Cost and Efficiency Standing Committee evaluated one measure undergoing maintenance review against NQF's standard measure evaluation criteria.

Table 2. Cost and Efficiency Measure Evaluation Summary

Status	Maintenance	New	Total
Measure under review	1	0	1
Measure recommended for endorsement	1	0	1

Comments Received Prior to Standing Committee Evaluation

NQF solicits comments on endorsed measures on an ongoing basis through the Quality Positioning System (QPS). In addition, NQF accepts comments for a continuous 16-week period during each evaluation cycle via an online tool located on the project webpage. For this evaluation cycle, the commenting period opened on December 23, 2020, and closed on April 30, 2021. Pre-meeting commenting closed on January 26, 2021. As of that date, one comment was submitted. This comment was shared with the Standing Committee prior to the measure evaluation meetings (Appendix F).

Comments Received After Standing Committee Evaluation

The continuous 16-week public commenting period with NQF member support closed on April 30, 2021. Following the Standing Committee's evaluation of the measures under review, NQF received one comment from one member organization pertaining to the draft report and to the measures under review. This comment for the measure under review has been summarized in Appendix A. The commenter questioned the appropriateness of the revisions to the measure specification and raised concerns on whether the testing results produce performance scores that are reliable and valid for facility-level reporting. They were also concerned with the risk adjustment approach for determining whether to include social risk factors to the risk adjustment model.

Summary of Measure Evaluation

The following summary of the measure evaluation highlights the major issues that the Standing Committee considered. Details of the Standing Committee's discussion and ratings of the criteria for the measure is included in Appendix A.

NQF #2158 Medicare Spending per Beneficiary (MSPB) Hospital (Acumen, LLC): Recommended

Description: The MSPB Hospital measure evaluates hospitals' risk-adjusted episode costs relative to the risk-adjusted episode costs of the national median hospital. Specifically, the MSPB Hospital measure assesses the cost to Medicare for Part A and Part B services performed by hospitals and other healthcare providers during an MSPB Hospital episode, which is comprised of the periods 3-days prior to, during, and 30-days following a patient's hospital stay. The MSPB Hospital measure is not condition specific and uses standardized prices when measuring costs. Beneficiary populations eligible for the MSPB Hospital calculation include Medicare beneficiaries enrolled in Medicare Parts A and B who were discharged between January 1 and December 1 in a calendar year from short-term acute hospitals paid under the Inpatient Prospective Payment System (IPPS).; **Measure Type**: Cost/Resource Use; **Level of Analysis**: Facility; **Setting of Care**: Inpatient/Hospital; **Data Source**: Assessment Data, Claims, Enrollment Data, Other

The Standing Committee recommended the measure for continued endorsement. During both meetings, the quorum required for voting was not achieved (14 out of 20 Standing Committee members). Therefore, the Standing Committee discussed all relevant criteria and voted offline using a web-based voting tool. The Standing Committee questioned the extent to which hospitals could control patient outcomes, noting that the key improvement opportunities provided by the developer focused on post-acute care settings. The developer explained that providers can exert control over patient outcomes after acute care hospitalization during this period by utilizing their resources and relationships for referrals. When considering the opportunity for improvement, the Standing Committee commented that the interquartile range was narrow. The developer also commented that when looking at the change in improvement from 2017 to 2018, the tail end of the distribution had a difference of 0.09 (from 0.94 in 2017 to 1.03 in 2018). The developer stated that these changes were substantial due to the difference in associated costs. As the average episode cost was $22,000, the 9 percent change equated to almost $2,000 per episode. With around six million episodes, the opportunity for improvement was approximately $12 billion. The Standing Committee ultimately agreed that this measure addresses a high-impact/high-resource use area of healthcare.

The Standing Committee noted that this measure was evaluated by the SMP. The SMP did not note any particular areas of concern and passed the measure with a high rating for reliability and a moderate rating for validity. The Standing Committee expressed no major concerns with respect to reliability and passed the measure on this criterion. Regarding validity, the Standing Committee had concerns about the exclusion of social risk factors from the risk adjustment model. The Standing Committee also acknowledged one public comment that was received for this measure, which raised a similar concern with the lack of social risk factors included in the model. The commenter also raised concern with the inadequacy of the current risk adjustment model due to the unadjusted and adjusted R-squared results ranging from 0.11 to 0.67. Standing Committee members commented that hospitals with more patients affected by social risk factors would have higher costs, which would also have adverse effects on their measure performance. The Standing Committee recommended that the developer re-examine how risk factors are entered into their risk adjustment model to include hospital-fixed effects, as the 109 risk factors that are included may not be precisely estimated. The developer stated that they attempted an alternative approach by examining a different model specification for social risk factor testing with dual eligibility included, but this presented challenges that involved the inclusion of another 3,000 estimators of provider effects. The developer further stated that this led to precision error in the estimation prediction. Therefore, the developer did not include social risk factors. The Standing Committee also questioned how the developer would account for the cost variation from the effects of COVID-19. The developer responded that they were working on monitoring 2020 data with the Centers for Medicare & Medicaid Services (CMS). They stated that all claims from January 1, 2020 to June 30, 2020, for a series of measures across certain hospital programs will be excluded. The Standing Committee did not raise any further questions or concerns and passed the measure on validity.

The Standing Committee regarded the measure as feasible. In their discussions related to usability and use, the Standing Committee recognized that this measure is currently used in the Hospital Value-Based Purchasing (HVBP) Program. For usability, the Standing Committee stated that it was unclear as to what drives variation in public reports for this measure and recommended that the reports be more granular. The Standing Committee also discussed that the Medicare hip and knee replacement bundled program

may be the most prominent example of an episode-based program showing cost savings. It was noted that cost savings were achieved by shifting from skilled nursing facilities to home or home health services and by considering costs in conjunction with other outcomes, such as readmission rates, to aid in the evaluation of quality of care. The Standing Committee discussed related and competing measures during the post-comment web meeting on June 2, 2021. The Standing Committee did not raise any comments or concerns regarding the measure harmonization.

The Standing Committee also reviewed one comment received on this measure during the public and member commenting period. In the submitted comment, the commenter questioned whether the revisions to the measure specifications are appropriate and if the testing results produce performance scores that are reliable and valid for facility-level reporting. They were concerned with the risk adjustment approach for determining whether to include social risk factors within the risk adjustment model. The Standing Committee previously considered the specifications and the scientific acceptability of the measure, including the adequacy of the risk model. The Standing Committee discussed these aspects of the measure during the measure evaluation meetings and ultimately recommended the measure for endorsement. The Standing Committee didn't bring forth any additional discussion, concerns or questions related to the submitted comment.

References

1. Martin AB, Hartman M, Lassman D, et al. National Health Care Spending In 2019: Steady Growth For The Fourth Consecutive Year: Study examines national health care spending for 2019. *Health Affairs*. 2021;40(1):14-24.

2. Tikkanen R, Abrams MK. U.S. Health Care from a Global Perspective, 2019: Higher Spending, Worse Outcomes? https://www.commonwealthfund.org/publications/issue-briefs/2020/jan/us-health-care-global-perspective-2019. Last accessed March 2021.

3. Medicare Payment Advisory Commission. *March 2019 Report to the Congress: Medicare Payment Policy*.; 2019. http://www.medpac.gov/docs/default-source/reports/mar19_medpac_ch1_sec.pdf?sfvrsn=0.

Appendix A: Details of Measure Evaluation

Rating Scale: H=High; **M**=Moderate; **L**=Low; **I**=Insufficient; **NA**=Not Applicable

Note*:* Vote totals may differ between measure criteria and between measures as Standing Committee members often have to join calls late or leave calls early. NQF ensures that quorum is maintained for all live voting. All voting outcomes are calculated using the number of Standing Committee members present for that vote as the denominator. One Standing Committee member was on inactive status for this cycle and a second Standing Committee member was recused from the discussions and voting due to their involvement on a developer-convened Technical Expert Panel (TEP) that informed the development of NQF #2158. Lastly, one Standing Committee member was recused from voting on the scientific acceptability (i.e., reliability and validity) due to their involvement with the SMP and having previously voted on this criterion.

During the measure evaluation meetings on February 11 and 26, 2021, voting quorum (14 out of 20 Standing Committee members) was not achieved. Therefore, the Standing Committee discussed all relevant criteria and voted after the meeting using an online voting tool.

Measures Recommended

NQF #2158 Medicare Spending per Beneficiary (MSPB) Hospital

Submission | Specifications

Description: The MSPB Hospital measure evaluates hospitals' risk-adjusted episode costs relative to the risk-adjusted episode costs of the national median hospital. Specifically, the MSPB Hospital measure assesses the cost to Medicare for Part A and Part B services performed by hospitals and other healthcare providers during an MSPB Hospital episode, which is comprised of the periods 3-days prior to, during, and 30-days following a patient's hospital stay. The MSPB Hospital measure is not condition specific and uses standardized prices when measuring costs. Beneficiary populations eligible for the MSPB Hospital calculation include Medicare beneficiaries enrolled in Medicare Parts A and B who were discharged between January 1 and December 1 in a calendar year from short-term acute hospitals paid under the Inpatient Prospective Payment System (IPPS).

Numerator Statement: The numerator for a hospital's MSPB Hospital measure is the average ratio of observed episode cost to expected episode cost across all episodes from a hospital, multiplied by the average observed cost from all hospital episodes nationwide.

Denominator Statement: The denominator for a hospital's MSPB Hospital measure is the episode-weighted median MSPB Hospital Amount across all hospitals nationally.

Exclusions: Exclusions that are based on beneficiary or hospitalization characteristics are applied to promote episode comparability and completeness. Episodes are excluded from the MSPB Hospital measure if they meet any of the following conditions:

- The beneficiary has a primary payer other than Medicare during the episode window or in the 90-day lookback period.
- The beneficiary was not enrolled in Medicare Parts A and B or was enrolled in Part C during the 90-day lookback period and episode window.
- The beneficiary's death occurred during the episode.
- The index admission for the episode did not occur in a subsection (d) hospital paid under the Inpatient Prospective Payment System or occurred in a Maryland hospital.
- The index admission for the episode is involved in an acute-to-acute hospital transfer (i.e., the admission ends in a hospital transfer or begins because of a hospital transfer).
- The index admission inpatient claim indicates a $0 actual payment or a $0 standardized payment.

Adjustment/Stratification: Stratification by risk category/subgroup
Level of Analysis: Facility
Setting of Care: Inpatient/Hospital
Type of Measure: Cost/Resource Use
Data Source: Assessment Data, Claims, Enrollment Data, Other
Measure Steward/Developer: Centers for Medicare & Medicaid Services

STANDING COMMITTEE MEETING [February 11, 2021 & February 26, 2021]

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

(1a. High Impact or High Resource Use, 1b. se, 1b. Opportunity for Improvement)
1a. High Impact or High Resource Use & 1b. Opportunity for Improvement: **Total Votes-16; H-8; M-8; L-0; I-0**
Rationale:

- The Standing Committee acknowledged that this measure is undergoing maintenance endorsement consideration and was previously endorsed in 2017.
- From the 2017 endorsement review, the developer cited data indicating Medicare expenditures accounted for 3.6% ($647.6 billion) of the Gross Domestic Product (GDP) in 2015 and hospital benefits accounted for 30% ($188.3 billion) of those Medicare expenditures. The developer also cited data indicating Medicare expenditures will account for 6.0 to 9.1% of the GDP by 2090, if current trends continue.
- The Standing Committee considered new data cited in the Medicare Payment Advisory Commission (MedPAC) Report from July 2020 showing that approximately 3,200 general short-term acute care hospitals paid under the Inpatient Prospective Payment System (IPPS) received $189 billion in Medicare fee-for-service revenue in 2018, increasing at an average annual rate of 1.4 percent from 2014 to 2018.
- The Standing Committee also considered updated data from an analysis of all IPPS-eligible hospitals with at least 25 episodes for the 2018 performance period and measure score changes between 2017 and 2018.
    - Mean: 0.99; standard deviation: 0.08; median: 0.99; interquartile range: 0.94 to 1.03 with the minimum of 0.49 and maximum of 1.68.
    - The data on measure score changes between 2017 and 2018 showed that hospital scores do vary over time; 48.8% of providers evidenced improved (lower) scores. The distribution in score changed between these two years, with negative values indicating improvement with -1.76% and -2.01% as the 25th and 75th percentiles, respectively.
- The Standing Committee commented that the interquartile range was narrow. The developer responded that when looking at the change in improvement from 2017 to 2018, the tail end of the distribution had a difference of 0.09 (from 0.94 to 1.03). The developer stated that these changes were substantial due to the difference in associated costs. As the average episode cost was $22,000, the 9% change equated to almost $2,000. Therefore, the opportunity for improvement was around 12 billion, as represented throughout the quartiles.
- The Standing Committee ultimately agreed that this measure addresses a high resource area within healthcare and that there is room for improvement. Therefore, the Standing Committee passed the measure on the Importance to Measure and Report criterion.

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

(2a. Reliability - precise specifications, testing; 2b. Validity - testing, threats to validity)
2a. Reliability: **Total Votes-15 (due to SMP member recusal); H-8**; **M-6**; **L-1**; **I-0**; 2b. Validity: **Total Votes-15 (due to SMP member recusal); H-1**; **M-11**; **L-3**; **I-0**
Rationale:

Reliability

- The Standing Committee considered the reliability testing, which was conducted at the measure-score level. The developer conducted signal-to-noise and multi-sample (or split-sample) analyses.
- Mean (at least 25 episodes): 0.92; Median (at least 25 episodes): 0.96; IQR: 0.91-0.98
- The Pearson correlation coefficient was 0.83 for the 2018 split-sample and 0.79 for the 2017 and 2018 samples. The Shrout-Fleiss intraclass correlation coefficients were similar at 0.83 and 0.79 for the 2018 split-sample and the 2017 and 2018 samples.
- The Standing Committee acknowledged that this measure was reviewed by the SMP, which passed the measure with a high rating for reliability (H-7; M-0; L-0; I-0).
- The Standing Committee did not raise any major concerns and passed the measure on reliability.
- Since quorum was not achieved during the measure evaluation meetings, the Standing Committee was not asked whether they would like to uphold the SMP's rating. Voting occurred offline through a web-based tool, and the Standing Committee was asked to provide their own vote for reliability.

Validity

- The Standing Committee reviewed the validity testing data provided by the developer:
    - **Costing approach:** Costing approach is based on payments by Medicare for services within the identified resource use service categories; payments are based on agreed upon fee schedules for each setting.
    - **Testing:**
        - **Expert Panel:** Panelists "agreed" with the measure's "all-cost approach" and provided additional considerations for social risk factor testing.
        - **Empirical validity:** The developer reported that the correlations across all services categories averaged at 0.487, with procedure use having the strongest correlation of 0.721.
    - Roughly 37% of all episodes were excluded, with the largest contributor being episodes in which the initial inpatient stay was in a non-acute hospital or a critical access hospital (11.45%).
    - **Risk Adjustment:**

        - The developer used data from or based on the American Community Survey (ACS) and Common Medicare Environment (CME) in evaluating patient cohort and social risk factors in risk adjustment.

            - The developer did not include social risk factors in the model, reporting that including social risk factors in the risk adjustment model would mask provider differences based on the decomposition analysis conducted. The developer also reported minimal impact on measure scores from social risk factors.

        - The developer reports a range of R-squared values for the measure's risk models from 0.11 to 0.67, with an overall R-squared value of 0.457 and an overall adjusted R-squared value of 0.456.

    - **Meaningful Differences:** The developer reports a distribution of measure scores showing that the 90th percentile is over 21% greater than the 10th percentile with differences in rural versus urban areas and teaching hospitals vs. non-teaching hospitals.
- The Standing Committee acknowledged that this measure was reviewed by the SMP, which passed the measure with a moderate rating for validity (H-1; M-6; L-0; I-0).
- The Standing Committee had concerns about the exclusion of social risk factors from the risk adjustment model.
- The Standing Committee also acknowledged one public comment that was received for this measure, which raised a similar concern with the lack for social risk factors included in the model. The commenter also raised concern with the inadequacy of the current risk adjustment model due to the unadjusted and adjusted R-squared results ranging from 0.11 to 0.67.
- Standing Committee members commented that hospitals with more patients affected by social risk factors would have higher costs, which would have adverse effects on their measure performance. The Standing Committee recommended that the developer re-examine how risk factors are entered into their risk adjustment model to include hospital fixed effects, as the 109 risk factors that are included may not be precisely estimated. The developer stated that they attempted an alternative approach by examining a different model specification for social risk factor testing with dual eligibility included, but this presented challenges that involved the inclusion of another 3,000 estimators of provider effects. The developer further stated that this led to precision error in the estimation prediction. Therefore, the developer did not include social risk factors.
- The Standing Committee also questioned how the developer would account for the cost variation from the effects of COVID-19. The Standing Committee noted that race was not a part of risk adjustment, and Black and Brown people have been disproportionately affected by COVID-19. The developer responded that they were working on monitoring 2020 data with CMS. They stated that all claims from January 1, 2020 to June 30, 2020 for a series of measures across certain hospital programs will be excluded.
- Ultimately, the Standing Committee passed the measure on validity.
- Since quorum was not achieved during the measure evaluation meetings, the Standing Committee was not asked whether they would like to uphold the SMP's rating. Voting occurred offline through a web-based tool, and the Standing Committee was asked to provide their own vote for validity.

3. Feasibility: Total Votes-16; H-12; M-4; L-0; I-0

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

Rationale:

- The Standing Committee considered that the data for this measure are both generated and used by healthcare personnel during the provision of care and are coded by someone other than the person obtaining the original information. All data elements are in defined fields in a combination of electronic data sources. No fees, licensing, or other requirements were associated with this measure.
- The Standing Committee did not raise any concerns and deemed this measure to be feasible.

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

(Used and useful to the intended audiences for 4a. Accountability and Transparency; 4b. Improvement; and 4c. Benefits outweigh evidence of unintended consequences)

4a. Use**: Total Votes-16; Pass-16; No Pass-0**; 4b. Usability: **Total Votes-16; H-1; M-11; L-4; I-0**

Rationale:

- The Standing Committee passed the measure on use, noting that it is reported publicly on CMS' Care Compare website.
- The Standing Committee considered data comparing the MSPB Hospital measure scores between 2017 and 2018, which demonstrated that 48.8% of all hospitals improved on the MSPB Hospital measure score.
- The Standing Committee stated that it was unclear as to what drives variation in public reports for this measure, as the data presented were very high level. In addition, the Standing Committee recommended that the reports be more granular.
- The Standing Committee also discussed whether there was a best practice example of a hospital or hospital-based accountable care organization with a performance improvement initiative that showed improvement in cost savings using NQF #2158. One Standing Committee member stated that the Medicare hip and knee replacement bundled program may be the most prominent example of an episode-based program showing cost savings. It was noted that cost savings were achieved by shifting from skilled nursing facilities to home or home health services and by considering costs in conjunction with other outcomes, such as readmission rates, to aid in the evaluation of quality of care.
- The Standing Committee did not raise any further questions or concerns and passed the measure on use and usability.

5. Related and Competing Measures

- This measure is related to the following measures:
    - NQF #3561 Medicare Spending per Beneficiary – Post-Acute Care Measure for Inpatient Rehabilitation Facilities
    - NQF #3562 Medicare Spending Per Beneficiary – Post-Acute Care Measure for Long-Term Care Hospitals
- The developers noted that the measure specifications have been harmonized to the extent possible with the related and competing measures. They stated that MSPB Hospital measure has been harmonized with

MSPB Clinician and MSPB-PAC in the following ways: (1) change in risk-adjusted ratio calculation and (2) allowing readmissions to trigger an episode specific to MSPB Clinician. They also stated that the MSPB Hospital measure differs from MSPB Clinician and MSPB-PAC in that it captures all Medicare Part A and Part B costs associated with an episode that is triggered by an inpatient stay while MSPB Clinician, for example, excludes services that are unrelated to clinician care.

- The Standing Committee discussed related and competing measures during the post-comment web meeting on June 2, 2021. The Standing Committee did not raise any comments or concerns regarding the measure harmonization.

6. **Standing Committee Recommendation for Endorsement: Total Votes-16; Yes-13**; **No-3**

7. **Public and Member Comment**
   - One comment was submitted on this measure during the public and member commenting period. In the submitted comment, the commenter questioned whether the revisions to the measure specifications are appropriate and if the testing results produce performance scores that are reliable and valid for facility-level reporting. They were concerned with the risk adjustment approach for determining whether to include social risk factors within the risk adjustment model.
8. **Consensus Standards Approval Committee (CSAC) Endorsement Decision: Yes-X; No-X**

9. **Appeals**

Appendix B: Cost and Efficiency Portfolio—Use in Federal Programs[a]

NQF #	Title	Federal Programs: Finalized or Implemented as of February 1, 2021
1598	Total Resource Use Population-Based PMPM Index	None
1604	Total Cost of Care Population-Based PMPM Index	None
2158	Medicare Spending per Beneficiary (MSPB) – Hospital	Care Compare (Implemented); Hospital Value-Based Purchasing (Implemented)
2431	Hospital-Level, Risk-Standardized Payment Associated With a 30-Day Episode of Care for Acute Myocardial Infarction (AMI)	Care Compare (Implemented); Hospital Inpatient Quality Reporting (Implemented); Hospital Value-Based Purchasing (Implemented)
2436	Hospital-Level, Risk-Standardized Payment Associated With a 30-Day Episode of Care for Heart Failure	Care Compare (Implemented); Hospital Inpatient Quality Reporting (Implemented); Hospital Value-Based Purchasing (Implemented)
2579	Hospital-Level, Risk-Standardized Payment Associated With a 30-Day Episode of Care for Pneumonia	Care Compare (Implemented); Hospital Inpatient Quality Reporting (Implemented)
3474	Hospital-Level, Risk Standardized Payment Elective for THA/TKA	Care Compare (Implemented); Hospital Inpatient Quality Reporting (Considered)
3509	Routine Cataract Removal With Intraocular Lens (IOL) Implantation	None
3510	Screening/Surveillance Colonoscopy	None
3512	Knee Arthroplasty	None
3561	Medicare Spending per Beneficiary (MSPB) – Post-Acute Care Measure for Inpatient Rehabilitation Facilities (IRF)	None
3562	Medicare Spending Per Beneficiary (MSPB) – Post-Acute Care Measure for Long-Term Care Hospitals (LTCH)	Long-Term Care Hospital Quality Reporting (Implemented); Long-Term Care, Care Compare (Implemented)
3575	Total Per Capital Cost (TPCC)	None

[a] Per CMS Measures Inventory Tool as of 03/03/2021

Appendix C: Cost and Efficiency Standing Committee and NQF Staff

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Appendix D: Measure Specifications

Measure	NQF #2158 Medicare Spending Per Beneficiary (MSPB) Hospital
Steward	Centers for Medicare & Medicaid Services
Description	The MSPB Hospital measure evaluates hospitals' risk-adjusted episode costs relative to the risk-adjusted episode costs of the national median hospital. Specifically, the MSPB Hospital measure assesses the cost to Medicare for Part A and Part B services performed by hospitals and other healthcare providers during an MSPB Hospital episode, which is comprised of the periods 3-days prior to, during, and 30-days following a patient's hospital stay. The MSPB Hospital measure is not condition specific and uses standardized prices when measuring costs. Beneficiary populations eligible for the MSPB Hospital calculation include Medicare beneficiaries enrolled in Medicare Parts A and B who were discharged between January 1 and December 1 in a calendar year from short-term acute hospitals paid under the Inpatient Prospective Payment System (IPPS).
Type	Cost/Resource Use
Data Source	Assessment Data, Claims, Enrollment Data, Other Medicare Part A and Part B claims data: Part A and B claims data are used to build MSPB Hospital episodes, calculate episode costs, and construct risk adjustors. CMS Office of Information Systems (OIS) maintains a detailed Medicare Claims Processing Manual available here. Medicare Enrollment Database (EDB): This is used to determine beneficiary-level exclusions and supplemental risk adjustors, specifically Medicare Parts A, B, and C enrollment; primary payer; disability status; end-stage renal disease (ESRD); beneficiary birth dates; and beneficiary death dates. Minimum Data Set (MDS): The MDS is used to create the Long Term Care Indicator variable in risk adjustment. Data documentation for the MDS is available here. We used additional data sources for measure testing purposes: • American Community Survey (ACS): This is used for evaluating social risk factors. • Common Medicare Environment (CME) database: This is used for evaluating social risk factors. • Area Deprivation Index (ADI): University of Wisconsin School of Medicine Public Health. 2015 Area Deprivation Index. February 24, 2020.
Level	Facility
Setting	Inpatient/Hospital
Numerator Statement	The numerator for a hospital's MSPB Hospital measure is the average ratio of observed episode cost to expected episode cost across all episodes from a hospital, multiplied by the average observed cost from all hospital episodes nationwide.
Numerator Details	The numerator is also referred to as the MSPB Hospital Amount.
Denominator Statement	The denominator for a hospital's MSPB Hospital measure is the episode-weighted median MSPB Hospital Amount across all hospitals nationally.
Denominator Details	N/A
Exclusions	The MSPB Hospital measure excludes episodes based on select hospitalization or beneficiary characteristics to foster comparability in service use and population captured by the measure.
Exclusion details	Specifically, the measure excludes episodes that meet any of the following criteria: • The beneficiary has a primary payer other than Medicare during the episode window or in the 90-day lookback period

Measure	NQF #2158 Medicare Spending Per Beneficiary (MSPB) Hospital
	• The beneficiary was not enrolled in Medicare Parts A and B, or was enrolled in Part C, during the 90-day lookback period and episode window • The beneficiary's death occurred during the episode. • The index admission for the episode did not occur in neither a subsection (d) hospital paid under the Inpatient Prospective Payment System (IPPS) or occurred in a Maryland hospital. • The index admission for the episode is involved in an acute-to-acute hospital transfer (i.e., the admission ends in a hospital transfer or begins because of a hospital transfer). • • The index admission inpatient claim indicates a $0 actual payment or a $0 standardized payment.
Risk Adjustment	Stratification by risk category/subgroup
Stratification	The MSPB Hospital measure is stratified by Major Diagnostic Category (MDC), which are mutually exclusive groups of MS-DRGs that correspond to an organ system (e.g., diseases and disorders of the digestive system) or cause (e.g., burns). There are 25 MDCs (numbered 01-25), and a Pre-MDC group for extremely resource intensive MS-DRGs. MS-DRGs within the numbered MDCs are largely determined by principal diagnosis, while MS-DRGs within the Pre-MDC group are determined by Operating Room procedures (e.g., organ transplant). The MSPB Hospital measure's MDC stratification and risk adjustment model, which controls for episode MS-DRG, allows for equitable patient episode comparisons that preserve clinically meaningful distinctions in the beneficiary population within each MDC. The risk adjustment variables included in the model are listed in document hyperlinked in Section S.1.
Type Score	Ratio; Attachment An MSPB Hospital measure that is less than 1 indicates that a hospital's MSPB Hospital Amount (i.e. risk-adjusted spending) is less than the national episode-weighted median MSPB Hospital Amount across all hospitals during a given performance period. An MSPB Hospital measure that is greater than 1 indicates that a hospital's MSPB Hospital Amount (i.e. risk-adjusted spending) is greater than the national episode-weighted median MSPB Hospital Amount across all hospitals during a given performance period.
Algorithm	The MSPB Hospital amount includes the cost of services performed by hospitals and other healthcare providers during an MSPB Hospital episode, which is comprised of the period 3 days prior to an inpatient PPS hospital admission (index admission) through 30-days post-hospital discharge. All costs are payment standardized to control for geographic variation in Medicare reimbursement rates. To account for the clinical severity of patients, standardized costs are risk adjusted at the Major Diagnostic Category (MDC) level, using a combination of clinical indicators of CMS' Hierarchical Condition Category Version 22 (CMS-HCC V22) risk adjustment model (patient-level), an indicator of the severity of the index hospitalization (hospital stay, MS-DRG), an indicator of whether an index hospitalization is initiated within 30 days of another inpatient stay, indicators that rely on Medicare beneficiary enrollment and assessment data (patient level, e.g., ESRD coverage), and combinations thereof. The risk adjustment models are run within each MDC and with these indicators to support comparability across episodes. Further, the risk adjustment indicators are assessed over the 90 days preceding the episode to ensure that clinical events occurring near the episode window are captured and to minimize the loss of data for patients with a limited history of Medicare claims and administrative data. The indicators used for risk adjustment and the methodology are detailed in the Measure Information Form linked in Section S.1.
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Appendix E: Related and Competing Measures

Comparison of NQF #2158 and NQF #3561

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3561: Medicare Spending Per Beneficiary – Post Acute Care Measure for Inpatient Rehabilitation Facilities
Steward	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services
Description	The MSPB Hospital measure evaluates hospitals' risk-adjusted episode costs relative to the risk-adjusted episode costs of the national median hospital. Specifically, the MSPB Hospital measure assesses the cost to Medicare for Part A and Part B services performed by hospitals and other healthcare providers during an MSPB Hospital episode, which is comprised of the periods 3-days prior to, during, and 30-days following a patient's hospital stay. The MSPB Hospital measure is not condition specific and uses standardized prices when measuring costs. Beneficiary populations eligible for the MSPB Hospital calculation include Medicare beneficiaries enrolled in Medicare Parts A and B who were discharged between January 1 and December 1 in a calendar year from short-term acute hospitals paid under the Inpatient Prospective Payment System (IPPS).	The Medicare Spending Per Beneficiary – Post Acute Care Measure for Inpatient Rehabilitation Facility (MSPB-PAC IRF) was developed to address the resource use domain of the Improving Medicare Post-Acute Care Transformation Act of 2014 (IMPACT Act). This resource use measure is intended to evaluate each IRF's efficiency relative to that of the national median IRF. Specifically, the measure assesses Medicare spending by the IRF and other healthcare providers during an MSPB episode. The measure reports the ratio of the payment-standardized, risk-adjusted MSPB-PAC Amount for each IRF divided by the episode-weighted median MSPB-PAC Amount across all IRFs. The MSPB-PAC Amount is the ratio of the observed episode spending to the expected episode spending, multiplied by the national average episode spending for all IRFs. The measure is calculated using two consecutive years of Medicare Fee-for-Service (FFS) claims data and was developed using calendar year (CY) 2015-2016 data. This submission is based on fiscal year (FY) 2016-2017 data; i.e., IRF admissions from October 1, 2015 through September 30, 2017. Claims-based MSPB-PAC measures were developed in parallel for the IRF, long-term care hospital (LTCH), skilled nursing facility (SNF), and home health agency (HHA) settings to meet the mandate of the IMPACT Act. To align with the goals of standardized assessment across all settings in PAC, these measures were conceptualized uniformly across the four settings in terms of the construction logic, the approach to risk adjustment, and measure calculation. Clinically meaningful case-mix considerations were evaluated at the level of each setting. For example, clinicians with IRF experience evaluated IRF claims and then gave direction on how to adjust for specific patient and case-mix characteristics. The MSPB-PAC IRF measure was adopted by the Centers for Medicare & Medicaid Services (CMS) for the IRF Quality Reporting Program (QRP) and finalized in the FY 2017 IRF Prospective Payment System

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3561: Medicare Spending Per Beneficiary – Post Acute Care Measure for Inpatient Rehabilitation Facilities
		(PPS) Final Rule.[1] Public reporting for the measure began in Fall 2018 through the IRF Compare website using FY 2016-2017 data. Notes: [1] Medicare Program; Inpatient Rehabilitation Facility Prospective Payment System for Federal Fiscal Year 2017. https://www.gpo.gov/fdsys/pkg/FR-2016-08-05/pdf/2016-18196.pdf Federal Register, Vol. 81, No. 151.
Type	Cost/Resource Use	Cost/Resource Use
Data Source	Assessment Data, Claims, Enrollment Data, Other Medicare Part A and Part B claims data: Part A and B claims data are used to build MSPB Hospital episodes, calculate episode costs, and construct risk adjustors. CMS Office of Information Systems (OIS) maintains a detailed Medicare Claims Processing Manual available here. Medicare Enrollment Database (EDB): This is used to determine beneficiary-level exclusions and supplemental risk adjustors, specifically Medicare Parts A, B, and C enrollment; primary payer; disability status; end-stage renal disease (ESRD); beneficiary birth dates; and beneficiary death dates. Minimum Data Set (MDS): The MDS is used to create the Long Term Care Indicator variable in risk adjustment. Data documentation for the MDS is available here. We used additional data sources for measure testing purposes: • American Community Survey (ACS): This is used for evaluating social risk factors. • Common Medicare Environment (CME) database: This is used for evaluating social risk factors. • Area Deprivation Index (ADI): University of Wisconsin School of Medicine Public Health. 2015 Area Deprivation Index v2.0. Downloaded from February 24, 2020. Data dictionary URL; Data dictionary attachment; Code table attachment	Assessment Data, Claims, Enrollment Data, Other This measure is based on Medicare FFS administrative claims and uses data from the Medicare enrollment database and Minimum Data Set (MDS). The enrollment database provides information such as date of birth, date of death, sex, reasons for Medicare eligibility, periods of Part A and Part B coverage, and periods in the Medicare FFS program. The MDS is used to construct a risk adjustment variable, indicating beneficiaries who have been institutionalized for at least 90 days in a given year. The data elements from the Medicare FFS claims are those basic to the operation of the Medicare payment systems and include data such as date of admission, date of discharge, diagnoses, procedures, and revenue center codes. The Medicare FFS claims data files are used to identify Medicare services from IRFs and other settings (e.g., the outpatient setting) within the episode window. No data beyond the claims submitted in the normal course of business are required from providers for the calculation of this measure. This measure submission is based on FY 2016-2017 data, which were the most recent data available at the time of our analyses. We used the data sources listed below to develop the analytic file for measure specification and testing: • Medicare Fee-For-Services claims and enrollment data: We accessed inpatient, outpatient, carrier, skilled nursing facility, home health, durable medical equipment, and hospice claims through the Centers for Medicare & Medicaid Services (CMS) Common Working File (CWF). The data dictionary for all Medicare FFS claims, demographic, and enrollment data is

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3561: Medicare Spending Per Beneficiary – Post Acute Care Measure for Inpatient Rehabilitation Facilities
		available here. General information about the CWF is available here: • Minimum Data Set (MDS): Acumen obtains the MDS through the Quality Improvement and Evaluation System (QIES). The data dictionary for the MDS data is available here. We used two mappings to group diagnosis and procedure codes for use in identifying clinical events, implementing exclusions and applying risk adjustment: • Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) groupings for Services and Procedures: Software is available for download here. • CMS-Hierarchical Condition Category (HCC) mappings of ICD-9 and ICD-10 codes: We used the Version 22 CMS-HCC mapping, which is included in the software available here We used five additional data sources for measure testing purposes only and not for measure specification: • 2017 American Community Survey (ACS) 5-year estimate: We used the ACS to obtain the ZIP Code Tabulation Area (ZCTA) level measures needed to compute the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score for use in social risk factor testing. This information is downloadable at the US Census website. • Rural-Urban Continuum Codes 2013: We used this data source to construct rural-urban identifiers for social risk factor testing. These codes include county FIPS indicators, which are then merged onto our episode file. More information on this data source can be found here. • Provider of Services Current Files (POS File): We used this data source to describe the characteristics of IRFs included in measure specification and testing, such as census region, ownership type, and rurality, as reported in Table 1. The POS file contains data on characteristics of hospitals and other types of healthcare facilities, including the name and address of the facility and the type of Medicare services the facility provides, among other information. The data are collected through the CMS Regional Offices. General information about the POS Files is available here.

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3561: Medicare Spending Per Beneficiary – Post Acute Care Measure for Inpatient Rehabilitation Facilities
		• IRF Compare data: We used this data source to examine the relationship between MSPB and assessment-based quality measures. The IRF Compare data include publicly reported IRF quality measures. The data are available here. • Common Medicare Environment (CME) database: We extracted patient-level dual eligibility information from the CME database for social risk factor testing. CMS has designated the CME database as the single, enterprise-wide authoritative source for Medicare beneficiary enrollment and demographic data. The CME database integrates and standardizes different types of beneficiary data from CMS legacy systems. The CME database receives information from the EDB and also contains additional information not available in the EDB. A description of the CME is available here. Assessment Data, Claims, Enrollment Data, Other Data dictionary URL; Code table attachment Data dictionary URL; Code table attachment
Level	Facility	Facility
Setting	Inpatient/Hospital	Post-Acute Care
Numerator Statement	The numerator for a hospital's MSPB Hospital measure is the average ratio of observed episode cost to expected episode cost across all episodes from a hospital, multiplied by the average observed cost from all hospital episodes nationwide.	The numerator is the MSPB-PAC IRF Amount, or the average risk-adjusted episode spending across all episodes for the attributed provider. This is then multiplied by the national average episode spending level for all IRF providers nationally.
Numerator Details	The numerator is also referred to as the MSPB Hospital Amount.	N/A
Denominator Statement	The denominator for a hospital's MSPB Hospital measure is the episode-weighted median MSPB Hospital Amount across all hospitals nationally.	The denominator is the episode-weighted national median of the MSPB-PAC IRF Amounts for all IRFs nationally.
Denominator Details	N/A	N/A
Exclusions	The MSPB Hospital measure excludes episodes based on select hospitalization or beneficiary characteristics to foster comparability in service use and population captured by the measure.	Exclusion of clinically unrelated services. Certain services are excluded from the MSPB-PAC IRF episodes because they are clinically unrelated to IRF care and/or because IRF providers may have limited influence over certain Medicare services delivered by other providers during

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3561: Medicare Spending Per Beneficiary – Post Acute Care Measure for Inpatient Rehabilitation Facilities
		the episode window. These limited service-level exclusions are not counted towards a given IRF provider's Medicare spending to ensure that beneficiaries with certain conditions and complex care needs receive the necessary care. The list of excluded services was developed by obtaining consensus on the exclusion of each service from CMS clinicians, eight independently contracted clinicians (including two TEP members) with expertise in each of the PAC settings, and the measure developer's clinicians. Feedback from the TEP provided through the in-person meeting and follow-up email survey was also taken into consideration.
Exclusion Details	Specifically, the measure excludes episodes that meet any of the following criteria: • The beneficiary has a primary payer other than Medicare during the episode window or in the 90-day lookback period • The beneficiary was not enrolled in Medicare Parts A and B, or was enrolled in Part C, during the 90-day lookback period and episode window • The beneficiary's death occurred during the episode. • The index admission for the episode did not occur in neither a subsection (d) hospital paid under the Inpatient Prospective Payment System (IPPS) or occurred in a Maryland hospital. • The index admission for the episode is involved in an acute-to-acute hospital transfer (i.e., the admission ends in a hospital transfer or begins because of a hospital transfer). • • The index admission inpatient claim indicates a $0 actual payment or a $0 standardized payment.	Additional information on the process for developing the list of clinically unrelated services is available in Appendix D of the Measure Specifications document provided in section S.1. The specialties of the non-CMS clinicians with whom we consulted during the measure development process are provided in Appendix F of the Measure Specifications document provided in section S.1. Services that were determined by clinical consensus to be outside of the control of PAC providers include: • Planned hospital admissions[1] • Routine management of certain preexisting chronic conditions (e.g., dialysis for end-stage renal disease (ESRD), enzyme treatments for genetic conditions, treatment for preexisting cancers, and treatment for organ transplants) • Some routine screening and health care maintenance (e.g., colonoscopy and mammograms) • Immune modulating medications (e.g., immunosuppressants for organ transplant or rheumatoid arthritis) Other Exclusions. Once clinically unrelated services are excluded at the claim line level, we exclude episodes based on several other characteristics, such as: 1) Any episode that is triggered by a PAC claim outside the 50 states, D.C., Puerto Rico, and U.S. Territories. Rationale: This exclusion ensures that complete claims data are available for each provider.

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		2) Any episode where the claim(s) constituting the attributed PAC provider's treatment have a standard allowed amount of zero or where the standard allowed amount cannot be calculated. Rationale: Episodes where the claim(s) constituting the attributed PAC provider's treatment are zero or have unknown allowed payment do not reflect the cost to Medicare. Including these episodes in the calculation of MSPB-PAC IRF measure could potentially misrepresent a providers' resource use. 3) Any episode in which a patient is not enrolled in Medicare FFS for the entirety of a 90-day lookback period (i.e., a 90-day period prior to the episode trigger) plus episode window (including where a beneficiary dies) or is enrolled in Part C for any part of the lookback period plus episode window. Rationale: Episodes meeting this criteria do not have complete claims information that is needed for risk-adjustment and the measure calculation as there may be other claims (e.g., for services provided under Medicare Advantage [Part C]) that we do not observe in the Medicare Part A and B claims data. Similarly, episodes in which the patient dies are, by definition, truncated episodes and do not have a complete episode window. Including these episodes in the MSPB-PAC IRF measure could potentially misrepresent a provider's resource use. This exclusion also allows us to faithfully construct Hierarchical Condition Categories (HCCs) for each episode by scanning the lookback period prior to its start without missing claims. 4) Any episode in which a patient has a primary payer other than Medicare for any part of the 90-day lookback period plus episode window. Rationale: When a patient has a primary payer other than Medicare, complete claims data may not be observable. These episodes are removed to ensure that the measures are accurately calculated using complete data. 5) Any episode where the claim(s) constituting the attributed PAC provider's treatment include at least one related condition code indicating that it is not a prospective payment system bill.

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		Rationale: Claims that are not a prospective payment system bill may not report sufficient information to allow for payment standardization. 6) Any episode with problematic claims data (e.g., anomalous records for stays that overlap wholly or in part, or are otherwise erroneous or contradictory) Rationale: The episode with the most recent processing date is kept to ensure the accuracy of data elements. Finally, as part of the measure construction process described in section S.7.2, episodes with residuals below the 1st or above the 99th percentile of the residual distribution are excluded, reducing the impact of high- and low-payment outliers. Notes: [1] The lists of clinically unrelated services built off the planned readmissions algorithm developed by the Yale New Haven Health Services Corporation/Center for Outcomes Research & Evaluation, as well as the expansions to the Yale algorithm by RTI. Clinicians reviewed the list of exclusions from that algorithm in the context of PAC treatment. During the review process, clinicians reviewed admissions observed in MSPB-PAC episodes and created exclusions that overlap with the Yale algorithm. Details on the Yale and RTI algorithms are available here: "Hospital-Wide All-Cause Unplanned Readmission Measure - Version 4.0," in 2015 Measure Updates and Specifications Report, ed. Yale New Haven Health Services Corporation/Center for Outcomes Research & Evaluation (2015). 10-11. Laura Smith, West, S., Coots, L., Ingber, M., "Skilled Nursing Facility Readmission Measure (SNFRM) NQF #2510: All-Cause Risk-Standardized Readmission Measure," (Centers for Medicare & Medicaid Services, 2015). 5-6
Risk Adjustment	Stratification by risk category/subgroup	Statistical risk model The detailed steps to computing the measure score are described in section S.7.2. Risk-adjustment is applied in “Step 3: Calculate Predicted Episode Payments.” The purpose of risk adjustment is to compensate for patient health circumstances and demographic factors that affect resource use but are beyond the influence of the

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3561: Medicare Spending Per Beneficiary – Post Acute Care Measure for Inpatient Rehabilitation Facilities
		attributed provider. The MSPB-PAC IRF measure risk adjustment model is adapted from the model used in the NQF-endorsed MSPB-Hospital measure, which itself is an adaptation of the standard CMS-HCC risk-adjustment model.[1,2] The MSPB-PAC IRF model uses a linear regression framework and a 90-day HCC lookback period. The risk adjustment model is estimated on all MSPB-PAC IRF episodes that meet the exclusion criteria. Each provider's MSPB-PAC IRF measure score is calculated as a provider's average MSPB-PAC Amount divided by the median MSPB-PAC Amount across all providers. A provider's MSPB-PAC IRF Amount is defined as the sum of standardized, risk-adjusted spending across all of a provider's eligible episodes divided by the number of episodes for that provider. Below is a description of the risk adjustment variables. Risk-Adjustment Variables The following beneficiary health status indicators are included as covariates in each MSPB-PAC IRF risk adjustment model and to the greatest extent possible are consistent across PAC settings (see Appendix C of the Measure Specifications document provided in section S.1 for a comprehensive list of independent variables used in the risk adjustment model): • 70 HCCs • 11 HCC interactions • 11 brackets for age at the start of the episode • Original entitlement to Medicare through disability • ESRD status • Long-term care institutionalization at start of episode.[3] Six clinical case-mix categories reflecting recent prior care (described further below).[4] Hospice utilization during the episode Prior acute ICU utilization day categories Prior acute length of stay categories Rehabilitation Impairment Categories (RICs) The clinical case-mix category variables used in the MSPB-PAC IRF risk adjustment model are included to account for differences in intensity

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		and type of care received by beneficiaries prior to the start of an MSPB-PAC IRF episode. See section S.7.5 for more details on the methodology of assigning clinical case-mix categories to each episode. Notes: [1] QualityNet, "CMS Price (Payment) Standardization – Detailed Methods" (Revised April 2019) https://www.qualitynet.org/inpatient/measures/payment-standardization [2] CMS, "Medicare Risk Adjustment Information" (2016) https://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Risk-Adjustors.html [3] Identifies beneficiaries who have been institutionalized for at least 90 days in a given year. The indicator is based on 90-day assessments from the Minimum Data Set (MDS) and is calculated based on CMS' definition of institutionalized individuals. [4] There are 7 case-mix categories as described above, but one category is removed to prevent collinearity. Statistical risk model
Stratification	The MSPB Hospital measure is stratified by Major Diagnostic Category (MDC), which are mutually exclusive groups of MS-DRGs that correspond to an organ system (e.g., diseases and disorders of the digestive system) or cause (e.g., burns). There are 25 MDCs (numbered 01-25), and a Pre-MDC group for extremely resource intensive MS-DRGs. MS-DRGs within the numbered MDCs are largely determined by principal diagnosis, while MS-DRGs within the Pre-MDC group are determined by Operating Room procedures (e.g., organ transplant). The MSPB Hospital measure's MDC stratification and risk adjustment model, which controls for episode MS-DRG, allows for equitable patient episode comparisons that preserve clinically meaningful distinctions in the beneficiary population within each MDC.	Not applicable: the MSBP-PAC IRF measure is not stratified.

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	The risk adjustment variables included in the model are listed in document hyperlinked in Section S.1.	
Type Score	Ratio; Attachment An MSPB Hospital measure that is less than 1 indicates that a hospital's MSPB Hospital Amount (i.e. risk-adjusted spending) is less than the national episode-weighted median MSPB Hospital Amount across all hospitals during a given performance period. An MSPB Hospital measure that is greater than 1 indicates that a hospital's MSPB Hospital Amount (i.e. risk-adjusted spending) is greater than the national episode-weighted median MSPB Hospital Amount across all hospitals during a given performance period.	Ratio An MSPB-PAC IRF measure score of 1 indicates that an IRF had an average MSPB-PAC Amount (i.e., risk-adjusted spending level) which is equal to the national episode-weighted median MSPB-PAC Amount across all IRFs during a given performance period. An MSPB-PAC IRF measure score of greater than 1 indicates that an IRF had higher average risk-adjusted spending levels compared to those of the national median IRF. For example, a measure score of 1.1 indicates that the IRF had average risk-adjusted spending levels that are 10 percent higher than the median IRF. On the other hand, an MSPB-PAC IRF measure score of less than 1 indicates that an IRF had lower average risk-adjusted spending levels compared to those of the median IRF. For example, a measure score of 0.9 indicates that the IRF had average risk-adjusted spending levels that are 10 percent lower than the median IRF.
Algorithm	The MSPB Hospital amount includes the cost of services performed by hospitals and other healthcare providers during an MSPB Hospital episode, which is comprised of the period 3 days prior to an inpatient PPS hospital admission (index admission) through 30-days post-hospital discharge. All costs are payment standardized to control for geographic variation in Medicare reimbursement rates. To account for the clinical severity of patients, standardized costs are risk adjusted at the Major Diagnostic Category (MDC) level, using a combination of clinical indicators of CMS' Hierarchical Condition Category Version 22 (CMS-HCC V22) risk adjustment model (patient-level), an indicator of the severity of the index hospitalization (hospital stay, MS-DRG), an indicator of whether an index hospitalization is initiated within 30 days of another inpatient stay, indicators that rely on Medicare beneficiary enrollment and assessment data (patient level, e.g., ESRD coverage), and combinations thereof. The risk adjustment models are run within each MDC and with these indicators to support comparability across episodes. Further, the risk adjustment indicators are assessed over the 90 days preceding the episode to ensure that clinical events occurring	In order to create a resource use measure that is clinically valid, there were multiple steps involved in excluding the least clinically relevant codes. Using an episode window, we organized claims into clinically meaningful service categories or settings. For example, Medicare Severity-Diagnosis Related Groups (MS-DRGs) noted after an IRF discharge were evaluated as medical or surgical admissions post-discharge. Clinical Classifications Software (CCS) and Current Procedural Terminology/Healthcare Common Procedure Coding System (CPT/HCPCS) services were organized into outpatient services, emergency department (ER) services, and durable medical equipment claims and evaluated for their relevance or relatedness to IRF care. Extensive clinical review was performed by clinicians with experience providing care in IRF settings, as well as in collaboration with Medical Officers at CMS. The hospitalizations and outpatient services least clinically related to the IRF care were excluded from resource use calculation. For instance, it was not felt that an IRF could influence a beneficiary's rehospitalization for nervous system neoplasms (DRG 054), post-discharge outpatient services for kidney transplant (CCS

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	near the episode window are captured and to minimize the loss of data for patients with a limited history of Medicare claims and administrative data. The indicators used for risk adjustment and the methodology are detailed in the Measure Information Form linked in Section S.1.	105), or routine fecal occult blood testing (CPT 82270). Therefore, these types of services were excluded. Services were only added to the exclusions list if there was consensus across IRF and CMS clinicians. Please see section S.9.1 for overall clinical consensus regarding the types of exclusions. To account for the association between clinical severity and resource use, we risk adjust the total observed episode spending (described in section S.12) using CMS-HCC indicators and interactions between selected comorbidities. Diagnosis codes on claims that occur during the 90-day period prior to the start of an MSPB-PAC IRF episode (90-day "look back") are used to create HCC indicators. The MSPB-PAC IRF measure accounts for comorbid conditions and interactions by broadly following the CMS-HCC risk adjustment methodology, which is derived from Medicare Part A and B claims and is used in the Medicare Advantage (MA) program. For example, the measure accounts for interactions between disability and selected HCC groups (e.g., Cystic Fibrosis, Severe Hematological Disorders, Opportunistic Infections, among others). Given the fact that beneficiaries often have more than one comorbidity, the model also includes commonly observed paired condition interactions, (e.g., chronic obstructive pulmonary disease [COPD] and congestive heart failure [CHF]) and commonly observed triple-interactions (e.g., diabetes mellitus, congestive heart failure, and renal failure). The full list of variables used in the risk adjustment model can be found in the Measure Specifications document provided in section S.1. In addition to comorbidities, the MSPB-PAC IRF measure utilizes clinical case-mix categories to create clinically meaningful subgroups that influence the type of services a beneficiary will receive in an IRF. To create these subgroups, information was derived from the institutional claim of the most recent hospitalization. The clinical case-mix category variables used in the MSPB-PAC IRF risk-adjustment model are included to account for differences in intensity and type of care received by beneficiaries prior to the start of an MSPB-PAC IRF episode. Taking the most recent institutional claim (by

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3561: Medicare Spending Per Beneficiary – Post Acute Care Measure for Inpatient Rehabilitation Facilities
		end date) in the 60 days prior to the start of an MSPB-PAC IRF episode, the episode is assigned to one of the following mutually exclusive and exhaustive clinical case-mix categories: 1) Prior Acute Surgical IP – Orthopedic – beneficiaries who have most recently undergone orthopedic surgery in an acute inpatient hospital 2) Prior Acute Surgical IP – Non-Orthopedic – beneficiaries who have most recently undergone a non-orthopedic surgery in an acute inpatient hospital 3) Prior Acute Medical IP with ICU – beneficiaries who have most recently stayed in an acute inpatient hospital for non-surgical reasons and had a stay in the ICU 4) Prior Acute Medical IP without ICU – beneficiaries who have most recently stayed in an acute inpatient hospital for non-surgical reasons but did not have a stay in the ICU 5) Prior PAC - Institutional – beneficiaries who are continuing PAC from an institutional PAC setting (i.e., coming from an LTCH, IRF, or SNF) 6) Prior PAC - HHA – beneficiaries who are continuing PAC from a HHA 7) Community – all other beneficiaries Finally, the MSPB-PAC IRF measure uses RICs from the IRF admission. A full list of the RICs used in the risk adjustment model is included in Appendix C of the Measure Specifications document provided in section S.1. To simplify the clinical logic and avoid the issue of attributing claims to MSPB-PAC IRF episodes in the case of concurrent clinical events, all claims that begin within the episode window (treatment period and associated services period) are included in the MSPB-PAC IRF measure. An MSPB-PAC IRF episode is assigned to the rehabilitation facility of the index admission. A new episode may begin during the associated services period of a previous MSPB-PAC IRF episode in the 30 days post-discharge from the IRF.

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Submission items	5.1 Identified measures: 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: 5b.1 If competing, why superior or rationale for additive value: H.2.1 Response: The MSPB Hospital measure has been harmonized with MSPB Clinician and MSPB-PAC in the following ways: (i) change in risk adjusted ratio calculation, and (ii) allowing readmissions to trigger an episode (specific to MSPB Clinician). The MSPB Hospital measure differs from MSPB Clinician and MSPB-PAC in that it captures all Medicare Part A and Part B costs associated with an episode that is triggered by an inpatient stay while MSPB Clinician, for example, excludes services that are unrelated to clinician care. H.3.1 Response: The MSPB Hospital measure evaluates hospitals' efficiency relative to the efficiency of the median hospital. The target population is Medicare beneficiaries enrolled in Medicare Parts A and B who were discharged from short-term acute hospitals. There are currently no NQF-endorsed measures that address both this same measure focus and this same target population.	

Comparison of NQF #2158 and NQF #3562

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3562: Medicare Spending Per Beneficiary – Post Acute Care Measure for Long-Term Care Hospitals
Steward	Centers for Medicare & Medicaid Services	Centers for Medicare & Medicaid Services

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3562: Medicare Spending Per Beneficiary – Post Acute Care Measure for Long-Term Care Hospitals
Description	The MSPB Hospital measure evaluates hospitals' risk-adjusted episode costs relative to the risk-adjusted episode costs of the national median hospital. Specifically, the MSPB Hospital measure assesses the cost to Medicare for Part A and Part B services performed by hospitals and other healthcare providers during an MSPB Hospital episode, which is comprised of the periods 3-days prior to, during, and 30-days following a patient's hospital stay. The MSPB Hospital measure is not condition specific and uses standardized prices when measuring costs. Beneficiary populations eligible for the MSPB Hospital calculation include Medicare beneficiaries enrolled in Medicare Parts A and B who were discharged between January 1 and December 1 in a calendar year from short-term acute hospitals paid under the Inpatient Prospective Payment System (IPPS).	The Medicare Spending Per Beneficiary – Post Acute Care Measure for Long-Term Care Hospitals (MSPB-PAC LTCH) was developed to address the resource use domain of the Improving Medicare Post-Acute Care Transformation Act of 2014 (IMPACT Act). This resource use measure is intended to evaluate each LTCH's efficiency relative to that of the national median LTCH. Specifically, the measure assesses Medicare spending by the LTCH and other healthcare providers during an MSPB episode. The measure reports the ratio of the payment-standardized, risk-adjusted MSPB-PAC Amount for each LTCH divided by the episode-weighted median MSPB-PAC Amount across all LTCH facilities. The MSPB-PAC Amount is the ratio of the observed episode spending to the expected episode spending, multiplied by the national average episode spending for all LTCHs. The measure is calculated using two consecutive years of Medicare Fee-for-Service (FFS) claims data and was developed using calendar year (CY) 2015-2016 data. This submission is based on fiscal year (FY) 2016-2017 data; i.e., LTCH admissions from October 1, 2015 through September 30, 2017. Claims-based MSPB-PAC measures were developed in parallel for the LTCH, inpatient rehabilitation facility (IRF), skilled nursing facility (SNF), and home health agency (HHA) settings to meet the mandate of the IMPACT Act. To align with the goals of standardized assessment across all settings in PAC, these measures were conceptualized uniformly across the four settings in terms of the construction logic, the approach to risk adjustment, and measure calculation. Clinically meaningful case-mix considerations were evaluated at the level of each setting. For example, clinicians with LTCH expertise evaluated LTCH claims and then gave direction on how to adjust for specific patient and case-mix characteristics. The MSPB-PAC LTCH measure was adopted by the Centers for Medicare & Medicaid Services (CMS) for the LTCH Quality Reporting Program (QRP) and finalized in the FY 2017 LTCH Prospective Payment System (PPS) Final Rule.[1] The measure entered into use on October 1, 2016. Public reporting for the measure began in Fall 2018 through the LTCH Compare website using FY 2016-2017 data. Notes: [1] Medicare Program; Hospital Inpatient Prospective Payment Systems for Acute Care Hospitals and the Long Term Care Hospital Prospective Payment System and Policy Changes and Fiscal Year 2017 Rates. Federal Register,

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3562: Medicare Spending Per Beneficiary – Post Acute Care Measure for Long-Term Care Hospitals
		Vol. 81, No. 162. https://www.govinfo.gov/content/pkg/FR-2016-08-22/pdf/2016-18476.pdf
Type	Cost/Resource Use	Cost/Resource Use
Data Source	Assessment Data, Claims, Enrollment Data, Other Medicare Part A and Part B claims data: Part A and B claims data are used to build MSPB Hospital episodes, calculate episode costs, and construct risk adjustors. CMS Office of Information Systems (OIS) maintains a detailed Medicare Claims Processing Manual available here. Medicare Enrollment Database (EDB): This is used to determine beneficiary-level exclusions and supplemental risk adjustors, specifically Medicare Parts A, B, and C enrollment; primary payer; disability status; end-stage renal disease (ESRD); beneficiary birth dates; and beneficiary death dates. Minimum Data Set (MDS): The MDS is used to create the Long Term Care Indicator variable in risk adjustment. Data documentation for the MDS is available here. We used additional data sources for measure testing purposes: • American Community Survey (ACS): This is used for evaluating social risk factors. • Common Medicare Environment (CME) database: This is used for evaluating social risk factors. • Area Deprivation Index (ADI): University of Wisconsin School of Medicine Public Health. 2015 Area Deprivation Index v2.0. Downloaded from February 24, 2020. Data dictionary URL; Data dictionary attachment; Code table attachment	Assessment Data, Claims, Enrollment Data, Other This measure is based on Medicare FFS administrative claims and uses data from the Medicare enrollment database and Minimum Data Set (MDS). The enrollment database provides information such as date of birth, date of death, sex, reasons for Medicare eligibility, periods of Part A and Part B coverage, and periods in the Medicare FFS program. The MDS is used to construct a risk adjustment variable, indicating beneficiaries who have been institutionalized for at least 90 days in a given year. The data elements from the Medicare FFS claims are those basic to the operation of the Medicare payment systems and include data such as date of admission, date of discharge, diagnoses, procedures, and revenue center codes. The Medicare FFS claims data files are used to identify Medicare services from LTCH and other settings (e.g., the outpatient setting) within the episode window. No data beyond the claims submitted in the normal course of business are required from providers for the calculation of this measure. This measure submission is based on FY 2016-2017 data, which were the most recent data available at the time of our analyses. We used the data sources listed below to develop the analytic file for measure specification and testing: • Medicare Fee-For-Services claims and enrollment data: We access inpatient, outpatient, carrier, skilled nursing facility, home health, durable medical equipment, and hospice claims through the Centers for Medicare & Medicaid Services (CMS) Common Working File (CWF). The data dictionary for all Medicare FFS claims, demographic, and enrollment data is available here. General information about the CWF is available here. • Minimum Data Set (MDS): Acumen obtains the MDS through the Quality Improvement and Evaluation System (QIES). The data dictionary for the MDS data is available here. We used two mappings to group diagnosis and procedure codes for use in identifying clinical events, implementing exclusions and applying risk adjustment:

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3562: Medicare Spending Per Beneficiary – Post Acute Care Measure for Long-Term Care Hospitals
		• Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) groupings for Services and Procedures: Software is available for download here. • CMS-Hierarchical Condition Category (HCC) mappings of ICD-9 and ICD-10 codes: We used the Version 22 CMS-HCC mapping, which is included in the software available here. We used five additional data sources for measure testing purposes only and not for measure specification: • 2017 American Community Survey (ACS) 5-year estimate: We used the ACS to obtain the ZIP Code Tabulation Area (ZCTA) level measures needed to compute the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score for use in social risk factor testing. This information is downloadable at the US Census website. • Rural-Urban Continuum Codes 2013: We used this data source to construct rural-urban identifiers for social risk factor testing. These codes include county FIPS indicators, which are then merged onto our episode file. More information on this data source can be found here. • Provider of Services Current Files (POS File): We used this data source to describe the characteristics of IRFs included in measure specification and testing, such as census region, ownership type, and rurality, as reported in Table 1. The POS file contains data on characteristics of hospitals and other types of healthcare facilities, including the name and address of the facility and the type of Medicare services the facility provides, among other information. The data are collected through the CMS Regional Offices. General information about the POS Files is available here. • IRF Compare data: We used this data source to examine the relationship between MSPB and assessment-based quality measures. The IRF Compare data include publicly reported IRF quality measures. The data are available here. • Common Medicare Environment (CME) database: We extracted patient-level dual eligibility information from the CME database for social risk factor testing. CMS has designated the CME database as the single, enterprise-wide authoritative source for Medicare beneficiary enrollment and demographic data. The CME database integrates and

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		standardizes different types of beneficiary data from CMS legacy systems. The CME database receives information from the EDB and also contains additional information not available in the EDB. A description of the CME is available here. This measure is based on Medicare FFS administrative claims and uses data from the Medicare enrollment database and Minimum Data Set (MDS). The enrollment database provides information such as date of birth, date of death, sex, reasons for Medicare eligibility, periods of Part A and Part B coverage, and periods in the Medicare FFS program. The MDS is used to construct a risk adjustment variable, indicating beneficiaries who have been institutionalized for at least 90 days in a given year. The data elements from the Medicare FFS claims are those basic to the operation of the Medicare payment systems and include data such as date of admission, date of discharge, diagnoses, procedures, and revenue center codes. The Medicare FFS claims data files are used to identify Medicare services from LTCH and other settings (e.g., the outpatient setting) within the episode window. No data beyond the claims submitted in the normal course of business are required from providers for the calculation of this measure. This measure submission is based on FY 2016-2017 data, which were the most recent data available at the time of our analyses. We used the data sources listed below to develop the analytic file for measure specification and testing: • Medicare Fee-For-Services claims and enrollment data: We access inpatient, outpatient, carrier, skilled nursing facility, home health, durable medical equipment, and hospice claims through the Centers for Medicare & Medicaid Services (CMS) Common Working File (CWF). The data dictionary for all Medicare FFS claims, demographic, and enrollment data is available here. General information about the CWF is available here. • Minimum Data Set (MDS): Acumen obtains the MDS through the Quality Improvement and Evaluation System (QIES). The data dictionary for the MDS data is available here. We used two mappings to group diagnosis and procedure codes for use in identifying clinical events, implementing exclusions and applying risk adjustment:

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		• Agency for Healthcare Research and Quality (AHRQ) Clinical Classifications Software (CCS) groupings for Services and Procedures: Software is available for download here. • CMS-Hierarchical Condition Category (HCC) mappings of ICD-9 and ICD-10 codes: We used the Version 22 CMS-HCC mapping, which is included in the software available here. We used five additional data sources for measure testing purposes only and not for measure specification: • 2017 American Community Survey (ACS) 5-year estimate: We used the ACS to obtain the ZIP Code Tabulation Area (ZCTA) level measures needed to compute the Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score for use in social risk factor testing. This information is downloadable at the US Census website. • Rural-Urban Continuum Codes 2013: We used this data source to construct rural-urban identifiers for social risk factor testing. These codes include county FIPS indicators, which are then merged onto our episode file. More information on this data source can be found here. • Provider of Services Current Files (POS File): We used this data source to describe the characteristics of IRFs included in measure specification and testing, such as census region, ownership type, and rurality, as reported in Table 1. The POS file contains data on characteristics of hospitals and other types of healthcare facilities, including the name and address of the facility and the type of Medicare services the facility provides, among other information. The data are collected through the CMS Regional Offices. General information about the POS Files is available here. • LTCH Compare data: We used this data source to examine the relationship between MSPB and assessment-based quality measures. The LTCH Compare data include publicly reported LTCH quality measures. The data are available are available here. • Common Medicare Environment (CME) database: We extracted patient-level dual eligibility information from the CME database for social risk factor testing. CMS has designated the CME database as the single, enterprise-wide authoritative source for Medicare beneficiary enrollment and demographic data. The CME database integrates and

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		standardizes different types of beneficiary data from CMS legacy systems. The CME database receives information from the EDB and also contains additional information not available in the EDB. A description of the CME is available at here. Data dictionary URL; Code table attachment Data dictionary URL; Code table attachment
Level	Facility	Facility
Setting	Inpatient/Hospital	Post-Acute Care
Numerator Statement	The numerator for a hospital's MSPB Hospital measure is the average ratio of observed episode cost to expected episode cost across all episodes from a hospital, multiplied by the average observed cost from all hospital episodes nationwide.	The numerator is the MSPB-PAC LTCH Amount, or the average risk-adjusted episode spending across all episodes for the attributed provider, comparing Standard and Site Neutral episodes only with episodes of the same type. This is then multiplied by the national average episode spending level for all LTCH providers nationally.
Numerator Details	The numerator is also referred to as the MSPB Hospital Amount.	N/A
Denominator Statement	The denominator for a hospital's MSPB Hospital measure is the episode-weighted median MSPB Hospital Amount across all hospitals nationally.	The denominator is the episode-weighted national median of the MSPB-PAC LTCH Amounts for all LTCH facilities nationally.
Denominator Details	N/A	N/A
Exclusions	The MSPB Hospital measure excludes episodes based on select hospitalization or beneficiary characteristics to foster comparability in service use and population captured by the measure.	Exclusion of clinically unrelated services. Certain services are excluded from the MSPB-PAC LTCH episodes because they are clinically unrelated to LTCH care and/or because LTCH providers may have limited influence over certain Medicare services delivered by other providers during the episode window. These limited service-level exclusions are not counted towards a given LTCH provider's Medicare spending to ensure that beneficiaries with certain conditions and complex care needs receive the necessary care. The list of excluded services was developed by obtaining consensus on the exclusion of each service from CMS clinicians, eight independently contracted clinicians (including two TEP members) with expertise in each of the PAC settings, and the measure developer's clinicians. Feedback from the TEP provided through the in-person meeting and follow-up email survey was also taken into consideration.
Exclusion Details	Specifically, the measure excludes episodes that meet any of the following criteria:	Additional information on the process for developing the list of clinically unrelated services is available in Appendix D of the Measure Specifications

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	• The beneficiary has a primary payer other than Medicare during the episode window or in the 90-day lookback period • The beneficiary was not enrolled in Medicare Parts A and B, or was enrolled in Part C, during the 90-day lookback period and episode window • The beneficiary's death occurred during the episode. • The index admission for the episode did not occur in neither a subsection (d) hospital paid under the Inpatient Prospective Payment System (IPPS) or occurred in a Maryland hospital. • The index admission for the episode is involved in an acute-to-acute hospital transfer (i.e., the admission ends in a hospital transfer or begins because of a hospital transfer). • • The index admission inpatient claim indicates a $0 actual payment or a $0 standardized payment.	document provided in section S.1. The specialties of the non-CMS clinicians with whom we consulted during the measure development process are provided in Appendix F of the Measure Specifications document provided in section S.1. Services that were determined by clinical consensus to be outside of the control of PAC providers include: • Planned hospital admissions[1] • Routine management of certain preexisting chronic conditions (e.g., dialysis for end-stage renal disease (ESRD), enzyme treatments for genetic conditions, treatment for preexisting cancers, and treatment for organ transplants) • Some routine screening and health care maintenance (e.g., colonoscopy and mammograms) • Immune modulating medications (e.g., immunosuppressants for organ transplant or rheumatoid arthritis) Other Exclusions. Once clinically unrelated services are excluded at the claim line level, we exclude episodes based on several other characteristics, such as: 1) Any episode that is triggered by a PAC claim outside the 50 states, D.C., Puerto Rico, and U.S. Territories. Rationale: This exclusion ensures that complete claims data are available for each provider. 2) Any episode where the claim(s) constituting the attributed PAC provider's treatment have a standard allowed amount of zero or where the standard allowed amount cannot be calculated. Rationale: Episodes where the claim(s) constituting the attributed PAC provider's treatment are zero or have unknown allowed payment do not reflect the cost to Medicare. Including these episodes in the calculation of MSPB-PAC LTCH measure could potentially misrepresent a providers' resource use. 3) Any episode in which a patient is not enrolled in Medicare FFS for the entirety of a 90-day lookback period (i.e., a 90-day period prior to the episode trigger) plus episode window (including where a beneficiary dies) or is enrolled in Part C for any part of the lookback period plus episode window.

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3562: Medicare Spending Per Beneficiary – Post Acute Care Measure for Long-Term Care Hospitals
		Rationale: Episodes meeting this criteria do not have complete claims information that is needed for risk-adjustment and the measure calculation as there may be other claims (e.g., for services provided under Medicare Advantage [Part C]) that we do not observe in the Medicare Part A and B claims data. Similarly, episodes in which the patient dies are, by definition, truncated episodes and do not have a complete episode window. Including these episodes in the MSPB-PAC LTCH measure could potentially misrepresent a provider's resource use. This exclusion also allows us to faithfully construct Hierarchical Condition Categories (HCCs) for each episode by scanning the lookback period prior to its start without missing claims. 4) Any episode in which a patient has a primary payer other than Medicare for any part of the 90-day lookback period plus episode window. Rationale: When a patient has a primary payer other than Medicare, complete claims data may not be observable. These episodes are removed to ensure that the measures are accurately calculated using complete data. 5) Any episode where the claim(s) constituting the attributed PAC provider's treatment include at least one related condition code indicating that it is not a prospective payment system bill. Rationale: Claims that are not a prospective payment system bill may not report sufficient information to allow for payment standardization. 6) Any episode with problematic claims data (e.g., anomalous records for stays that overlap wholly or in part, or are otherwise erroneous or contradictory) Rationale: The episode with the most recent processing date is kept to ensure the accuracy of data elements. Finally, as part of the measure construction process described in section S.7.2, episodes with residuals below the 1st or above the 99th percentile of the residual distribution are excluded, reducing the impact of high- and low-payment outliers. Notes: [1] The lists of clinically unrelated services built off the planned readmissions algorithm developed by the Yale New Haven Health Services Corporation/Center for Outcomes Research & Evaluation,

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		as well as the expansions to the Yale algorithm by RTI. Clinicians reviewed the list of exclusions from that algorithm in the context of PAC treatment. During the review process, clinicians reviewed admissions observed in MSPB-PAC episodes and created exclusions that overlap with the Yale algorithm. Details on the Yale and RTI algorithms are available here: "Hospital-Wide All-Cause Unplanned Readmission Measure - Version 4.0," in 2015 Measure Updates and Specifications Report, ed. Yale New Haven Health Services Corporation/Center for Outcomes Research & Evaluation (2015). 10-11. Laura Smith, West, S., Coots, L., Ingber, M., "Skilled Nursing Facility Readmission Measure (SNFRM) NQF #2510: All-Cause Risk-Standardized Readmission Measure," (Centers for Medicare & Medicaid Services, 2015). 5-6
Risk Adjustment	Stratification by risk category/subgroup	Statistical risk model The detailed steps to computing the measure score are described in section S.7.2. Risk-adjustment is applied in “Step 3: Calculate Predicted Episode Payments.” The purpose of risk adjustment is to compensate for patient health circumstances and demographic factors that affect resource use but are beyond the influence of the attributed provider. The MSPB-PAC LTCH measure risk adjustment model is adapted from the model used in the NQF-endorsed MSPB-Hospital measure, which itself is an adaptation of the standard CMS-HCC risk-adjustment model.[1,2] The MSPB-PAC LTCH model uses a linear regression framework and a 90-day HCC lookback period. The risk adjustment model is estimated on all MSPB-PAC LTCH episodes that meet the exclusion criteria. The model is estimated separately for Standard and Site Neutral episodes (see section S.7.2 for description of episode types). LTCH episodes are only compared to episodes of the same type (i.e., Standard episodes are only compared to Standard episodes, and Site Neutral episodes to Site Neutral episodes). This ensures that comparisons are fair, meaningful, and reflective of payment policy differences within particular LTCH settings. Each provider’s MSPB-PAC LTCH measure score is calculated as a provider’s average MSPB-PAC Amount divided by the median MSPB-PAC Amount across all providers. A provider’s MSPB-PAC LTCH Amount is defined as the sum of standardized, risk-adjusted spending across all of a provider’s

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		eligible episodes divided by the number of episodes for that provider. Below is a description of the risk adjustment variables. Risk-Adjustment Variables The following beneficiary health status indicators are included as covariates in each MSPB-PAC LTCH risk adjustment model and to the greatest extent possible are consistent across PAC settings (see Appendix C of the Measure Specifications document provided in section S.1 for a comprehensive list of independent variables used in the risk adjustment model): • 70 HCCs • 11 HCC interactions • 11 brackets for age at the start of the episode • Original entitlement to Medicare through disability • ESRD status • Long-term care institutionalization at start of episode.[3] • Six clinical case-mix categories reflecting recent prior care (described further below).[4] • Hospice utilization during the episode • Prior acute ICU utilization day categories • Prior acute length of stay categories • Medicare Severity-Long-Term Care Diagnosis-Related Groups (MS-LTC-DRGs) The clinical case-mix category variables used in the MSPB-PAC LTCH risk adjustment model are included to account for differences in intensity and type of care received by beneficiaries prior to the start of an MSPB-PAC LTCH episode. See section S.7.5 for more details on the methodology of assigning clinical case-mix categories to each episode. Notes: [1] QualityNet, "Measure Methodology Reports: Medicare Spending Per Beneficiary (MSPB) Measure," (2015). http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228772057350 [2] CMS, “Medicare Risk Adjustment Information” (2016) https://www.cms.gov/Medicare/Health-Plans/MedicareAdvtgSpecRateStats/Risk-Adjustors.html

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		[3] Identifies beneficiaries who have been institutionalized for at least 90 days in a given year. The indicator is based on 90-day assessments from the Minimum Data Set (MDS) and is calculated based on CMS' definition of institutionalized individuals. [4] There are 7 case-mix categories as described above, but one category is removed to prevent collinearity. Statistical risk model
Stratification	The MSPB Hospital measure is stratified by Major Diagnostic Category (MDC), which are mutually exclusive groups of MS-DRGs that correspond to an organ system (e.g., diseases and disorders of the digestive system) or cause (e.g., burns). There are 25 MDCs (numbered 01-25), and a Pre-MDC group for extremely resource intensive MS-DRGs. MS-DRGs within the numbered MDCs are largely determined by principal diagnosis, while MS-DRGs within the Pre-MDC group are determined by Operating Room procedures (e.g., organ transplant). The MSPB Hospital measure's MDC stratification and risk adjustment model, which controls for episode MS-DRG, allows for equitable patient episode comparisons that preserve clinically meaningful distinctions in the beneficiary population within each MDC. The risk adjustment variables included in the model are listed in document hyperlinked in Section S.1.	The MSPB-PAC LTCH measure is stratified by standard and site neutral payment rate admissions. An MSPB-PAC LTCH Standard episode is triggered by a standard payment rate claim, while an MSPB-PAC LTCH Site Neutral episode is triggered by a site neutral payment rate claim. Risk adjustment is then performed separately for MSPB-PAC LTCH Standard and Site Neutral cases. Thus, LTCH Standard and Site Neutral episodes are compared only with LTCH Standard and Site Neutral episodes, respectively, to ensure that the measure is making fair comparisons between clinically similar beneficiaries.
Type Score	Ratio; Attachment An MSPB Hospital measure that is less than 1 indicates that a hospital's MSPB Hospital Amount (i.e. risk-adjusted spending) is less than the national episode-weighted median MSPB Hospital Amount across all hospitals during a given performance period. An MSPB Hospital measure that is greater than 1 indicates that a hospital's MSPB Hospital Amount (i.e. risk-adjusted spending) is greater than the national episode-weighted median MSPB Hospital Amount across all hospitals during a given performance period.	Ratio An MSPB-PAC LTCH measure score of 1 indicates that an LTCH had an average MSPB-PAC Amount (i.e., risk-adjusted spending level) which is equal to the national episode-weighted median MSPB-PAC Amount across all LTCH facilities during a given performance period. An MSPB-PAC LTCH measure score of greater than 1 indicates that an LTCH had higher average risk-adjusted spending levels compared to those of the national median LTCH. For example, a measure score of 1.1 indicates that the LTCH had average risk-adjusted spending levels that are 10 percent higher than the median LTCH. On the other hand, an MSPB-PAC LTCH measure score of less than 1 indicates that an LTCH had lower average risk-adjusted spending levels compared to those of the median LTCH. For example, a measure

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		score of 0.9 indicates that the LTCH had average risk-adjusted spending levels that are 10 percent lower than the median LTCH.
Algorithm	The MSPB Hospital amount includes the cost of services performed by hospitals and other healthcare providers during an MSPB Hospital episode, which is comprised of the period 3 days prior to an inpatient PPS hospital admission (index admission) through 30-days post-hospital discharge. All costs are payment standardized to control for geographic variation in Medicare reimbursement rates. To account for the clinical severity of patients, standardized costs are risk adjusted at the Major Diagnostic Category (MDC) level, using a combination of clinical indicators of CMS' Hierarchical Condition Category Version 22 (CMS-HCC V22) risk adjustment model (patient-level), an indicator of the severity of the index hospitalization (hospital stay, MS-DRG), an indicator of whether an index hospitalization is initiated within 30 days of another inpatient stay, indicators that rely on Medicare beneficiary enrollment and assessment data (patient level, e.g., ESRD coverage), and combinations thereof. The risk adjustment models are run within each MDC and with these indicators to support comparability across episodes. Further, the risk adjustment indicators are assessed over the 90 days preceding the episode to ensure that clinical events occurring near the episode window are captured and to minimize the loss of data for patients with a limited history of Medicare claims and administrative data. The indicators used for risk adjustment and the methodology are detailed in the Measure Information Form linked in Section S.1.	Grouping methodology: The grouping methodology includes all Medicare Part A and B services delivered to a beneficiary during the treatment period (from admission to the LTCH through to discharge from the LTCH) and associated services period (from admission to the LTCH through to 30 days after discharge from the LTCH). To simplify the clinical logic and avoid the issue of attributing claims to MSPB episodes in the case of concurrent clinical events, all claims that begin within the episode window (treatment period and associated services period) are included in the MSPB-PAC LTCH measure. In order to create a resource use measure that is clinically valid, there were multiple steps involved in excluding the least clinically relevant codes. Using an episode window, we organized claims into clinically meaningful service categories or settings. For example, Medicare Severity-Diagnosis Related Groups (MS-DRGs) noted after an LTCH discharge were evaluated as medical or surgical admissions post-discharge. Clinical Classifications Software (CCS) and Current Procedural Terminology/Healthcare Common Procedure Coding System (CPT/HCPCS) services were organized into outpatient services, emergency department (ER) services, and durable medical equipment claims and evaluated for their relevance or relatedness to LTCH care. Extensive clinical review was performed by clinicians with experience and expertise in LTCH, as well as in collaboration with Medical Officers at CMS. The inpatient, outpatient, Part B physician and supplier, and DMEPOS services least clinically related to the LTCH care were excluded from the measure. For instance, services related to the routine management of preexisting chronic conditions (e.g., dialysis for ESRD, treatment for preexisting cancers, and treatment for organ transplants) were felt to be clinically unrelated to the scope of the type of care that LTCHs provide. Therefore, these types of services were excluded. Services were excluded if there was consensus across clinicians from the measure developer, external clinical experts including TEP members, and CMS medical officers.

Measure	2158: Medicare Spending Per Beneficiary (MSPB) Hospital	3562: Medicare Spending Per Beneficiary – Post Acute Care Measure for Long-Term Care Hospitals
		Please see section S.9.1 for overall clinical consensus regarding the types of exclusions. Attribution algorithm: An MSPB-PAC LTCH episode is assigned to the facility of the index admission. A new episode may begin during the associated services period of a previous MSPB-PAC LTCH episode in the 30 days post-discharge from the LTCH.
Submission items	5.1 Identified measures: 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: 5b.1 If competing, why superior or rationale for additive value: H.2.1 Response: The MSPB Hospital measure has been harmonized with MSPB Clinician and MSPB-PAC in the following ways: (i) change in risk adjusted ratio calculation, and (ii) allowing readmissions to trigger an episode (specific to MSPB Clinician). The MSPB Hospital measure differs from MSPB Clinician and MSPB-PAC in that it captures all Medicare Part A and Part B costs associated with an episode that is triggered by an inpatient stay while MSPB Clinician, for example, excludes services that are unrelated to clinician care. H.3.1 Response: The MSPB Hospital measure evaluates hospitals' efficiency relative to the efficiency of the median hospital. The target population is Medicare beneficiaries enrolled in Medicare Parts A and B who were discharged from short-term acute hospitals. There are currently no NQF-endorsed measures that address both this same measure focus and this same target population.	5.1 Identified measures: 2158 : Medicare Spending Per Beneficiary (MSPB) - Hospital 5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: 2158 : Medicare Spending Per Beneficiary (MSPB) - Hospital 5b.1 If competing, why superior or rationale for additive value: Not applicable. There are currently no measures that address both the same measure focus AND the same target population. MSPB-PAC measures are harmonized across PAC settings as well as with MSPB-Hospital. MSPB-PAC measures were developed in parallel for all PAC settings to meet the mandate of the IMPACT Act. To align with the goals of standardized assessment across PAC settings, these measures were conceptualized uniformly across the four settings in terms of the construction logic, the approach to risk adjustment, and measure calculation. The measures mirror the general construction of MSPB-Hospital. Aligning the MSPB-Hospital and MSPB-PAC measures in this way creates continuous accountability and aligns incentives to improve care planning and coordination across inpatient and PAC settings.

Appendix F: Pre-Evaluation Comments

Comments received as of January 26, 2021.

Topic	Commenter	Comment
2158: Medicare Spending Per Beneficiary (MSPB) Hospital	Submitted by American Medical Association	The American Medical Association (AMA) requests that the Standing Committee discuss the revisions made to the measure as described in S.7.2, specifically the change to equally weigh all risk-adjusted hospital episodes by the average ratio of observed to expected costs, and the expansion of episodes to include re-hospitalizations within 30 days of discharge of any admission that opens an episode. No rationale was provided for any of these changes, which makes it difficult for the AMA to provide input and determine whether we agree with the changes. The AMA is particularly concerned that the expansion to include re-hospitalizations will now double count the costs attributed to a hospital. The AMA does not believe that the current risk adjustment model is adequate due to the unadjusted and adjusted R-squared results ranging from 0.11 to 0.67 across the Major Diagnostic Category. The measure is not adequately tested and adjusted for social risk factors. It is unclear why the measure developer would test social risk factors after adjusting for clinical risk factors rather than assessing the impact of both clinical and social risk factors in the model at the same time. These variations in how risk adjustment factors are examined could also impact how each variable (clinical or social) perform in the model and remain unanswered questions. In addition, we note that hospitals measure scores shift when some or all of the social risk factors are applied within the risk model and particularly just over 15% of safety-net hospitals move above or below the delta in Model 13 (Table 2b34b.c Impact of Social Risk Factors). We ask the Standing Committee to carefully consider whether these results impact the ability of the measure to meet the validity criterion. Lastly, we would like to express our appreciation that the measure developer completed correlations with existing hospital quality measures and encourage the measure developer to continue to provide this information for other cost measures.

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