



## Measure Information

This document contains the information submitted by measure developers/stewards, but is organized according to NQF's measure evaluation criteria and process. The item numbers refer to those in the submission form but may be in a slightly different order here. In general, the item numbers also reference the related criteria (e.g., item IM1.1 relates to sub criterion IM1).

### Brief Measure Information

**NQF #: 2579**

**De.2. Measure Title:** Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN)

**Co.1.1. Measure Steward:** Centers for Medicare & Medicaid Services

**De.3. Brief Description of Measure:** This measure estimates hospital-level, risk-standardized payment for an eligible pneumonia episode of care starting with inpatient admission to a short term acute-care facility and extending 30 days post-admission for Medicare fee-for-service (FFS) patients who are 65 years or older with a principal discharge diagnosis of pneumonia or principal discharge diagnosis of sepsis (not including severe sepsis) that have a secondary discharge diagnosis of pneumonia coded as present on admission (POA) and no secondary diagnosis of severe sepsis coded as POA.

**IM.1.1. Developer Rationale:** In 2019 total Medicare expenditures were \$799.4 billion [1], representing 3.6% of gross domestic product (GDP). Current estimates suggest that Medicare spending will grow 7.6% per year between 2019 and 2028 [1]. This growth in spending underscores the need to create incentives for high value care. Measuring costs in a way that is transparent to consumers and fair to providers is an important component of understanding and controlling costs of care and rewarding value. Measuring condition-specific costs of care is needed to identify high value care.

Pneumonia is a common condition in the elderly with a substantial range in payments due to different practice patterns, making it an ideal condition for assessing relative value for an episode of care that begins with an acute hospitalization. Pneumonia is one of the leading causes of hospitalization for Americans over 65 years old [2] and costs the US around \$13.4 billion annually [3].

In part due to increasing Medicare spending on pneumonia care and geographic variation in resource use and spending, Centers for Medicare and Medicaid Services (CMS) payment programs have aimed to incentivize reductions in spending as determined by Medicare payments made to providers and institutions, as well as improved clinical outcomes for an episode of pneumonia care.

Medicare payments are difficult to interpret in isolation. Some high payment hospitals may have better clinical outcomes when compared with low payment hospitals; other high payment hospitals may not. For this reason, the value of hospital care is more clearly assessed when pairing hospital payments with hospital quality. A measure of payments for Medicare patients during an episode of care for pneumonia aligned with current quality of care measures will facilitate profiling hospital value (payments and quality). This measure, which uses standardized payments, reflects differences in the management of care for patients with pneumonia both during hospitalization and immediately post-discharge. By focusing on one specific condition, value assessments may provide actionable feedback to hospitals and incentivize targeted improvements in care.

This measure is intended to align with current quality measures to facilitate profiling hospital value (payments and quality). Given that pneumonia is a condition with substantial variability in costs of care, aligning this payment measure with quality measures (e.g., RSMRs) will allow the assessment of hospital value. By evaluating their RSPs and RSMRs for pneumonia, hospitals have an opportunity to consider actionable improvements and efficiencies on a broader scale to impact value of care. This measure provides transparency on the payments made for Medicare beneficiaries who have had pneumonia. Hospitals receive detailed information on how they compare with other institutions regarding the amount and venues of resources expended on patients. As such, the measure provides insight to hospitals that is not otherwise possible.

#### References:

1. <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NHE-Fact-Sheet>

2. <https://www.hcup-us.ahrq.gov/faststats/NationalDiagnosesServlet>  
 3. Tong, S., Amand, C., Kieffer, A. et al. Trends in healthcare utilization and costs associated with pneumonia in the United States during 2008–2014. BMC Health Serv Res 18, 715 (2018). <https://doi.org/10.1186/s12913-018-3529-4>

**De.1. Measure Type:** Cost/Resource Use

**S.5. Data Source:** Claims

Enrollment Data

**S.3. Level of Analysis:** Facility

**IF Endorsement Maintenance – Original Endorsement Date:** Dec 29, 2014 **Most Recent Endorsement Date:** Dec 29, 2014

**IF this measure is included in a composite, NQF Composite#/title:**

**IF this measure is paired/grouped, NQF#/title:**

**De.4. IF PAIRED/GROUPED, what is the reason this measure must be reported with other measures to appropriately interpret results?**

## Importance to Measure and Report

Extent to which the specific measure focus is evidence-based, important to making significant gains in healthcare quality, and improving health outcomes for a specific high-priority (high-impact) aspect of healthcare where there is variation in or overall less-than-optimal performance. ***Measures must be judged to meet all sub criteria to pass this criterion and be evaluated against the remaining criteria.***

### IM.1. Opportunity for Improvement

**IM.1.1. Briefly explain the rationale for this measure (e.g., the benefits or improvements in performance envisioned by use of this measure)**

In 2019 total Medicare expenditures were \$799.4 billion [1], representing 3.6% of gross domestic product (GDP). Current estimates suggest that Medicare spending will grow 7.6% per year between 2019 and 2028 [1]. This growth in spending underscores the need to create incentives for high value care. Measuring costs in a way that is transparent to consumers and fair to providers is an important component of understanding and controlling costs of care and rewarding value. Measuring condition-specific costs of care is needed to identify high value care.

Pneumonia is a common condition in the elderly with a substantial range in payments due to different practice patterns, making it an ideal condition for assessing relative value for an episode of care that begins with an acute hospitalization. Pneumonia is one of the leading causes of hospitalization for Americans over 65 years old [2] and costs the US around \$13.4 billion annually [3].

In part due to increasing Medicare spending on pneumonia care and geographic variation in resource use and spending, Centers for Medicare and Medicaid Services (CMS) payment programs have aimed to incentivize reductions in spending as determined by Medicare payments made to providers and institutions, as well as improved clinical outcomes for an episode of pneumonia care.

Medicare payments are difficult to interpret in isolation. Some high payment hospitals may have better clinical outcomes when compared with low payment hospitals; other high payment hospitals may not. For this reason, the value of hospital care is more clearly assessed when pairing hospital payments with hospital quality. A measure of payments for Medicare patients during an episode of care for pneumonia aligned with current quality of care measures will facilitate profiling hospital value (payments and quality). This measure, which uses standardized payments, reflects differences in the management of care for patients with pneumonia both during hospitalization and immediately post-discharge. By focusing on one specific condition, value assessments may provide actionable feedback to hospitals and incentivize targeted improvements in care.

This measure is intended to align with current quality measures to facilitate profiling hospital value (payments and quality). Given that pneumonia is a condition with substantial variability in costs of care, aligning this payment measure with quality measures (e.g., RSMRs) will allow the assessment of hospital value. By evaluating their RSPs and RSMRs for pneumonia, hospitals have an

opportunity to consider actionable improvements and efficiencies on a broader scale to impact value of care. This measure provides transparency on the payments made for Medicare beneficiaries who have had pneumonia. Hospitals receive detailed information on how they compare with other institutions regarding the amount and venues of resources expended on patients. As such, the measure provides insight to hospitals that is not otherwise possible.

References:

1. <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NHE-Fact-Sheet>
2. <https://www.hcup-us.ahrq.gov/faststats/NationalDiagnosesServlet>
3. Tong, S., Amand, C., Kieffer, A. et al. Trends in healthcare utilization and costs associated with pneumonia in the United States during 2008–2014. BMC Health Serv Res 18, 715 (2018). <https://doi.org/10.1186/s12913-018-3529-4>

**IM.1.2. Provide performance scores on the measure as specified** (current and over time) **at the specified level of analysis.** (This is required for endorsement maintenance. Include mean, stddev, min, max, interquartile range, scores by decile. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include). **This information also will be used to address the subcriterion on improvement (U.3.1.) under Usability and Use.**

We examine the distribution of hospital payment scores to demonstrate the variation, current and over time, in payment among measured hospitals.

Current results: Within the measure reporting period (July 1, 2016-June 30, 2019), 1,191,997 admissions were included in this analysis, representing care at 4,564 hospitals. The mean risk-standardized payment (RSP) was \$18,283, and the range was \$10,529-\$29,861. The median hospital RSP in the combined three-year dataset was \$18,200 (IQR \$17,015- \$19,453).

The distribution of hospital pneumonia RSPs for the three-year reporting period (2016-2019) is shown below, followed by the distribution of RSPs for individual years (2016/2017, 2017/2018,2018/2019).

Distribution for the 3-year reporting period (July 1, 2016-June 30, 2019):

Number of Hospitals: 4,564  
Number of Admissions: 1,191,997  
Mean(SD): 18,282.8(2,096.7)  
Range(Min-Max): 10,529.1-29,860.6  
Minimum: 10,529  
10th percentile: 15,826  
20th percentile: 16,702  
30th percentile: 17,277  
40th percentile: 17,747  
50th percentile: 18,200  
60th percentile: 18,661  
70th percentile: 19,170  
80th percentile: 19,790  
90th percentile: 20,715  
Maximum: 29,861

Distribution of hospital-level RSPs for each individual year:

Periods//YEAR1617//YEAR1718//YEAR1819//YEAR1619  
Number of Hospitals//4,473//4,473//4,437//4,564  
Number of Admissions//386,117//414,009//391,871//1,191,997  
Mean(SD)//18,468.2(1,753.8)//18,286.5(1,741.5)//18,122.1(1,689.8)//18,282.8(2,096.7)  
Range(Min-Max)//10,880.5-25,643.4//11,675-26,094.6//11,824.3-28,085.7//10,529.1-29,860.6  
Minimum//10,881//11,675//11,824//10,529  
10th percentile//16,386//16,144//16,084//15,826  
20th percentile//17,088//16,940//16,801//16,702  
30th percentile//17,621//17,462//17,310//17,277  
40th percentile//18,036//17,867//17,679//17,747

50th percentile//18,434//18,226//18,037//18,200  
60th percentile//18,852//18,631//18,411//18,661  
70th percentile//19,256//19,074//18,865//19,170  
80th percentile//19,849//19,613//19,395//19,790  
90th percentile//20,606//20,452//20,211//20,715  
Maximum//25,643//26,095//28,086//29,861

**IM.1.3. If no or limited performance data on the measure as specified is reported in IM.1.2., then provide a summary of data from the literature that indicates opportunity for improvement or overall less than optimal performance on the specific focus of measurement.**

N/A

**IM.1.4. Provide disparities data from the measure as specified (current and over time) by population group, e.g., by race/ethnicity, gender, age, insurance status, socioeconomic status, and/or disability.** (This is required for endorsement maintenance. Describe the data source including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities include.) **This information also will be used to address the subcriterion on improvement (U.3.1.) under Usability and Use.**  
Disparities data was conducted based on a) dual eligibility status and b) AHRQ SES score.

a) Distribution of Pneumonia RSPs by Proportion of Dual Eligible Patients (for Hospitals with 25 or More Cases):

Dates of Data: April 2016 through March 2019

Data Source: Medicare FFS claims, Medicare Beneficiary Summary File (MBSF)

Quartile//Q1//Q4

Social Risk Proportion(%)//(0-14.65)/(30.03-97.37)

#ofHospitals//1,009//1,004

Maximum//27,277//28,166

90%//20,231//21,632

75%//19,240//19,871

50%//18,223//18,313

25%//17,077//16,928

10%//15,798//15,699

0%Min//10,529//11,150

b) Distribution of Pneumonia RSPs by Proportion of Patients with AHRQ SES Index Scores (for Hospitals with 25 or More Cases):

Dates of Data: July 2016 through June 2019

Data Source: Medicare FFS claims and the American Community Survey (2013-2017) data

Quartile//Q1//Q4

Social Risk Proportion(%)//(0-7.02)/(33.61-100)

#ofHospitals//1,009//1,009

100%Max//27,277//29,808

90%//20,620//21,275

75%//19,311//19,531

50%//18,079//18,125

25%//16,902//16,805

10%//15,646//15,464

0%Min//11,976//10,851

**IM.1.5. If no or limited data on disparities from the measure as specified is reported in IM.1.4., then provide a summary of data from the literature that addresses disparities in care on the specific focus of measurement. Include citations.**

N/A

**IM.2. Measure Intent**

**IM.2.1. Describe intent of the measure and its components/ Rationale (including any citations) for analyzing variation in resource use in this way.**

A hospital-level, episode-of-care payment measure for pneumonia is informative for several reasons. First, it provides transparency into the differences in costs of care to Medicare for the same condition across hospitals. Second, it allows hospitals to assess the payments for patients admitted to their institution relative to other hospitals and thus may incentivize hospitals to examine their own practices and coordinate with post-discharge providers to seek new efficiencies. Finally, when paired with existing outcome measures for pneumonia patients, it identifies institutions that, after removing the effect of geography, policy adjustments, and case mix, demonstrate good patient outcomes at low cost. Such hospitals may provide important examples of positive deviance from which other hospitals can learn.

The pneumonia payment measure is aligned with the pneumonia mortality measure (NQF #0468). Other measures of quality include the pneumonia readmission measure (NQF #0506).

## Scientific Acceptability of Measure Properties

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

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

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

Respiratory : Pneumonia

**De.6. Non-Condition Specific** (check all the areas that apply):

Care Coordination

**De.7. Care Setting** (Select all the settings for which the measure is specified and tested):

Inpatient/Hospital

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

<WebPageURLExists nodeType="1"><https://www.qualitynet.org/inpatient/measures/payment/methodology>

**S.2. Type of resource use measure** (Select the most relevant)

Per episode

**S.3. Level of Analysis** (Check ONLY the levels of analysis for which the measure is SPECIFIED AND TESTED):

Facility

**S.4. Target Population Category** (Check all the populations for which the measure is specified and tested if any):

**S.5. Data Source** (Check ONLY the sources for which the measure is SPECIFIED AND TESTED).

If other, please describe in S.5.1.

Claims

Enrollment Data

**S.5.1. Data Source or Collection Instrument** (Identify the specific data source or data collection instrument, e.g. name of database,

*clinical registry, collection instrument, etc.)*

#### Data Sources

**Medicare Inpatient and Outpatient Administrative Claims:** This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient physician claims.

The 2020 reporting period for these analyses include Medicare administrative claims and enrollment information for patients with hospitalizations between July 1, 2016 and June 30, 2019. Medicare administrative claims for the 12 months prior to and during the index admission are used for risk adjustment. The period for public reporting of the PN payment measure aligns with the 30-day PN mortality and readmission measures for harmonization purposes.

The datasets also contain price-standardized payments for Medicare patients across all Medicare settings, services, and supplies (that is, inpatient, outpatient, SNF, home health agency, hospice, physician/clinical laboratory/ambulance services, and durable medical equipment, prosthetics/orthotics, and supplies). The CMS Standardization Methodology for Allowed Amount for 2009 through 2019 was applied to the claims to calculate the measures. Price-standardized payments for Medicare patients across all Medicare settings, services, and supplies (that is, inpatient, outpatient, SNF, home health agency, hospice, physician/clinical laboratory/ambulance services, and durable medical equipment, prosthetics/orthotics, and supplies) were calculated using standardized methodology specific to services reimbursed through Medicare parts A and B (for specific values see <https://www.resdac.org/articles/cms-price-payment-standardization-overview>).

#### Medicare Enrollment Database (EDB)

This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This dataset was used to obtain information on enrollment, date of birth, and post-discharge mortality status. These data have previously been shown to accurately reflect patient vital status (Fleming et al. 1992).

#### Medicare Fee Schedules

Fee schedules are lists of pre-determined reimbursement amounts for certain services and supplies (e.g. physician services, independent clinical labs, ambulance services, durable medical equipment) and are used by Medicare in the calculation of payment to providers. We used the applicable fee schedules when calculating payments for claims that occurred in each care setting.

#### Federal Register Final Rules for Medicare Prospective Payment Systems and Payment Policies

Certain data necessary to calculate payments (e.g. annual base payments and conversion factors, DRG weights, wage indexes, and average length of stay) were taken from applicable Federal Register Final Rules.

#### CMS-published Wage Index Data

Wage index data not published in Federal Register Final Rules (such as the wage index data for Renal Dialysis Facilities) were obtained through the CMS website.

#### American Community Survey (2013-2017)

We used the American Community Survey (2013-2017) to derive an updated Agency for Healthcare Research and Quality (AHRQ) Socioeconomic Status (SES) index score at the patient nine-digit zip code level for use in studying the association between our measure and social risk factors (SRFs).

#### Reference

Fleming, C., Fisher, E., Chang, C., Bubolz, T., & Malenka, D. (1992). Studying Outcomes and Hospital Utilization in the Elderly: The Advantages of a Merged Data Base for Medicare and Veterans Affairs Hospitals. *Medical Care*, 30(5), 377-391.

**S.5.2. Data Source or Collection Instrument Reference** *(available at measure-specific Web page URL identified in S.1 OR in the file attached here) (Save file as: S\_5\_2\_DataSourceReference)*

**S.6. Data Dictionary or Code Table** *(Please provide a web page URL or attachment if exceeds 2 pages. NQF strongly prefers URLs. Attach documents only if they are not available on a web page.)*

**Data Dictionary:**

URL:

Please supply the username and password:

Attachment: S6\_Data\_Dictionary.xlsx

**Code Table:**

URL:

Please supply the username and password:

Attachment:

**Construction Logic**

**S.7.1. Brief Description of Construction Logic**

If applicable, summarize the general approach or methodology to the measure construction. This is most relevant to measures that are part of or rely on the execution of a measure system or applies to multiple measures.

This measure estimates hospital-level, risk-standardized payments for a 30-day episode of care for PN. To this end, we constructed a cohort of PN patients by examining the principal discharge diagnosis in administrative claims data. Specifically, we included Medicare fee-for-service patients 65 or older with a principal discharge diagnosis of an AMI (defined by ICD-10 codes in attached data dictionary). We then applied several exclusion criteria as detailed in S.9.1.

Once our cohort was finalized we examined all payments for these patients (including co-pays, co-insurance, and deductibles) that occurred within 30 days of the index admission. We included payments for all care settings, except Part D Medicare claims. We standardized payments across providers by removing or averaging geographic differences and removing policy adjustments from the total payment for that service. These payments were then assigned to the initial admitting hospital. As part of our model, we risk adjusted these payments for patient comorbidities listed in outpatient and inpatient claims in the 12 months prior to the index admission as well as the secondary diagnoses included in the index admission. We then used hierarchical generalized linear regression models to calculate a risk-standardized payment for each hospital.

**S.7.2. Construction Logic** *(Detail logic steps used to cluster, group or assign claims beyond those associated with the measure's clinical logic.)*

To construct the measure, we use Medicare administrative claims data. These data contain claims for all care settings, supplies, and services as outlined in Section S.7.8. (except Part D). Claim payment data are organized by the setting, supply, or service in which they were rendered. Standard Medicare payment rates were assigned to each service based on claim type, facility type, and place of service codes. These payments are then summed by individual patients. To create a hospital-level measure, we aggregate the payments for all eligible patients at each hospital.

**S.7.2a. CONSTRUCTION LOGIC ATTACHMENT or URL:** If needed, attach supplemental documentation (Save file as: S\_7\_2\_Construction\_Logic). All fields of the submission form that are supplemented within the attachment must include a summary of important information included in the attachment and its intended purpose, including any references to page numbers, tables, text, etc.

URL: [https://qualitynet.cms.gov/files/5d0d37f3764be766b0101db2?filename=PN\\_Pymnt\\_MeasMeth\\_Rprt\\_092513.pdf](https://qualitynet.cms.gov/files/5d0d37f3764be766b0101db2?filename=PN_Pymnt_MeasMeth_Rprt_092513.pdf)

Please supply the username and password:

Attachment:

**S.7.3. Concurrency of clinical events, measure redundancy or overlap, disease interactions** *(Detail the method used for identifying concurrent clinical events, how to manage them, and provide the rationale for this methodology.)*

This measure examines payments for a 30-day episode of care beginning with an admission for PN and extending to 30-days post-



admission. We determine if a patient has a PN by examining the principal discharge diagnosis code in the administrative data. If a patient has a principal discharge diagnosis of any other condition, even if this includes a secondary diagnosis of PN, this admission is not considered as an index admission. Therefore, the concurrency of clinical events is not an issue when determining what triggers the episode of care. Once, an episode is triggered, however, we include payments for all care settings, except Part D Medicare claims. The model risk adjusts for comorbidities listed in outpatient and inpatient claims in the 12 months prior to the index admission as well as the secondary diagnoses included in the index admission that are not considered complications of care.

**S.7.4. Complementary services** *(Detail how complementary services have been linked to the measure and provide rationale for this methodology.)*

The measure includes payments for all care settings, except Part D, that occur during the 30-day window. If a claim for a complimentary service was filed in the study window, then it would be included in the measure.

**S.7.5. Clinical hierarchies** *(Detail the hierarchy of codes or condition groups used and provide rationale for this methodology.)*

The measure uses a risk-adjustment model based on Condition Categories (CCs) as opposed to Medicare Advantage Hierarchical Condition Categories (HCCs). We used CCs because they provide detailed descriptions about comorbidities that may influence care decisions that affect payment for PN without assigning hierarchy. This allows conditions that would be ranked lower in the hierarchy to be considered for risk adjustment if they are medically and statistically relevant. For example, it would allow for the inclusion of both HCC 34 (peptic ulcer, hemorrhage, other specified gastrointestinal disorders) and HCC 33 (inflammatory bowel disease) rather than only HCC 33, which is considered the more “severe” condition.

**S.7.6. Missing Data** *(Detail steps associated with missing data and provide rationale for this methodology (e.g., any statistical techniques to impute missing data))*

We do not provide measure specifications or guidelines for missing data :

We do not impute missing data for any of the variables included in the measure. However, if a hospitalization is missing a DRG or DRG weight, we exclude it as an index admission.

**S.7.7. Resource Use Service Categories (Units)** **(Select all categories that apply)**

Inpatient services: Inpatient facility services

Inpatient services: Evaluation and management

Inpatient services: Procedures and surgeries

Inpatient services: Imaging and diagnostic

Inpatient services: Lab services

Inpatient services: Admissions/discharges

Inpatient services: Labor (hours, FTE, etc.)

Other inpatient services

Ambulatory services: Outpatient facility services

Ambulatory services: Emergency Department

Ambulatory services: Pharmacy

Ambulatory services: Evaluation and management

Ambulatory services: Procedures and surgeries

Ambulatory services: Imaging and diagnostic

Ambulatory services: Lab services

Ambulatory services: Labor (hours, FTE, etc.)

Other ambulatory services



Durable Medical Equipment (DME)

Other services not listed

See S.7.8 for a full list of care settings included

See S.7.8 for a full list of care settings included

See S.7.8 for a full list of care settings included

**S.7.8. Identification of Resource Use Service Categories (Units)**

*(For each of the resource use service categories selected above, provide the rationale for their selection and detail the method or algorithms to identify resource units, including codes, logic and definitions.)*

To estimate payments for a 30-day episode of care for PN we included payments for all care settings, services, and supplies, except drugs covered under Part D Medicare claims. We did not include Part D since a large proportion of Medicare beneficiaries are not enrolled in Part D and there is variation in enrollment status across and within states. Including payments for Part D services would thus bias payments upwards for hospitals with high Part D enrollment. By following patients through an episode of care for PN, CMS and hospitals can gain key insights into the drivers of payments and how practice patterns vary across providers.

We include payments for the following care settings below in the measure:

Inpatient hospital facility and physician  
Outpatient hospital facility and physician  
Skilled nursing facility and physician  
Hospice facility and physician  
Home health facility and physician  
Inpatient psychiatric facility and physician  
Inpatient rehab facility and physician  
Long-term care hospital facility  
Clinical labs facility and physician  
Comprehensive outpatient rehab facility and physician  
Outpatient rehab facility and physician  
Renal dialysis facility and physician  
Community mental health centers facility and physician  
DME/POS/PEN  
Observation stay facility  
Part B drugs  
Ambulance and ambulance physician  
Emergency department facility and physician  
Physician office  
Federally qualified health centers facility and physician  
Rural health clinics facility and physician  
Ambulatory surgical centers facility and physician

We also include physician payments for the following care settings:

Indian health service free-stand facility  
Indian health service provider facility  
Tribal free-standing facility  
Tribal facility  
Military treatment facility  
Independent clinic  
State or local health clinic  
Mass immunization center  
Walk-in retail health clinic  
Urgent care facility  
Unassigned  
Pharmacy  
School

Homeless Shelter  
Prison  
Group Home  
Mobile Unit  
Temporary Lodging  
Birthing Center  
Intermediary Care/Mentally Retarded  
Residential Substance Abuse  
Psychiatric Residential Facility  
Non-Residential Substance Abuse  
Other Physician  
Other carrier claims with HCPCS codes P9603 or P9604

In order to determine how to assign claims, we examine the place of service code for physician claims and a combination of claim type and facility type codes to determine the facility in which care was provided. Depending on the facility and physician codes we standardize payments differently. Information on how we standardize claims can be found in the methodology report.

**S.7.8a. If needed, provide supplemental resource use service category specifications in either URL (preferred) or as an attachment (Save file as S.7.8a\_RU\_Service\_Categories):**

URL: [https://qualitynet.cms.gov/files/5d0d37f3764be766b0101db2?filename=PN\\_Pymnt\\_MeasMeth\\_Rprt\\_092513.pdf](https://qualitynet.cms.gov/files/5d0d37f3764be766b0101db2?filename=PN_Pymnt_MeasMeth_Rprt_092513.pdf)

Please supply the username and password:

Attachment:

## Clinical Logic

**S.8.1. Brief Description of Clinical Logic** (Briefly describe your clinical logic approach including clinical topic area, whether or not your account for comorbid and interactions, clinical hierarchies, clinical severity levels and concurrency of clinical events.)

PN is a common condition in the elderly with substantial variability in payments due to different practice patterns. Quality measures for PN such as 30-day AMI risk-standardized mortality rate (RSMR) are already publicly reported. In the context of its publicly reported quality measures, PN is an ideal condition in which to assess payments for Medicare patients and relative hospital value. Therefore, we created a measure of payments for a 30-day episode of care for PN that is aligned with CMS's 30-day AMI mortality and readmission measures, making it possible for CMS to assess the value of care provided for these episodes. The measure uses Condition Categories (CCs) to adjust for patient case-mix across hospitals. Details of our risk-adjustment strategy can be found in our technical report at <https://www.qualitynet.org/inpatient/measures/payment/methodology>.

This measure is for patients who are admitted with PN. We determine this by examining the principal discharge diagnosis code in the administrative data. If a patient has a principal discharge diagnosis of any other condition, even if this includes a secondary diagnosis of PN, this admission is not considered as an index admission. Therefore, the concurrency of clinical events is not applicable for this measure. However, the model does risk adjust for comorbidities listed in outpatient and inpatient claims in the 12 months prior to the index admission as well as the secondary diagnoses included in the index admission that are not considered complications of care.

**S.8.2. Clinical Logic** (Detail any clustering and the assignment of codes, including the grouping methodology, the assignment algorithm, and relevant codes for these methodologies.)

We focused on a 30-day episode of care triggered by admission for an PN as identified using ICD-10 diagnosis codes described in the data dictionary. The measure includes admissions for Medicare FFS beneficiaries aged 65 years and older. A full list of codes used to identify these conditions is provided in the data dictionary.

We assigned all payments for the episode of care to the hospital that originally admitted the patient.

**S.8.3. Evidence to Support Clinical Logic Described in S.8.2** Describe the rationale, citing evidence to support the grouping of clinical conditions in the measurement population(s) and the intent of the measure (as described in IM3)

The intent of the measure is to estimate payments for a 30-day episode of care for PN in order to gain insight into drivers of payment within and across hospitals. To profile hospital payments fairly, the measure fulfills the following criteria:

1. We standardize payments for geography to isolate payment differences related to the clinical care of patients with PN.
2. We adjust for hospital case-mix.
3. We align the PN payment measure specifications with the nationally reported 30-day PN risk-standardized mortality measure (RSMR) to identify practice patterns that may be expensive without conferring a quality benefit across an episode of care for PN.
4. We focused on a specific disease condition to provide the most meaningful feedback to hospitals and incentivize targeted improvements in care.

**S.8.3a. CLINICAL LOGIC ATTACHMENT or URL:** If needed, attach supplemental documentation (Save file as: S\_8\_3a\_Clinical\_Logic). All fields of the submission form that are supplemented within the attachment must include a summary of important information included in the attachment and its intended purpose, including any references to page numbers, tables, text, etc.

URL:

Please supply the username and password:

Attachment:

**S.8.4. Measure Trigger and End mechanisms** (Detail the measure's trigger and end mechanisms and provide rationale for this methodology)

When considering hospital payments, we focused on a 30-day episode of care triggered by admission for an eligible pneumonia condition for several key reasons. First, hospitalizations represent brief periods of illness that require ongoing management post-discharge. Second, decisions made at the admitting hospital affect payments for care in the immediate post-discharge period. Third, attributing payments for a continuous episode of care to admitting hospitals may reveal practice variations in the immediate and extended care of the illness that can result in increased payments. Fourth, a 30-day preset window provides a standard observation period by which to compare all hospitals. Lastly, we designed the pneumonia payment measure to be aligned with pneumonia quality measures, i.e. CMS's publicly reported 30-day Pneumonia mortality and readmission measures.

**S.8.5. Clinical severity levels** (Detail the method used for assigning severity level and provide rationale for this methodology)

The measure uses administrative claims data to risk-adjust for patient comorbidities but does not include adjustments for clinical severity. Our team has demonstrated the validity of claims-based measures for profiling hospitals for a number of prior measures by comparing either the measure results or the individual data elements against medical records. CMS validated the six NQF-endorsed claims-based measures currently in public reporting (i.e., mortality and readmission measures for AMI, heart failure, and pneumonia) with models that used medical record-abstracted data for risk adjustment. Specifically, claims model validation was conducted by building comparable models using abstracted medical record data for risk adjustment for heart failure patients (National Heart Failure data), AMI patients (Cooperative Cardiovascular Project data) and pneumonia patients (National Pneumonia Project dataset). When both models were applied to the same patient population, the hospital risk-standardized mortality and readmission rates estimated using the claims-based risk-adjustment models had a high level of agreement with the results based on the medical record model, thus supporting the use of the claims-based models for public reporting.

**S.8.6. Comorbid and interactions** (Detail the treatment of co-morbidities and disease interactions and provide rationale for this methodology.)

The goal of risk adjustment for this measure is to account for patient age, prior procedures (e.g., PCI and/or CABG), and comorbid conditions that are clinically relevant and have strong relationships with the outcome, while illuminating important payment differences between hospitals.

Comorbidities that are included in risk adjustment are identified in administrative claims during the 12 months prior to and including the index admission. To assemble the more than 70,000 ICD-10 codes into clinically coherent variables for risk adjustment, the measure primarily employs the publicly available CMS condition categories (CCs) to group ICD-10 codes into CCs, and selects comorbidities on the basis of both clinical relevance and statistical significance [1].

## Reference

Pope G, Ellis R, Ash A, et al. Principal Inpatient Diagnostic Cost Group Models for Medicare Risk Adjustment. *Health Care Financing Review*. 2000;21(3):26.

## Adjustments for Comparability

**S.9.1. Inclusion and Exclusion Criteria** *Detail initial inclusion/exclusion criteria and data preparation steps (related to clinical exclusions, claim-line or other data quality, data validation, e.g. truncation or removal of low or high dollar claim, exclusion of ESRD patients)*

:

The measure includes admissions for Medicare FFS beneficiaries aged 65 years or older discharged from non-federal short-term acute care hospitals (including Indian Health Service hospitals) and critical access hospitals, having a principal discharge diagnosis of pneumonia. The pneumonia measure also includes admissions with a principal discharge diagnosis of sepsis (not including severe sepsis) that have a secondary discharge diagnosis of pneumonia coded as POA and no secondary diagnosis of severe sepsis coded as POA.

CMS FFS beneficiaries with an index hospitalization to a non-federal short-term acute care hospital are included if they have been enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission to ensure a full year of administrative data for risk-adjustment.

For patients with more than one admission in a given year for a given condition, only one admission is randomly selected to include in the cohort as an index pneumonia.

The episode of care begins with an admission for pneumonia or sepsis (not including severe sepsis; with a secondary diagnosis of pneumonia) to a short-term acute care hospital. The hospital that initially admits the patient is assigned all payments that occur during the episode of care. This includes payments for patients who are subsequently transferred to another hospital for further care of the index admission. Claims from an emergency department do not begin the episode of care because CMS does not classify emergency department care as an inpatient admission. If a patient is transferred from an emergency department to another hospital and then subsequently admitted, the episode of care begins with the inpatient admission at the receiving hospital.

Excluded Populations:

Exclusion Criteria for PN Payment Measure

1. Discharged against medical advice (AMA)

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

2. Incomplete administrative data in the 30 days following the index admission if discharged alive.

Rationale: This is necessary in order to identify the outcome (payments) in the sample over our analytic period.

3. Transferred to a federal hospital

Rationale: We do not have claims data for these hospitals; therefore, including these patients would systematically underestimate payments.

4. Discharged alive on day of admission or following day and not transferred to another acute care facility.

Rationale :

This exclusion prevents inclusion of patients who likely did not have clinically significant PN.

5. Not matched to admission in the PN mortality measure

Rationale: As part of the current data processing, we match our index PN admissions to the PN mortality cohort to obtain the risk-adjustment variables. Patients are excluded if they cannot be matched between the PN payment and PN mortality cohorts.

6. Missing index DRG weight where provider received no payment

Rationale: With neither DRG weight or payment data, we cannot calculate a payment for the patient's index admission; this would make the entire episode of care appear significantly less expensive

7. Patients with inconsistent or unknown vital status or other unreliable demographic data

Rationale: Reliable and consistent data are necessary for valid calculation of the measure.

8. Patients enrolled in the Medicare hospice program any time in the 12 months prior to the index admission, including on the first day of the index admission.

Rationale: These patients are excluded to align with the 30-Day PN Mortality measure.

For patients with more than one eligible admission for an PN in a single year, only one index admission for PN is randomly selected for inclusion in the cohort. Additional admissions within that year are excluded. When index admissions occur during the transition between two years within the measurement period (that is, June/July 2017 or June/July 2018) and both are randomly selected for inclusion in a measure, the measures include only the June admission. July admissions within the 30-day outcome window of the June admission are excluded to avoid assigning payments for the same claims to two admissions.

**S.9.2. Risk Adjustment Type** (Select type)

Statistical risk model

If other:

**S.9.3. Stratification Details/Variables** (All information required to stratify the measure results including the stratification variables, definitions, specific data collection items/responses, code/value sets)

N/A

**S.9.4 Costing method**

Detail the costing method including the source of cost information, steps to capture, apply or estimate cost information, and provide rationale for this methodology.

**Standardized pricing**

Medicare pays for health care services using a number of different payment systems that are generally organized by delivery setting. These payment systems consider not only the products the Medicare patient is buying in each setting, but also the characteristics of the care provider, the extent to which the same product may be furnished in different settings, and the market circumstances that affect providers' costs. Payment amounts within each payment system are usually updated annually (for example, the IPPS) with some fee schedules having quarterly updates (for example, Durable Medical Equipment/Prosthetics Orthotics and Supplies [DME/POS]). Information on CMS reimbursement rates for each care setting are made publicly available through either Final Rules published in the Federal Register or fee schedules provided on the CMS website. A summary of Medicare's reimbursement system for most care settings is publicly available at the Medicare Payment Advisory Committee (MedPAC) website. In the measure technical report we describe the key features of these payment systems and how we used these CMS payment algorithms to determine an episode-of-care payment for PN that isolates clinical care decisions. Please see Appendix C in the technical report for a full description of how we standardize payments for each care setting:

[https://qualitynet.cms.gov/files/5d0d37f3764be766b0101db2?filename=PN\\_Pymnt\\_MeasMeth\\_Rprt\\_092513.pdf](https://qualitynet.cms.gov/files/5d0d37f3764be766b0101db2?filename=PN_Pymnt_MeasMeth_Rprt_092513.pdf).

Details of CMS's price standardization methodology are described here:

[https://qualitynet.cms.gov/files/5ea9c75a6a6cce001f04eb?filename=CMS\\_Price\\_Pymnt\\_Standardization.pdf](https://qualitynet.cms.gov/files/5ea9c75a6a6cce001f04eb?filename=CMS_Price_Pymnt_Standardization.pdf)  
PN\_Pymnt\_MeasMeth\_Rprt\_092513\_-4-.pdf

**S.10. Type of score**(Select the most relevant):

Continuous variable

If other:

Attachment:

**S.11. Interpretation of Score** (Classifies interpretation of a ratio score(s) according to whether higher or lower resource use amounts is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score, etc.)

Results of the measure alone do not necessarily reflect the quality of care provided by hospitals but simply whether the total episode payments are greater than or less than would be expected for an average hospital with a similar case mix. Hospitals are classified as having a less than average, no different than average, or greater than average payment as compared to national average payment for an episode. Accordingly, a classification of lower than average payment should not be interpreted as better care. The PN risk-standardized payment (RSP) is most meaningful when presented in the context of an PN outcome measure, such as the publicly reported AMI mortality measure. This is because a measure of payments to hospitals that is aligned with a quality measure facilitates profiling hospital value (payments and quality).

**S.12. Detail Score Estimation** (Detail steps to estimate measure score.)

The RSP is calculated as the ratio of "predicted" payment to "expected" payment, multiplied by the national unadjusted average payment for the episode of care. The expected payment for each hospital is estimated using its patient mix and the average of the hospital-specific intercepts. The predicted payment for each hospital is estimated given the same patient mix but an estimated

hospital-specific intercept. Operationally, the expected payment for each hospital is obtained by summing the expected payments for all patients in the hospital. The expected payment for each patient is calculated via the hierarchical model by applying the subsequent estimated regression coefficients to the observed patient characteristics and adding the average of the hospital-specific intercepts. The predicted payment for each hospital is calculated by summing the predicted payments for all patients in the hospital. The predicted payment for each patient is calculated through the hierarchical model by applying the estimated regression coefficients to the patient characteristics observed and adding the hospital-specific intercept.

#### **Reporting Guidelines**

This section is optional and will be available for users of the measure as guidance for implementation and reporting.

##### **S.13.1. Describe discriminating results approach**

Detail methods for discriminating differences (reporting with descriptive statistics--e.g., distribution, confidence intervals).

To categorize hospital payments, CMS estimates each hospital's RSP and the corresponding 95% interval estimate. CMS assigns hospitals to a payment category by comparing each hospital's RSP interval estimate to the national mean payment. Comparative payments for hospitals with 25 or more eligible cases are classified as follows:

- "No Different than the National Payment" if the 95% interval estimate surrounding the hospital's RSP includes the national mean payment.
- "Greater than the National Payment" if the entire 95% interval estimate surrounding the hospital's RSP is higher than the national mean payment.
- "Less than the National Payment" if the entire 95% interval estimate surrounding the hospital's RSP is lower than the national mean payment.

If a hospital has fewer than 25 eligible cases for a measure, CMS assigns the hospital to a separate category: "Number of Cases Too Small." This category is used when the number of cases is too small (fewer than 25) to reliably estimate the hospital's RSP. If a hospital has fewer than 25 eligible cases, the hospital's RSP and interval estimate will not be reported for the measure.

##### **S.13.2. Detail attribution approach**

Detail the attribution rules used for attributing resources/costs to providers (e.g., a proportion of total measure cost or frequency of visits during the measure's measurement period) and provide rationale for this methodology.

The measure attributes payments incurred during the 30-day episode to the original admitting hospital. We assign these payments to the admitting hospital because decisions made at the admitting hospital affect payments for care in the inpatient setting as well as the post-discharge and recovery periods for an PN. Furthermore, attributing payments for a continuous episode of care to admitting hospitals may reveal practice variations in the full care of the illness that can result in increased payments. For patients who are admitted and then transferred to another hospital during the original index admission, we assign all payments to the original admitting hospital since this hospital is responsible for the initial care decisions and the decision to transfer the patient.

##### **S.13.3. Identify and define peer group**

Identify the peer group and detail how peer group is identified and provide rationale for this methodology.

As part of the measure methodology we compare payments for a hospital with the expected payment amounts for an average hospital with the same case mix. While we include all hospitals when estimating the risk-adjustment model, we do not report RSPs for hospitals with fewer than 25 PN admissions, since estimates for hospitals with fewer procedures are less reliable and CMS's past approach to public reporting has been not to report these results.

##### **S.13.4. Sample size**

Detail the sample size requirements for reporting measure results.

In order for hospitals to be publicly reported, they must have at least 25 index PN admissions during the measurement period.

##### **S.13.5. Define benchmarking and comparative estimates**

Detail steps to produce benchmarking and comparative estimates and provide rationale for this methodology.

Comparative estimates are provided by classifying hospitals as less than average, no different than average, or greater than average payment depending on the span of their confidence interval in comparison with the national average payment amount (i.e., the

benchmark). To categorize hospital payments, we estimate each hospital's RSP and the corresponding 95% interval estimate. As with all estimates, there is a degree of uncertainty associated with the RSP. The interval estimate is a range of probable values around the RSP that characterizes the amount of uncertainty associated with the estimate. A 95% interval estimate indicates that there is 95% probability that the true value of the RSP lies between the lower limit and the upper limit of the interval. In an effort to provide fair comparisons, we provide three categories (less than, no different than, or greater than the national average payment amount), which allows for conservative discrimination of hospital RSPs.

**Validity – See attached Measure Testing Submission Form**

**SA.1. Attach measure testing form**

[NQF\\_2579\\_PNpayment\\_Testing\\_Spring2021\\_010521\\_FINAL.docx](#)

## Feasibility

### F.1. Byproduct of Care Processes

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

#### F.1.1. Data Elements Generated as Byproduct of Care Processes.

[Coded by someone other than person obtaining original information \(e.g., DRG, ICD-9 codes on claims\)](#)

If other:

### F.2. Electronic Sources

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

#### F.2.1. To what extent are the specified data elements available electronically in defined fields (i.e., data elements that are needed to compute the performance measure score are in defined, computer-readable fields)

[ALL data elements are in defined fields in electronic claims](#)

**F.2.1a.** If ALL the data elements needed to compute the performance measure score are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources.

**F.2.2. If this is an eMeasure,** provide a summary of the feasibility assessment in an attached file or make available at a measure-specific URL.

**Attachment:**

### F.3. Data Collection Strategy

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

#### F.3.1. Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues.

[Using administrative claims variables for risk adjustment](#)

This measure uses variables from claims data submitted by hospitals for payment, data from Medicare fee schedules, data from Final Rules for Medicare prospective payment systems and payment policies, and CMS-published wage index data. Prior research has demonstrated that administrative claims data can be used to develop risk-adjusted outcomes measures for both mortality and



readmission following hospitalization for acute myocardial infarction[1,2], heart failure[3,4] and pneumonia[5,6] and that the models produce estimates of risk-standardized rates that are very similar to rates estimated by models based on medical record data. This high level of agreement supports the use of the claims-based risk-adjusted models for public reporting. The models have also demonstrated consistent performance across years of claims data.

The approach to gathering risk factors for patients also mitigates the potential limitations of claims data. Because not every diagnosis is coded at every visit, for Medicare FFS patients we use inpatient, outpatient, and physician claims data for the year prior to admission, and diagnosis codes during the index admission, for risk-adjustment. The 1-year look-back period for risk adjustment provides a more comprehensive view of patients' medical histories than is provided by the secondary diagnosis codes from the index hospitalization alone. If a diagnosis appears in some visits and not others, it is included, minimizing the effect of incomplete coding. We were careful, however, to include information about each patient's status at admission and not to adjust for possible complications of the admission. Although some codes, by definition, represent conditions that are present before admission (e.g. cancer), other codes and conditions cannot be differentiated from complications during the hospitalization (e.g. infection or shock). If these are secondary diagnoses coded only in the index admission, then they are not adjusted for in the analysis.

#### References:

1. Krumholz HM, Wang Y, Mattera JA, Wang Y-F, Han LF, Ingber MJ, Roman S, Normand SL. An administrative claims model suitable for profiling hospital performance based on 30-day mortality rates among patients with an acute myocardial infarction. *Circulation*. 2006 Apr 4;113(13):1683-92.
2. Krumholz HM, Lin Z, Drye EE, Desai MM, Han LF, Rapp MT, Mattera JA, Normand SL. An administrative claims measure suitable for profiling hospital performance based on 30-day all-cause readmission rates among patients with acute myocardial infarction. *Circulation: Cardiovascular Quality and Outcomes*. 2011 Mar 1;4(2):243-52.
3. Krumholz HM, Wang Y, Mattera JA, Wang Y-F, Han LF, Ingber MJ, Roman S, Normand SL. An administrative claims model suitable for profiling hospital performance based on 30-day mortality rates among patients with heart failure. *Circulation*. 2006 Apr 4;113(13):1693-701.
4. Keenan PS, Normand SL, Lin Z, Drye EE, Bhat KR, Ross JS, Schuur JD, Stauffer BD, Bernheim SM, Epstein AJ, Wang Y-F, Herrin J, Chen J, Federer JJ, Mattera JA, Wang Y, Krumholz HM. An administrative claims measure suitable for profiling hospital performance on the basis of 30-day all-cause readmission rates among patients with heart failure. *Circulation: Cardiovascular Quality and Outcomes*. 2008 Sep;1(1):29-37.
5. Bratzler DW, Normand SL, Wang Y, O'Donnell WJ, Metersky M, Han LF, Rapp MT, Krumholz HM. An administrative claims model for profiling hospital 30-day mortality rates for pneumonia patients. *Public Library of Science One*. 2011 Apr 12;6(4):e17401.
6. Lindenauer PK, Normand SL, Drye EE, Lin Z, Goodrich K, Desai MM, Bratzler DW, O'Donnell WJ, Metersky ML, Krumholz HM. Development, validation, and results of a measure of 30-day readmission following hospitalization for pneumonia. *Journal of Hospital Medicine*. 2011 Mar;6(3):142-50.

#### **F.3.2. Describe any fees, licensing, or other requirements to use any aspect of the measure as specified (e.g., value/code set, risk model, programming code, and algorithm)?**

There are no fees associated with the use of claims-based measures.

#### **F.3.3. If there are any fees associated with the use of this measure as specified, attach the fee schedule here. (Save file as: F3\_3\_FeeSchedule)**

### **Usability and Use**

Extent to which intended audiences (e.g., consumers, purchasers, providers, policy makers) can understand the results of the measure and are likely to find them useful for decision making.

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

#### **U.1.1. Current and Planned Use**

Specific Plan for Use	Current Use (for current use provide URL)
	<p>Public Reporting</p> <p>Care Compare  <a href="https://www.medicare.gov/care-compare/">https://www.medicare.gov/care-compare/</a></p> <p>Payment Program  Hospital Inpatient Quality Reporting (IQR)  <a href="https://qualitynet.cms.gov/inpatient/iqr">https://qualitynet.cms.gov/inpatient/iqr</a></p>

**U.1.2. For each CURRENT use, checked above, provide:**

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

**Public Reporting**

Program Name, Sponsor: Care Compare, Centers for Medicare and Medicaid Services (CMS)

Purpose: Under Care Compare and other CMS public reporting websites, CMS publishes hospital quality data with the goal of driving quality improvement through measurement and transparency by publicly displaying data to help consumers make more informed decisions about their health care. It is also intended to encourage hospitals and clinicians to improve the quality and cost of inpatient care provided to all patients. The data collected are available to consumers and providers on the Care Compare website at: <https://www.medicare.gov/care-compare/>.

**Payment Program**

Program Name, Sponsor: Hospital Inpatient Quality Reporting (IQR) Program, Centers for Medicare and Medicaid Services (CMS)

Purpose: The Hospital Inpatient Quality Reporting (IQR) program was originally mandated by Section 501(b) of the Medicare Prescription Drug, Improvement, and Modernization Act (MMA) of 2003. This section of the MMA authorized CMS to pay hospitals that successfully report designated quality measures a higher annual update to their payment rates. Initially, the MMA provided for a 0.4 percentage point reduction in the annual market basket (the measure of inflation in costs of goods and services used by hospitals in treating Medicare patients) update for hospitals that did not successfully report. The Deficit Reduction Act of 2005 increased that reduction to 2.0 percentage points.

In addition to giving hospitals a financial incentive to report the quality of their services, the hospital reporting program provides CMS with data to help consumers make more informed decisions about their health care. Some of the hospital quality of care information gathered through the program is available to consumers on the Care Compare website at: <https://www.medicare.gov/care-compare/>.

Geographic area and number and percentage of accountable entities and patients included:

The IQR program includes all participating non-federal acute care hospitals in the United States. The number and percentage of accountable hospitals included in the program, as well as the number of patients included in the measure, varies by reporting year.

**U.1.3. If not currently publicly reported OR used in at least one other accountability application (e.g., payment program, certification, licensing) what are the reasons? (e.g., Do policies or actions of the developer/steward or accountable entities restrict access to performance results or impede implementation?)**

N/A. This measure is currently publicly reported.

**U.1.4. If not currently publicly reported OR used in at least one other accountability application, provide a credible plan for implementation within the expected timeframes -- any accountability application within 3 years and publicly reported within 6 years of initial endorsement. (Credible plan includes the specific program, purpose, intended audience, and timeline for implementing the measure within the specified timeframes. A plan for accountability applications addresses mechanisms for data aggregation and reporting.)**

N/A. This measure is currently publicly reported.

**U.2.1.1. Describe how performance results, data, and assistance with interpretation have been provided to those being measured or other users during development or implementation. How many and which types of measured entities and/or others were included? If only a sample of measured entities were included, describe the full population and how the sample was selected.**

All non-federal short-term acute care hospitals (including Indian Health Service hospitals) and critical access hospitals are included in the measure calculation. However, only those hospitals with at least 25 pneumonia admissions are included in public reporting. Each hospital generally receives their measure results in April/May of each calendar year through CMS's QualityNet website. The results are then publicly reported on CMS's public reporting websites in the summer of each calendar year. Since the measure is risk-standardized using data from all hospitals, hospitals cannot independently calculate their score.

However, CMS provides each hospital with several resources that aid in the interpretation of their results (described in detail below). These include Hospital-Specific Reports with details about every patient from their facility that was included in the measure calculation (for example, dates of admission and discharge, discharge diagnoses, outcome [total payments] and post-discharge costs). These reports facilitate quality improvement activities such as review of patterns of care and make visible to hospitals post-discharge costs that they may otherwise be unaware of and allow hospitals to look for patterns that may inform quality improvement (QI) work. CMS also provides measure frequently asked questions (FAQs), webinars, and provides a mechanism for stakeholders to ask specific questions.

The Hospital-Specific Reports also provide hospitals with more detailed benchmarks with which to gauge their performance relative to peer hospitals and interpret their results, including comorbidity frequencies for their patients relative to other hospitals in their state and the country. For the payment measures, the hospital-specific reports additionally include a national assessment of the value of care where the distributions of hospitals in each performance category for the mortality measure are evaluated against the distributions in each of the payment measure performance categories.

Additionally, the programming code used to process the claims data and calculate measure results is written in Statistical Analysis System (SAS) (Cary, NC) and is provided each year to hospitals upon request.

**U.2.1.2. Describe the process(es) involved, including when/how often results were provided, what data were provided, what educational/explanatory efforts were made, etc.**

During the spring of each year, hospitals have access to the following list of updated resources related to the measure, which is provided directly or posted publicly for hospitals to use:

1. Hospital-Specific Reports (HSR): available for hospitals to download from QualityNet in April/May of each calendar year; includes information on the index admissions included in the measure calculation for each facility, detailed measure results, and state and national results.
2. HSR User Guide: available with the HSR and posted on QualityNet; provides instructions for interpreting the results and descriptions of each data field in the HSR.
3. Mock HSR: posted on QualityNet; provides real national results and simulated state and hospital results for stakeholders who do not receive an HSR.
4. HSR Tutorial Video: a brief, animated video to help hospitals navigate their HSR and interpret the information provided.
5. Public Reporting Preview and Preview Help Guide: available for hospitals to view from QualityNet in Spring of each calendar year; includes measure results that will be publicly reported on CMS's public reporting websites.
6. Annual Updates and Specification Reports: posted in April/May of each calendar year on QualityNet; includes detailed measure specifications, descriptions of changes made to the measure specifications with rationale and impact analysis (when appropriate), updated risk variable frequencies and coefficients for the national cohort, and updated national results for the new measurement period.
7. FAQs: posted in April of each calendar year on QualityNet; includes general and measure-specific questions and responses, as well as infographics that explain complex components of the measure's methodology.
8. SAS Code: used to calculate the measure with documentation describing what data files are used and how the SAS code works. This code and documentation are updated each year and are released upon request beginning in July of each year.
9. Measure Fact Sheets: posted in April/May of each calendar year on QualityNet; provide a brief overview of measures and measure updates.

During the summer of each year, the publicly-reported measure results are posted on CMS's public reporting websites, a tool to find hospitals and compare their quality of care that CMS created in collaboration with organizations representing consumers, hospitals, doctors, employers, accrediting organizations, and other federal agencies. Measure results are updated in July of each calendar year.

**U.2.2.1. Summarize the feedback on measure performance and implementation from the measured entities and others described in 4d.1. Describe how feedback was obtained.**

Feedback on Measure performance: Hospital and Stakeholder comment

The measured entities (acute care hospitals) and other stakeholders or interested parties submit questions or comments through an online portal on QualityNet. Experts on measure specifications, calculation, or implementation, prepare responses to those inquiries and reply directly to the submitter. We consider issues raised through the Q&A process about measure specifications or measure calculation in measure reevaluation.

Feedback on Measure performance: Literature Reviews

In addition, we continually scan the literature for scholarly articles describing research related to this measure. We summarize new information obtained through these reviews every three years as a part of comprehensive reevaluation as mandated by the Measure Management System (MMS) Blueprint.

**U.2.2.2. Summarize the feedback obtained from those being measured.**

Summary of Questions or Comments from Hospitals submitted through the Q & A process

For the pneumonia payment measure, we have received the following inquiries from hospitals since the last endorsement cycle:

1. Requests for the SAS code used to calculate measure results.
2. Questions about preview reports.
3. Questions about how to interpret the outcome and how performance categories are calculated.
4. Questions about the reporting period.
5. Questions about measure specifications, including risk adjustment, outcome definition, and inclusion/exclusion criteria.

**U.2.2.3. Summarize the feedback obtained from other users.**

Summary of Question and Comments from Other Stakeholders

For the pneumonia payment measure, we have received the following inquiries from other stakeholders since the last endorsement cycle:

1. Requests for the SAS code used to calculate measure results.
2. Questions about what measures are publicly reported for Critical Access Hospitals.
3. Request for measure specifications.
4. Questions about the reporting period.
5. Questions about measure specifications, including inclusion and exclusion criteria, outcome definition and attribution.
6. A question from a Quality Improvement Organization (QIO) about where to find information in the Hospital Specific Report.
7. Questions on the CMS program that implements the measure.
8. Questions on how the payment measure is different from the Medicare Spending Per Beneficiary (MSPB) measure.
9. Request for SDS variable analysis results.
10. Questions on inflation adjustments used in the measures.

Summary of Relevant Publications from the Literature Review

Since the last endorsement maintenance cycle, we have reviewed several articles related to pneumonia payment. Relevant articles covered the following topics: the association between payment and mortality events, and the association between payment and adverse events and impact of case mix on hospital costs. Additional details of these studies are provided below.

Anderson et al. investigated the relationship between 30-day episodic costs of care and mortality for Medicare FFS patients admitted for pneumonia between 2011-2014. After adjustment for comorbid conditions and hospital characteristics, models showed no significant association between higher hospital-level expenditures and lower 30-day mortality rates. These findings suggest that hospitals that spend less have similar mortality outcomes than those that spend more. Continued evaluation of episode

of care payments via the pneumonia payment measure could help monitor whether this relationship is maintained.

Desai et al. investigated the association between 30-day mortality and 30-day risk-standardized payments (RSPs) for AMI, HF, and pneumonia, in an effort to highlight patterns of value in care, using Medicare data from 2011-2014. They found considerable variation in both mortality rates and RSPs, though only a weak inverse correlation between the two outcomes; about 25% of hospitals had lower mortality and lower RSPs, illustrating that it is possible to improve the value of care for AMI, HF, and pneumonia patients while also lowering both mortality and readmission rates. Note: among the authors of this article are individuals who are employed by or who have affiliations with CORE.

Wang et al. investigated the association between 30-day episode of care spending and inpatient adverse events. The authors found that hospital-level adverse events were associated with hospital-specific 30-day episode of care spending for AMI, HF, and pneumonia patients, illustrating that hospitals that can reduce the number of adverse events may be able to reduce costs as a result. These findings provide validity for measuring episodic costs in tandem with outcomes such as mortality, readmissions, and complications for AMI, HF, and pneumonia patients. Note: among the authors of this article are individuals who are employed by or who have affiliations with CORE.

Krumholz et al. studied whether variations in hospital costs are due to patient case mix or other factors. The study cohort included Medicare patients who had admissions to two different hospitals for the same principal discharge diagnosis (HF or pneumonia). Overall, they found that patients had different costs at each hospital, demonstrating that hospitals play a significant role in influencing episodic costs of care. Note: among the authors of this article are individuals who are employed by or who have affiliations with CORE.

#### References:

Anderson JD, Wadhera RK, Joynt Maddox KE, et al. Thirty-Day Spending and Outcomes for an Episode of Pneumonia Care Among Medicare Beneficiaries. *Chest*. 2020;157(5):1241-1249.

Desai NR, Ott LS, George EJ, et al. Variation in and Hospital Characteristics Associated With the Value of Care for Medicare Beneficiaries With Acute Myocardial Infarction, Heart Failure, and Pneumonia. *JAMA Netw Open*. 2018;1(6):e183519.

Wang Y, Eldridge N, Metersky ML, et al. Association Between Medicare Expenditures and Adverse Events for Patients With Acute Myocardial Infarction, Heart Failure, or Pneumonia in the United States. *JAMA Netw Open*. 2020;3(4):e202142.

Krumholz HM, Wang Y, Wang K, et al. Association of Hospital Payment Profiles With Variation in 30-Day Medicare Cost for Inpatients With Heart Failure or Pneumonia. *JAMA Netw Open*. 2019;2(11):e1915604.

#### **U.2.3. Describe how the feedback described in 4a2.2 has been considered when developing or revising the measure specifications or implementation, including whether the measure was modified and why or why not**

Each year, issues raised through the Q&A process or in the literature related to this measure are considered by measure and clinical experts. Any issues that warrant additional analytic work due to potential changes in the measure specifications are addressed as a part of annual measure reevaluation. If small changes are indicated after additional analytic work is complete, those changes are usually incorporated into the measure in the next measurement period. If the changes are substantial, CMS may propose the changes through rulemaking and adopt the changes only after CMS received public comment on the changes and finalizes those changes in the Inpatient Prospective Payment System (IPPS) or other rule. There were no questions or issues raised by stakeholders requiring additional analysis or changes to the measure since the last endorsement maintenance cycle.

#### **U.3.1. Progress on Improvement. (Not required for initial endorsement unless available.) Performance results on this measure (current and over time) should be provided in IM.1.2 and IM.1.4.**

##### **Discuss:**

- **Purpose Progress (trends in performance results)**
- **Geographic area and number and percentage of accountable entities and patients included**

The median hospital 30-day RSP for the pneumonia payment measure for the 3-year period between July 1, 2016 and June 30, 2019 was \$18,200. Across most of the distribution, the RSPs decreased slightly; for example the median RSP decreased by 1% from July 2017-June 2018 (median RSP: \$18,226) to July 2018-June 2019 (median RSP: \$18,037). The goal of this measure, however, is not necessarily to reduce costs, but to provide a value signal when combined with quality information.

Distribution of hospital-level RSPs for each individual year:

Periods//YEAR1617//YEAR1718//YEAR1819//YEAR1619

Number of Hospitals//4,473//4,473//4,437//4,564

Number of Admissions//386,117//414,009//391,871//1,191,997

Mean(SD)//18,468.2(1,753.8)//18,286.5(1,741.5)//18,122.1(1,689.8)//18,282.8(2,096.7)

Range(Min-Max)//10,880.5-25,643.4//11,675-26,094.6//11,824.3-28,085.7//10,529.1-29,860.6

Minimum//10,881//11,675//11,824//10,529

10th percentile//16,386//16,144//16,084//15,826

20th percentile//17,088//16,940//16,801//16,702

30th percentile//17,621//17,462//17,310//17,277

40th percentile//18,036//17,867//17,679//17,747

50th percentile//18,434//18,226//18,037//18,200

60th percentile//18,852//18,631//18,411//18,661

70th percentile//19,256//19,074//18,865//19,170

80th percentile//19,849//19,613//19,395//19,790

90th percentile//20,606//20,452//20,211//20,715

Maximum//25,643//26,095//28,086//29,861

**U.3.2. If no improvement was demonstrated, what are the reasons? If not in use for performance improvement at the time of initial endorsement, provide a credible rationale that describes how the performance results could be used to further the goal of high-quality, efficient healthcare for individuals or populations.**

N/A

**U.4.1. Please explain any unexpected findings (positive or negative) during implementation of this measure including unintended impacts on patients.**

We did not identify any unintended consequences during measure development and testing. We are committed to monitoring this measure's use and assessing potential unintended consequences over time, such as the inappropriate shifting of care or coding/billing practices, increased patient morbidity and mortality, and other negative unintended consequences for patients.

**U.4.2. Please explain any unexpected benefits from implementation of this measure.**

N/A

## Related or Competing Measures

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

### H.1. Relation to Other NQF-endorsed Measures

If there are related measures (conceptually, either same measure focus or target population) or competing measures (conceptually both the same measure focus and same target population)? If yes, list the NQF # and title of all related and/or competing measures.

#### H.1.1. List of related or competing measures (selected from NQF-endorsed measures)

0230 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following acute myocardial infarction (AMI) hospitalization

0468 : Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia hospitalization

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

2158 : Medicare Spending Per Beneficiary (MSPB) Hospital

2436 : Hospital-level, risk-standardized payment associated with a 30-day episode-of-care for heart failure (HF)

3474 : Hospital-level, risk-standardized payment associated with a 90-day episode of care for elective primary total hip and/or total knee arthroplasty (THA/TKA)

#### H.1.2. If related or competing measures are not NQF endorsed please indicate measure title and steward.

N/A

<p><b>H.2. Harmonization</b></p> <p><b>H.2.1. If this measure conceptually addresses EITHER the same measure focus OR the same target population as NQF-endorsed measure(s):</b> Are the measure specifications completely harmonized? Yes</p> <p><b>H.2.2. If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden.</b></p>
<p><b>H.3. Competing Measure(s)</b></p> <p><b>H.3.1. If this measure conceptually addresses both the same measure focus and the same target population as NQF-endorsed measure(s):</b> Describe why this measure is superior to competing measures (e.g., a more valid or efficient way to measure quality); OR provide a rationale for the additive value of endorsing an additional measure. (Provide analyses when possible.) N/A</p>

<p><b>Contact Information</b></p> <p><b>Co.1 Measure Steward (Intellectual Property Owner):</b> Centers for Medicare &amp; Medicaid Services  <b>Co.2 Point of Contact:</b> James, Poyer, james.poyer@cms.hhs.gov, 410-786-2261-  <b>Co.3 Measure Developer if different from Measure Steward:</b> Yale Center for Outcomes Research and Evaluation  <b>Co.4 Point of Contact:</b> Jacqueline, Grady, jacqueline.grady@yale.edu, 203-764-5700-</p>
<p><b>Additional Information</b></p> <p><b>Ad.1 Workgroup/Expert Panel involved in measure development</b> List the workgroup/panel members' names and organizations. Describe the members' role in measure development. Technical Expert Panel Members: Amanda Kowalski, PhD; Yale University Anne-Marie Audet, MD, MSc, SM; Commonwealth Fund David S. P. Hopkins, PhD; Pacific Business Group on Health Donald Casey, MD, MPH, MBA; NYU Langone Medical Center Kavita Patel, MD, MS; Engelberg Center for Health Care Reform Lesley Curtis, PhD, MS; Duke University Peter Bach, MD, MAPP; Memorial Sloan-Kettering Cancer Center Peter Lindenauer, MD, MSc; Tufts University; Baystate Medical Center; Center for Quality of Care Research Scott Flanders, MD; University of Michigan Stephen Schmaltz, PhD, MS, MPH; Joint Commission Terry Golash, MD; Aetna Vivian Ho, PhD; Rice University</p> <p><b>Measure Developer/Steward Updates and Ongoing Maintenance</b>  <b>Ad.2 Year the measure was first released:</b> 2015  <b>Ad.3 Month and Year of most recent revision:</b> 11, 2019  <b>Ad.4 What is your frequency for review/update of this measure?</b> Yearly  <b>Ad.5 When is the next scheduled review/update for this measure?</b> 2021</p> <p><b>Ad.6 Copyright statement:</b> N/A  <b>Ad.7 Disclaimers:</b> N/A</p> <p><b>Ad.8 Additional Information/Comments:</b> N/A</p>



#2579 Hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia (PN), Last  
Updated: Apr 26, 2021