TO: Pulmonary and Critical Care Standing Committee

FR: NQF Staff

RE: Post-Comment Call to Discuss Public and Member Comments

DA: June 6, 2016

Purpose of the Call

The Pulmonary and Critical Care Standing Committee will meet via conference call on Monday, June 13, 2016 from 1:00-3:00 PM ET and on Thursday, June 16, 2016 from 2:00-4:00 PM ET. The purpose of these calls is to:

- Review comments, discuss and re-vote on eight measures that did not reach consensus on a recommendation by the Committee.
- Reconsider measure *#2816: Appropriateness of Emergency Department Visits for Children and Adolescents with Identifiable Asthma: A PQMP Measure* as requested by the developer.
- Review and discuss comments received during the post-evaluation public and member comment period and provide input on proposed responses to the post-evaluation comments.
- Consider harmonization of related measures and selecting "best in class" for competing measures.
- Determine whether reconsideration of any measures or other courses of action is warranted.

NQF staff has drafted responses to the comments. Due to time constraints the Committee will only discuss comments and responses when Committee members disagree with the draft response. Committee members should review all comments and draft responses prior to the calls. Standing Committee Actions:

1. Review this briefing memo and Draft Report.
2. Review and consider the full text of all comments received and the proposed responses to the post-evaluation comments (see Comment Table).
3. Be prepared to provide feedback and input on proposed post-evaluation comment responses.

Conference Call Information

Please use the following information to access the conference call line and webinar:
Public Dial-In #: (877) 358-3875 (*No Conference Code Required)*
Web Link Day #1: http://nqf.commpartners.com/se/Rd/Mt.aspx?117335
Web Link Day #2: http://nqf.commpartners.com/se/Rd/Mt.aspx?215411

Background

The Pulmonary and Critical Care Committee evaluated 22 measures against NQF's standard evaluation criteria—four new measures and 18 measures undergoing maintenance of endorsement review. Ten measures were recommended for endorsement, and one measure was recommended for inactive endorsement with reserve status. The Committee did not reach consensus on eight measures and did not recommend three measures for endorsement.

Comments Received

NQF solicits comments on measures undergoing review in various ways and at various times throughout the evaluation process. First, NQF solicits comments on endorsed measures on an ongoing basis through the Quality Positioning System (QPS). Second, NQF solicits member and public comments prior to the evaluation of the measures via an online tool located on the project webpage. Third, NQF opens

a 30-day comment period to both members and the public after measures have been evaluated by the full committee and once a report of the proceedings has been drafted.

Pre-evaluation comments

The pre-evaluation comment period was open February 10-24, 2016 for all 22 measures under review. No pre-evaluation comments were received.

Post-evaluation comments

The draft report went out for Public and Member comment April 20, 2016 to May 20, 2016. During this commenting period, NQF received 24 comments from three member organizations and two public organizations.

In order to facilitate discussion, the majority of the post-evaluation comments have been categorized into major topic areas or themes. Where possible, NQF staff has proposed draft responses for the Committee to consider. Although all comments and proposed responses are subject to discussion, we will not necessarily discuss each comment and response on the post-comment call. Instead, we will spend the majority of the time considering the major topics and/or those measures with the most significant issues that arose from the comments. Note that the organization of the comments into major topic areas is not an attempt to limit Committee discussion.

The comment table contains the commenter's name, comment, associated measure, topic (if applicable), and—for the post-evaluation comments—draft responses for the Committee's consideration. Please refer to the comment table to view and consider the individual comments received and the proposed responses to each comment.

"Consensus Not Reached" Measures

The Committee will consider comments received and developer responses in further evaluation of the measures that did not reach consensus on a recommendation by the Committee. During discussions of these measures please indicate any reasons for concern or unwillingness to recommend the measure as well as any supporting comments.

#0279: Bacterial Pneumonia Admission Rate (PQI 11)

One commenter supported the endorsement of this measure with slight modifications. The commenter suggested the name be changed to demonstrate that the measure applies to community acquired pneumonia rather than bacterial pneumonia.

> **Developer Response:** AHRQ agrees with Committee members that the current title of PQI 11 does not encompass the entirety of the specification. We propose a title change to "Community-Acquired Pneumonia Admission Rate". We further propose clarifying the scope of the measure in the rationale as follows:
>
> This indicator is intended to identify hospitalizations for community-acquired pneumonia, specifically bacterial pneumonia from organisms that are typically community-acquired and pneumonia without a specified organism. Like all PQI, the measure is intended to reflect access to community-based health care and community resources that promote health. With access to high quality care, prevention through effective efforts to ensure recommended pneumococcal immunization (especially of high risk populations), early identification of low-risk pneumonia and appropriate pharmaceutical treatment, community-acquired pneumonia can often be managed on an outpatient basis.
>
> The Committee discussed whether, given the declining admission rate, there remains an opportunity to improve pneumonia admission rates. PQI 11 is defined as a population health measure, meaning that these measures reflect various aspects of community based care, access

to care and community resources that promote health. Disparities in admission rates demonstrate the opportunity and need for further improvement. Analysis of the 2013 HCUP State Inpatient Databases showed that age-sex adjusted rates among patients residing zip codes in the lowest income quartile are ~74 percent greater than among patients residing in the highest income zip codes (329.7 vs. 189.7 per 100,000). Rates in the Midwest and South regions are higher than the Northeast and West (285.3, 242.8, 182.8, 187.3 respectively).1

The potential to impact PQI 11 rates must be judged at the population health level as mechanisms to prevent pneumonia infections, decrease the severity of illness or promptly treat pneumonia before it can progress. Beyond improvements in the identification and treatment of community-acquired pneumonia to prevent hospitalization, other community-based factors provide opportunities to improve hospitalization rates, such as the effective prevention and treatment of chronic disease and immunization of high risk patients.

Although some patients will usually require hospitalization, such as the elderly or those with high chronic disease burden, prevention via pneumonia vaccination is particularly important in these populations. The CDC has reported persistent low rates of pneumococcal vaccination (21.2% of high risk adults age 19-64 and 59.7 of adults ≥65 years in 2013) and disparities in vaccination rates persist among Hispanics and Asians.
(Thttp://www.cdc.gov/mmwr/preview/mmwrhtml/mm6404a6.htm)

Action Item: The Committee will revote on overall suitability for endorsement

#0334: PICU Severity-adjusted Length of Stay

One commenter did not support the endorsement of this measure stating that the measure was not feasible for health plans as an electronic clinical data and paper medical record measure. The commenter questioned the added value of this measure.

Developer Response: In regards to Measure 0334 PICU severity-adjusted length of stay, Ms. Mulvaney's comments appear to reflect a lack of understanding of pediatric care as well as a lack of understanding of the use of the measure.

First, the measure was never designed for use by health plans. The measures (and their validity and reliability) stem from the use of clinical data (whether paper or electronic). The measures are to be collected and reported at the PICU level specific to patients using patient level data. They are currently used by over 100 PICUs nationally and could readily be provided by health care organizations to insurers- if the insurers were so inclined to simply ask for this data.

Second, the comments state that the data is not categorized by diagnosis or patient type. There is nothing that precludes such categorization; instead the comment reflects assumptions on the part of Ms. Mulvaney and Highmark. Sub analysis by patient category can be readily performed at the PICU or aggregate level.

Third, unlike adult care where there are entire ICUs dedicated to relatively homogenous disease states, pediatrics deals with far smaller volumes of any patient type. PICUs have extremely heterogeneous populations. The belief by Highmark that diagnosis based classification is essential to a measure again reflects a lack of understanding of pediatric care. Diagnosis level categorization can be performed as a secondary analysis but would reflect such small numbers of patients that the findings would be challenging to interpret.

Perhaps most concerning is the lack of knowledge about pediatric care. While categorization is available using ICD-9 and/or ICD-10 codes, the suggestion that DRGs be used is deeply concerning. DRGs have been shown to be poor at best for use in pediatric care (Muldoon *Pediatrics.* 1999, 103; Munoz *J Peds* 1989, 115; Munoz *AJDC* 1989, 143(5)). Thus the suggestion

that these twice endorsed NQF measures are inappropriate due to their failure to use DRGs raises questions about Healthmark's knowledge of pediatrics.

Based on the cited literature and the fact that the measures were explicitly designed to use clinical data to avoid the well-published shortcomings of administrative data, we feel the comments by Highmark, while surely well intended, are largely not applicable or invalid.

Action Item: The Committee will revote on overall suitability for endorsement

#0335: PICU Unplanned Readmission Rate

One commenter did not support the endorsement of this measure. The commenter stated that the measure was not feasible for health plans as an electronic clinical data and paper medical record measure. The commenter questioned the value add of this measure.

Developer Response: For Measure 0335 PICU Unplanned readmission, the above responses apply to the majority of Highmark's comments. That said, the comment about measure 0335 "…does not seem of any value with no categorizing data," again reflects a lack of appreciation for the use of 0335 as a balancing measure to 0334 to prevent gaming of the measures.

Action Item: The Committee will revote on overall suitability for endorsement

#0343: PICU Standardized Mortality Ratio

One commenter did not support the endorsement of this measure. The commenter stated that the measure was not feasible for health plans as an electronic clinical data and paper medical record measure.

Action Item: The Committee will revote on overall suitability for endorsement

#0703: Intensive Care: In-hospital mortality rate

One commenter did not support the endorsement of this measure. The commenter stated that the measure was not feasible for health plans as an electronic clinical data and paper medical record measure.

Action Item: The Committee will revote on overall suitability for endorsement

#1799: Medication Management for People with Asthma

One commenter supported the endorsement of this measure with the condition that the asthma measures be harmonized especially in regard to age limits, data source, diagnoses definitions and risk adjustment methods.

Developer Response: The developer agrees that the age range should be harmonized for all of the asthma based measures. NQF 0047 is not an NCQA measure and will need to be addressed by the measure steward. The developer feels that there is no impact on interpretability of publicly-reported rates or added burden of data collection because the focus of each measure is different and the data for each measure is collected from different data sources by different entities. Additionally, both measures use value sets of codes to identify long-term asthma controller medications appropriate for use by patients with persistent asthma that do not conflict.

Action Item: The Committee will revote on overall suitability for endorsement

#2794: Rate of Emergency Department Visit Use for Children Managed for Identifiable Asthma: A PQMP Measure

Two commenters were supportive of this measure. Highmark pointed out the need for harmonization of the ages for all asthma measures but noted that electronic clinical data and paper medical records are not feasible for health plans. Another comment from the CDC Asthma Control Program questioned whether providers have control over this measure and whether it reflects quality of care, but generally supported the measure noting that ED visits are an important outcome for patients with asthma. The commenter also noted that there is a large body of evidence that ED visits can be reduced by appropriate intereventions and services. The CDC Asthma Control Program stated that providers and plans are more likely to influence the rate of ED visits compared to others outcomes such as hospitalizations, and disparities in asthma management for racial and ethnic minorities.

Developer Response: We appreciate the comments from Highmark, Inc. We respectfully urge adoption of this measure across the entire age range. The inclusion criteria resulted from a formal process and the age ranges were specified by a national, multidisciplinary expert panel that used a RAND-style modified Delphi process. The expert panel urged inclusion of younger children; the definition of identifiable asthma specifically incorporates age-sensitive criteria. The older (18-21 age group) is an important group of adolescents/young adults for whom inclusion with the pediatric population is more developmentally and medically valid, than inclusion as a small components of the adult population, from which they are not typically stratified. I note that our expert panel felt the measure was valid with both an upper age limit of 18 ad of 21. The lower age limit of 2 years was specific and resulted from in depth conversation by the panelists. We further note that we recommend age-group stratification of the reporting of the measure, allowing plans to compare harmoniously with (e.g. 0047, 1800, 1799) or groups as appropriate to the reporting or accountability entity. We invite consideration of whether there would be value for NCQA or other developers to lower the age range for existing measures. We make this observation given the following data form NYS Medicaid:

- 29.1% of children with ED visits for asthma in children with identifiable asthma age 2-21 ar age 2-4 years (31.0% of children age 2-18)
- 30.2% of ED visits for children with identifiable asthma are in children age 2-4 years (32.1% of children age 2-18).

In NY state Medicaid ED utilization varies by age stratum:

- 47.4 visits per 100 child-years for children 2-4,
- 26.0 visits per 100 child-years for children 5-11;
- 22.7 visits per 100 child-years for adolescents 12-18, and
- 34.1 visits per 100 child-years for adolescents 19-21.

Thus ED utilization in younger children is important and meaningful. Our modeling comparing 17 NYS Medicaid health plans against a randomly chosen plan found that in this younger age group 15 of 17 plans had performance significantly different from the index plan ($p<0.05$). The other two plans had p-values of 0.06 and 0.21.

Children age 2-4 are significant contributors to ED utilization for asthma. Measurement in this age group captures differences among plans. Understanding asthma performance across a child's lifespan is important and we show it is feasible, reliable, and valid. Establishment of asthma control should occur from an early age. Designing in the inability to capture differences in the care of younger children would make us blind to clinical failures and in itself would represent a failure of measurement.

Action Item: The Committee will revote on overall suitability for endorsement

#2852: Optimal Asthma Control

One commenter supported endorsement of the measure citing several reasons this measure fulfils a gap in care – no other measures address asthma control; a rich body of evidence documents the relationship between asthma control and exacerbations; assessment of control is a key component of the NAEPP guidelines; assessment of control to guide initial and follow-up treatment of asthma decreased the mean days for symptoms from 6 to 2 per week; and evidence from surveys and studies indicate that asthma is well-controlled in only 50% of people with asthma. Another commenter did not support this measurenoting that electronic clinical data and paper medical records are not feasible for health plans; and additional criteria are needed for practitioner review of asthma control during well visits or acute visits within the measurement year.

Developer Response: This measure is not specified for health plans.

Action Item: The Committee will revote on overall suitability for endorsement

Reconsideration Request

#2816: Appropriateness of Emergency Department Visits for Children and Adolescents with Identifiable Asthma: A PQMP Measure

During the in-person meeting, the developer (University Hospitals Cleveland Medical Center) was not able to provide enough evidence to support the measure as a process measure. The Committee believed that the measure was an outcome measure and suggested that the developer re-submit the measure. The developer has requested the measure be reconsidered as an outcome measure.

Developer Rationale for Reconsideration: We believe that NQF's measure evaluation criteria were not applied appropriately on the correct path. Although we originally submitted this measure as a process measure, on the phone meeting the Committee members indicated that they viewed this as an outcome measure, we agreed that we would be fine with having it considered as such, and the rest of the call proceeded as such.

At the in-person meeting, although the Committee and developers agreed that this should be considered as an outcome measure and expected it to be considered as such, staff directed the Committee to consider it only as a process measure pending the appeal process (since its measure type was submitted as process). Committee members (including at least one co-chair) asked that we request reconsideration of the measure and staff suggested the same. We make such a request herewith.

Summary of Updates Provided:

The developer has updated the measure and the following changes were made:

- Application: Changed process measure to an outcome measure.

- Evidence: Changed the date of submission, unchecked process measure and checked outcome measure, and moved evidence to the appropriate question.
- Testing: Changed the date of submission, unchecked process measure and checked outcome measure.

The updated measure information form and preliminary analysis are available on SharePoint.

Comment Received

The American Academy of Emergency Medicine commented that "dispostion of the ED was admission to the hospital-this may not be appropriate and may overestimate this outcome. Obtaining ABGs in ED may not always mean that is supports appropriateness of ED admission with asthma. There is question about evidence to support ABGs in the ED."

Developer Response: The criteria listed in our measure were developed by a multidisciplinary expert panel that included:one ED and two pediatric ED physicians, two pediatric asthma specialists (one pulmonologist and one allergist/immunologist), two general pediatricians, and one family physician. The panel utilized the RAND/UCLA modified Delphi method as a part of CAPQuaM's peer-reviewed 360 degree measure development process and the RAND/UCLA appropriateness method. We acknowledge that neither of the two specified criteria are perfect discriminators of appropriateness. However the assessment of each as a criterion may be thought of as follows. Among children with identifiable asthma and who are seen in the ED with a primary or secondary diagnosis of asthma:

Admission criterion: if the clinicians working in the ED decide to admit a child with asthma, how likely is it that the family erred in bringing the child to the ED? Our panel felt and we submit that it is correct that hospital admission is prima facie evidence that the child was experiencing a circumstance that, in the judgment of the clinical experts caring for the child, the child required a level of care greater than the family (even with the support of an outpatient clinician) was able to provide as an outpatient. That is sufficient to meet the bar to achieve appropriateness.

ABG criterion: if the clinicians working in the ED decide to obtain an ABG for a child with asthma, how likely is it that the family erred in bringing the child to the ED? We concur with the assertion that there are limited evidence suggesting that getting an ABG is important for the management of most children in the ED with asthma. But that is not relevant to the question at hand. The issue is not whether the absence of an ABG suggests inappropriateness, but whether the presence of an ABG suggests appropriateness. Obtaining an ABG suggests that the clinical experts caring for the child were unable to use clinical assessments to assure themselves that the child could be managed without this invasive procedure. Even were the ABG obtained for a reason other than to assess pulmonary status (which we expect would be rare) any clinical indication for an ABG suggests a high enough level of acuity that the child requires acute care in an equipped facility. Our panel felt that such a level of clinical uncertainty as would lead to obtaining an ABG on a child with asthma in the ED is sufficient evidence that the child required a level of care greater than the family (even with the support of an outpatient clinician) was able to provide as an outpatient. That is sufficient to meet the bar to achieve appropriateness

In conclusion, we respect and agree with the expert panel's inclusion of these two items as criteria indicating that the ED is an appropriate level of care for children with identifiable asthma who receive either service (admission or ABG in the ED).

Action Item: After review of the comment received and the information provided by the developer, does the Committee wish to reconsider this measure? If so, the lead discussant(s) and workgroup members will lead the discussion of each criterion and the Committee will vote on each criterion to reach a recommendation.

Comments and their Disposition

Two major themes were identified in the post-evaluation comments, as follows:

1. Feasibility of Electronic Clinical Data and Paper Medical Records
2. Secondary Diagnoses of COPD and Asthma

Theme 1 – Feasibility of Electronic Clinical Data and Paper Medical Records

Many of the submitted Pulmonary and Critical Measures use electronic clinical data and paper medical records. A commenter expressed that it was not feasible for health plans to implement measures

Developer Responses:

Measure #0047: Asthma: Pharmacologic Therapy for Persistent Asthma (The American Academy of Asthma Allergy and Immunology): The developer states that performance measurement is not just for health plans. Not every quality measure is going to work for everybody. Physicians are increasingly participating in performance measurement activities and provider performance initiatives. Measurement at all levels of the system is fast becoming the standard in health care.

Measure # 0334: PICU Severity-adjusted Length of Stay (Virtual PICU Systems, LLC): The developer notes that the measure was never designed for use by health plans. The measures (and their validity and reliability) stem from the use of clinical data (whether paper or electronic). The measures are to be collected and reported at the PICU level specific to patients using patient level data. They are currently used by over 100 PICUs nationally and could readily be provided by health care organizations to insurers.

Measure # 0335: PICU Unplanned Readmission Rate (Virtual PICU Systems, LLC): The developer states that based on the cited literature and the fact that the measures were explicitly designed to use clinical data to avoid the well-published shortcomings of administrative data, they feel the concern over feasible use by health plans is largely not applicable or invalid.

Measure #2852: Optimal Asthma Control (MN Community Measurement): The developer states that this measure is not specified for health plans.

Proposed Committee Response: The Committee expressed similar concerns during the in-person meeting but agreed these measures fulfil important gap areas and advise the developers to work towards converting these measures to more accessible data sources.

Theme 2 - Secondary Diagnoses of COPD and Asthma

A commenter stated that secondary diagnoses of COPD and Asthma should be captured along with the primary diagnosis for NQF measures #0275 and #0283 since acute conditions can exacerbate COPD or asthma.

Developer Response: The developer agrees that various acute conditions can exacerbate COPD and asthma. However, the suggestion to include secondary diagnoses of COPD and asthma is not desirable. Doing so will capture hospitalizations where COPD and asthma are recorded as complicating comorbidities but that did not principally occasion the admission. The intended use of the measure is to capture population rates of hospitalizations for COPD or asthma, a portion of which are potentially preventable. The developer agrees that in some cases an acute condition along with the COPD or asthma may occasion the hospitalization, but that acute condition may not be an ambulatory care sensitive condition.

Proposed Committee Response: Response pending committee discussion.

Theme 3 – Patient Refusals

A commenter noted for several measures *(#0047: Asthma: Pharmacologic Therapy for Persistent Asthma* and *#0091 COPD: Spirometry Evaluation*) that "patient refusal should not be an exclusion to the denominator" noting that patient education explaining the benefits of treatment is expected. The commenter stated that "asking the patient if he/she wants an inhaled steroid, and getting a refusal should not be terms for removing the patient from the denominator."

Developer Response (measure #0047): We believe that if the patient refuses, the provider should not be penalized as not meeting the measure. This is standard practice. For instance, the same exclusion would apply for a quality measure pertaining to influenza vaccination. The provider is not penalized for patients refusing to receive influenza vaccine. It is the job of the provider to educate patients so that they are making an informed decision. In some cases, even though patients have been made fully aware of the evidence, they will still decline a diagnostic or therapeutic intervention based on their values and preferences.

Developer Response (measure #0091): ATS would like to retain the patient reason denominator exclusion in the specifications for this measure."Spirometry is a patient effort-based test. Some COPD patients are unable to perform spirometry due to mental status, frailty, getting dizzy/lightheaded during spirometry, etc. Exclusions for patient reasons are numerically small, however, pulmonary physicians see a disproportionate number of these COPD patients who may be unable to perform the spirometry test."

Action Item*:* The Committee will discuss the comment submitted and the developers' responses. After review and discussion of the comment, does the Committee wish to change the recommendation of any measures?

Measure Update

#0708: Proportion of Patients with Pneumonia that have a Potentially Avoidable Complication (during the episode time window)

The Health Care Incentives Improvement Institute (HCI3) initially submitted #0708 for review in the Pulmonary and Critical Care project and it was not recommended for endorsement by the Committee. In addition, the developer also submitted six similar measures for review by the Cardiovascular (CV) Standing Committee were also not recommended for endorsement.

HCI3 met with the Consensus Standards Approval Committee (CSAC) co-chairs to discuss the developer's request for reconsideration for the six CV measures. After speaking with the CSAC co-chairs, HCI3 agreed to change the level of analysis for measures currently specified at the clinician level to the facility level.

Additionally, NQF leadership suggested that all six measures considered by the CV Committee, as well as the one measure considered by the Pulmonary Standing Committee, be reviewed by the Patient Safety Standing Committee in the upcoming Patient Safety project. After consulting with the Pulmonary Co-chairs, this measure has been defered and the Pulmonary Committee will not continue their review of the measure.

Related and Competing Measures

The following side-by-side tables present related and/or competing measures specifications. The Committee will discuss the potential need for harmonization of the related measures (measures that address the same measure focus or the same target population) and consider selecting a "best in class" for any competing measures (measures that address the same measure focus and the same target population.)

Duplicative measures and/or those with similar but not identical specifications increase measurement burden and can create confusion or inaccuracy in interpreting performance results, especially if such measures produce different results for the same provider. Harmonization of related measures should be done to the extent possible and differences in specifications should be justified. The endorsdement of multiple competing measures should be by exception, with adequate justification.

NATIONAL QUALITY FORUM

Memo

Related and Competing

Intensive Care Length of Stay: Comparison of NQF #0334 and NQF #0702

	0334 PICU Severity-adjusted Length of Stay	0702 Intensive Care Unit (ICU) Length-of-Stay (LOS)
Steward	Virtual PICU Systems, LLC	Philip R. Lee Institute for Health Policy Studies
Description	The number of days between PICU admission and PICU discharge.	For all eligible patients =18 years old admitted to the intensive care unit (ICU), total duration of time spent in the ICU until time of discharge from the ICU; both observed and risk-adjusted LOS reported with the predicted LOS measured using the Intensive Care Outcomes Model - Length-of-Stay (ICOMLOS).
Type	Outcome	Outcome
Data Source	Administrative claims, Paper Medical Records, Electronic Clinical Data: Registry No mandatory data source or collection instrument for PICU community. Potential resources include PICU-specific databases or the VPS database (myvps.org). Available at measure-specific web page URL identified in S.1 No data dictionary	Paper Medical Records ICU Outcomes Data Collection Instrument Available in attached appendix at A.1 Attachment ICU Outcomes Data Dictionary.pdf
Level	Facility	Facility
Setting	Hospital/Acute Care Facility	Hospital/Acute Care Facility
Time Window	Submitted quarterly for all discharges during that time period	Not-applicable; anyone with an ICU admission meeting eligibility criteria below is in the numerator.
Numerator Statement	Number of PICU days, PICU days = Number of days between PICU admission and PICU discharge.(For all eligible patients admitted to the ICU, the time at discharge from ICU minus the time of ICU admission (first recorded vital sign on ICU flow sheet)	For all eligible patients admitted to the ICU, the time at discharge from ICU (either death or physical departure from the unit) minus the time of admission (first recorded vital sign on ICU flow sheet). The measure is risk-adjusted, please see S.18.
Numerator	All patients < 18 years of age	Eligible patients include those with an ICU stay of at least 4

Details	Numerator is the average (mean) observed LOS with the observed LOS (if the observed LOS exceeded 30 days, then the LOS was reduced to 30 days).	hours and =18 years of age whose primary reason for admission does not include trauma, burns, or immediately post-coronary artery bypass graft surgery (CABG), as these patient groups are known to require unique risk-adjustment. Only index (initial) ICU admissions are recorded given that patient characteristics of readmissions are known to differ.
Denominator Statement	The denominator is the average (mean) predicted length of stay using the adjustment model.	Total number of eligible patients who are discharged (including deaths and transfers)
Denominator Details	The denominator is the average (mean) predicted length of stay using the adjustment model.	Eligible patients include those with an ICU stay of at least 4 hours and =18 years of age whose primary reason for admission does not include trauma, burns, or immediately post-coronary artery bypass graft surgery (CABG), as these patient groups are known to require unique risk-adjustment. Only index (initial) ICU admissions are recorded given that patient characteristics of readmissions are known to differ.
Exclusions	Patients => 18 years of age	<18 years of age at time of ICU admission, ICU readmission, <4 hours in ICU, primary admission due to trauma, burns, or immediately post-CABG, admitted to exclude myocardial infarction (MI) and subsequently found without MI or any other acute process requiring ICU care, transfers from another acute care hospital.
Exclusion Details	Patient age > 18 years and patients not eligible for PRISM measurement	<18 years of age at time of ICU admission (with time of ICU admission abstracted preferably from ICU vital signs flowsheet), ICU readmission (i.e. not the patient's first ICU admission during the current hospitalization), <4 hours in ICU, primary admission due to trauma, burns, or immediately post-CABG, admitted to exclude myocardial infarction (MI) and subsequently found without MI or any other acute process requiring ICU care, patient transfers from another acute care hospital (i.e. patients whose physical site immediately prior to the index ICU admission was an acute care unit at an outside hospital).

Risk Adjustment	Statistical risk model Selection criteria for risk adjustment tool for pediatric ICU's: - Tool must allow quality assessment and comparison between intensive care units, and must be widely used - Tool must be valid and reliable for severity adjustment and measurement of quality of care provided - Computation of mortality risk must be in the public domain (i.e. free of charge) - Algorithms must receive ongoing validation and recalibration The PRISM 3 model meets these criteria. VPS has updated the original PRISM LOS model by adding more predictors and re-estimating the coefficients. We developed the linear regression model for LOS on the training dataset (based on admissions between Q2 2009 and Q1 2013, n=275,013), and independently confirmed the performance of the resulting model on the validation dataset (based on admissions between Q2 2013 and Q1 2014, n=73,705). A few patients having long ICU stays can disproportionately influence LOS models. We used a 30-day truncation: if any patient had an observed LOS exceeding 30 days, the LOS was reduced to 30 days. Among 348,718 PICU admissions, less than 2% of PICU stays were longer than 30 days. Since the latest model release is intended to be a refresh of the PRISM III LOS model, we used predictors that are included in PRISM III Risk of Mortality (ROM) and did not include interaction terms or site level predictors. The LOS (in days) is predicted from the following terms at the patient-level: (1) PRISM3 Score (2) Neonatal (less than 1 month) patient, (3) Infant (1 month to 1 year) patient, (4) Post-operative patient, (5) Admission of patient from Inpatient Unit, (6) Previous ICU admission,	Statistical risk model Risk-adjustment variables include: age, heart rate >=150, SBP <=90, chronic renal, acute renal, GIB, cardiac arrhythmia, intracranial mass effect, mechanical ventilation, received CPR, cancer, cerebrovascular incident, cirrhosis, coma, medical admission or status post nonelective surgery, zero factor status (no risk factors other than age), and full code status (no restrictions on therapies or interventions at the time of ICU admission). The LOS risk-adjustment model is based on the Intensive Care Outcomes Model - Length-of-Stay (ICOMLOS) with candidate interactions among variables and variable coefficients customized for the population of interest. Provided in response box S.15a

	(7) Patient with an oncology diagnosis, (8) Patient with an acute overdose, (9) Patient with acute diabetes, (10) Patient with an operative cardiac disease, (11) Patient with pneumonia, (12) Patient with non-head trauma, (13) Patient associated with an acute problem, and (14) Patient on mechanical ventilation. References [1]. Pollack MM. Recalibration of the Length of Stay (LOS) Algorithm: 2006. Personal Communication. 2006. [2] VPS Webpage. VPS New PRISM 3 LOS Model. 2015. https://s3.amazonaws.com/vpspublic/PRISM+LOS+brochure.pdf	
Stratification	Risk-adjustment measure, not stratification.	Not-applicable
Type Score	Ratio better quality = lower score	Rate/proportion better quality = lower score
Algorithm	The standardized length of stay ratio (SLOSR) is created by dividing the average (mean) observed physical length of stay (truncated at 30 days) by the average (mean) predicted length of stay. Cases must meet PRISM 3 inclusion criteria to receive a PRISM 3 length of stay prediction. Numerator is the average (mean) observed LOS with the observed LOS = observed LOS exceeding 30 days, the LOS was reduced to 30 days. The denominator is the average (mean) predicted length of stay using the adjustment model. Risk adjustment/severity of illness addressed using PRISM 3 methodology. https://s3.amazonaws.com/vpspublic/PRISM+LOS+brochure.pdf. Available at measure-specific web page URL identified in S.1	The hospital's mean observed ICU LOS and and mean risk-adjusted LOS are calculated using the abstracted data. For each hospital, the model produces a median and 95% confidence interval for the standardized LOS ratio (SLOSR), which is the mean observed LOS divided by the mean predicted LOS. No diagram provided
Submission items	5.1 Identified measures:	5.1 Identified measures: 0703: Intensive Care: In-hospital mortality rate

	5a.1 Are specs completely harmonized? 5a.2 If not completely harmonized, identify difference, rationale, impact: 5b.1 If competing, why superior or rationale for additive value: N/A	5a.1 Are specs completely harmonized? Yes 5a.2 If not completely harmonized, identify difference, rationale, impact: This measure is completely harmonized with measure 0703 Intensive Care: In-hospital mortality rate. 5b.1 If competing, why superior or rationale for additive value:

Pneumonia Mortality Rate: Comparison of NQF #0468 and NQF #0231

	0468 Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia hospitalization	0231 Pneumonia Mortality Rate (IQI #20)
Steward	Centers for Medicare & Medicaid Services (CMS)	Agency for Healthcare Research and Quality
Description	The measure estimates a hospital-level 30-day risk-standardized mortality rate (RSMR). Mortality is defined as death for any cause within 30 days after the date of admission for the index admission, discharged from the hospital with a principal discharge diagnosis of pneumonia, including aspiration pneumonia or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary diagnosis of pneumonia (including aspiration pneumonia) coded as present on admission (POA). CMS annually reports the measure for patients who are 65 years or older and are either Medicare fee-for-service (FFS) beneficiaries and hospitalized in non-federal hospitals or patients hospitalized in Veterans Health Administration (VA) facilities. Please note this measure has been substantially updated since the last submission; as described in S.3., the cohort has been expanded. Throughout this application we refer to this measure as version 9.2.	In-hospital deaths per 1,000 hospital discharges with pneumonia as a principal diagnosis for patients ages 18 years and older. Excludes obstetric discharges and transfers to another hospital. [NOTE: The software provides the rate per hospital discharge. However, common practice reports the measure as per 1,000 discharges. The user must multiply the rate obtained from the software by 1,000 to report in-hospital deaths per 1,000 hospital discharges.]
Type	Outcome	Outcome
Data	Administrative claims Data sources for the Medicare FFS measure:	Administrative claims HCUP State Inpatient Databases (SID).

Source	1. Medicare Part A inpatient and Part B outpatient claims: This data source contains claims data for FFS inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, as well as inpatient and outpatient physician claims for the 12 months prior to an index admission. 2. Medicare Enrollment Database (EDB): This database contains Medicare beneficiary demographic, benefit/coverage, and vital status information. This data source was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission as well as vital status. These data have previously been shown to accurately reflect patient vital status (Fleming et al., 1992). 3. The American Community Survey (2008-2012): The American Community Survey data is collected annually and an aggregated 5-years data was used to calculate the AHRQ SES composite index score. 4. Data sources for the all-payer update: For our analyses to examine use in all-payer data, we used all-payer data from California in addition to CMS data for Medicare FFS patients aged 65 years or over (65+) in California hospitals. California is a diverse state, and, with more than 37 million residents, California represents 12% of the US population. We used the California Patient Discharge Data, a large, linked database of patient hospital admissions. In 2009, there were 3,193,904 adult discharges from 446 non-Federal acute care hospitals. Records are linked by a unique patient identification number, allowing us to determine patient history from previous hospitalizations and to evaluate rates of both readmission and mortality (via linking with California vital statistics records). Using all-payer data from California as well as CMS Medicare FFS data for California hospitals, we performed analyses to determine whether the pneumonia mortality measure can be applied to all adult patients, including not only FFS Medicare patients aged 65 or over, but also non-FFS Medicare patients aged 18-64 years at	Healthcare Cost and Utilization Project (HCUP). 2008. Agency for Healthcare Research and Quality, Rockville, MD. URL Attachment IQI_Regression_Coefficients-_Code_Tables_and_Value_Sets.xlsx

	the time of admission. Reference: Fleming C., Fisher ES, Chang CH, Bubolz D, Malenda J. Studying outcomes and hospital utilization in the elderly: The advantages of a merged data base for Medicare and Veterans Affairs Hospitals. Medical Care. 1992; 30(5): 377-91. No data collection instrument provided Attachment NQF_0468_S2b_Mortality_Data_Dictionary_v0.5_forCMS-635856833973209589.xls	
Level	Facility	Facility
Setting	Hospital/Acute Care Facility	Hospital/Acute Care Facility
Time Window	Numerator time window: We define the time period for death from any cause within 30 days from the date of admission for the index pneumonia hospitalization. Denominator time window: This original measure was developed with 12 months of data. The re-speci	The time window can be determined by user, but is generally a calendar year. Note the volume-outcome relationship is based on volume over a one year time period.
Numerator Statement	The outcome for this measure is 30-day all-cause mortality. We define mortality as death from any cause within 30 days of the index admission date for patients 18 and older discharged from the hospital with a principal discharge diagnosis of pneumonia, including aspiration pneumonia or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA and no secondary discharge diagnosis of severe sepsis.	Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator.
Numerator Details	The measure counts deaths for any cause within 30 days of the date of admission of the index pneumonia hospitalization. Identifying deaths in the FFS measure As currently reported, we identify deaths for FFS Medicare patients 65 years or over in the Medicare Enrollment Database (EDB). Identifying deaths in the all-payer measure For the purposes of development of an all-payer measure, deaths were identified using the California vital statistics data file.	Number of deaths (DISP=20) among cases meeting the inclusion and exclusion rules for the denominator.

	Nationally, post-discharge deaths can be identified using an external source of vital status, such as the Social Security Administration's Death Master File (DMF) or the Centers for Disease Control and Prevention's National Death Index (NDI).	
Denominator Statement	This claims-based measure can be used in either of two patient cohorts: (1) patients aged 65 years or over or (2) patients aged 18 years or older. We have specifically tested the measure in both age groups. The cohort includes admissions for patients aged 18 years and older discharged from the hospital with principal discharge diagnosis of pneumonia, including aspiration pneumonia or a principal discharge diagnosis of sepsis (not severe sepsis) with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis; and with a complete claims history for the 12 months prior to admission. The measure will be publicly reported by CMS for those patients 65 years or older who are Medicare FFS beneficiaries admitted to non-federal hospitals or patients admitted to VA hospitals. Additional details are provided in S.9 Denominator Details.	Discharges, for patients ages 18 years and older, with a principal ICD-9-CM diagnosis code for pneumonia.
Denominator Details	To be included in the measure cohort used in public reporting, patients must meet the following inclusion criteria: 1. Principal discharge diagnosis of pneumonia, including aspiration pneumonia; or Principal discharge diagnosis of sepsis (not including severe sepsis), with a secondary discharge diagnosis of pneumonia (including aspiration pneumonia) coded as POA but no secondary discharge diagnosis of severe sepsis. 2. Enrolled in Medicare fee-for-service (FFS) 3. Aged 65 or over 4. Not transferred from another acute care facility 5. Enrolled in Part A and Part B Medicare for the 12 months prior to the date of admission, and enrolled in Part A during the index	ICD-9-CM Pneumonia diagnosis codes: 00322 SALMONELLA PNEUMONIA 0212 PULMONARY TULAREMIA 0391 PULMONARY ACTINOMYCOSIS 0521 VARICELLA PNEUMONITIS 0551 POSTMEASLES PNEUMONIA 0730 ORNITHOSIS PNEUMONIA 1124 CANDIDIASIS OF LUNG 1140 PRIMARY COCCIDIOIDOMYCOS 1144 CHRONIC PULMON COCCIDIOIDOMYCOSIS 1145 UNSPEC PULMON COCCIDIOIDOMYCOSIS 11505 HISTOPLASM CAPS PNEUMON

	admission. This measure can also be used for an all-payer population aged 18 years and older. We have explicitly tested the measure in both patients aged 18 years and older, and those aged 65 years or over (see Testing Attachment for details). International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) codes used to define the cohort for each measure are: ICD-9 codes that define patients with pneumonia: 480.0 Pneumonia due to adenovirus 480.1 Pneumonia due to respiratory syncytial virus 480.2 Pneumonia due to parainfluenza virus 480.3 Pneumonia due to SARS-associated coronavirus 480.8 Pneumonia due to other virus not elsewhere classified 480.9 Viral pneumonia, unspecified 481 Pneumococcal pneumonia 482.0 Pneumonia due to Klebsiella pneumoniae 482.1 Pneumonia due to Pseudomonas 482.2 Pneumonia due to Hemophilus influenzae 482.30 Pneumonia due to Streptococcus, unspecified 482.31 Pneumonia due to Streptococcus, group A 482.32 Pneumonia due to Streptococcus, group B 482.39 Pneumonia due to other Streptococcus 482.40 Pneumonia due to Staphylococcus, unspecified 482.41 Methicillin susceptible pneumonia due to Staphylococcus aureus 482.42 Methicillin resistant pneumonia due to Staphylococcus aureus 482.49 Other Staphylococcus pneumonia 482.81 Pneumonia due to anaerobes 482.82 Pneumonia due to escherichia coli	11515 HISTOPLASM DUB PNEUMONIA 11595 HISTOPLASMOSIS PNEUMONIA 1304 TOXOPLASMA PNEUMONITIS 1363 PNEUMOCYSTOSIS 4800 ADENOVIRAL PNEUMONIA 4801 RESP SYNCYT VIRAL PNEUM 4802 PARINFLUENZA VIRAL PNEUM 4803 PNEUMONIA DUE TO SARS 4808 VIRAL PNEUMONIA NEC 4809 VIRAL PNEUMONIA NOS 481 PNEUMOCOCCAL PNEUMONIA 4820 K. PNEUMONIAE PNEUMONIA 4821 PSEUDOMONAL PNEUMONIA 4822 H.INFLUENZAE PNEUMONIA 48230 STREP PNEUMONIA UNSPEC 48231 GRP A STREP PNEUMONIA 48232 GRP B STREP PNEUMONIA 48239 OTH STREP PNEUMONIA 4824 STAPHYLOCOCCAL PNEUMONIA 48240 STAPH PNEUMONIA UNSP 48241 METH SUS PNEUM D/T STAPH 48242 METH RES PNEU D/T STAPH 48249 STAPH PNEUMON OTH 48281 ANAEROBIC PNEUMONIA 48282 E COLI PNEUMONIA 48283 OTH GRAM NEG PNEUMONIA 48284 LEGIONNAIRES DX 48289 BACT PNEUMONIA NEC 4829 BACTERIAL PNEUMONIA NOS 4830 MYCOPLASMA PNEUMONIA

	482.83 Pneumonia due to other gram-negative bacteria 482.84 Pneumonia due to Legionnaires' disease 482.89 Pneumonia due to other specified bacteria 482.9 Bacterial pneumonia, unspecified 483.0 Pneumonia due to mycoplasma pneumoniae 483.1 Pneumonia due to chlamydia 483.8 Pneumonia due to other specified organism 485 Bronchopneumonia, organism unspecified 486 Pneumonia, organism unspecified 487.0 Influenza with pneumonia 488.11 Influenza due to identified 2009 H1N1 influenza virus with pneumonia ICD-9 codes that define patients with aspiration pneumonia: 507.0 Pneumonitis due to inhalation of food or vomitus ICD-9 codes that define patients with sepsis (not including severe sepsis [995.92 or 785.52]) (Cohort requires principal discharge diagnosis of sepsis combined with a secondary discharge diagnosis of pneumonia or aspiration pneumonia coded as POA but no secondary discharge diagnosis of severe sepsis): 038.0 Streptococcal septicemia 038.10 Staphylococcal septicemia, unspecified 038.11 Methicillin susceptible Staphylococcus aureus septicemia 038.12 Methicillin resistant Staphylococcus aureus septicemia 038.19 Other staphylococcal septicemia 038.2 Pneumococcal septicemia [Streptococcus pneumoniae septicemia] 038.3 Septicemia due to anaerobes 038.40 Septicemia due to gram-negative organism, unspecified 038.41 Septicemia due to hemophilus influenzae [H. influenzae] 038.42 Septicemia due to escherichia coli [E. coli] 038.43 Septicemia due to pseudomonas	4831 CHLAMYDIA PNEUMONIA 4838 OTH SPEC ORG PNEUMONIA 4841 PNEUM W CYTOMEG INCL DIS 4843 PNEUMONIA IN WHOOP COUGH 4845 PNEUMONIA IN ANTHRAX 4846 PNEUM IN ASPERGILLOSIS 4847 PNEUM IN OTH SYS MYCOSES 4848 PNEUM IN INFECT DIS NEC 485 BRONCOPNEUMONIA ORG NOS 486 PNEUMONIA, ORGANISM NOS 4870 INFLUENZA WITH PNEUMONIA 48801 INFLUENZA D/T IDENTIFIED AVIAN INFLUENZA VIRUS 48811 INFLUENZA D/T IDENTIFIED 2009 H1N1 INFLUENZA VIRUS W/PNEUMONIA 48881 NOVEL INFLUENZA W/PNEUMONIA

	038.44 Septicemia due to serratia 038.49 Other septicemia due to gram-negative organisms 038.8 Other specified septicemias 038.9 Unspecified septicemia 995.91 Sepsis --- --- ICD-10 codes that define patients with pneumonia: J12.0 Adenoviral pneumonia J12.1 Respiratory syncytial virus pneumonia J12.2 Parainfluenza virus pneumonia J12.81 Pneumonia due to SARS-associated coronavirus J12.89 Other viral pneumonia J12.9 Viral pneumonia, unspecified J13 Pneumonia due to Streptococcus pneumoniae J18.1 Lobar pneumonia, unspecified organism J15.0 Pneumonia due to Klebsiella pneumoniae J15.1 Pneumonia due to Pseudomonas J14 Pneumonia due to Hemophilus influenzae J15.4 Pneumonia due to other streptococci J15.3 Pneumonia due to streptococcus, group B J15.20 Pneumonia due to staphylococcus, unspecified J15.211 Pneumonia due to Methicillin susceptible staphylococcus J15.212 Pneumonia due to Methicillin resistant staphylococcus J15.29 Pneumonia due to other staphylococcus J15.8 Pneumonia due to other specified bacteria J15.5 Pneumonia due to Escherichia coli J15.6 Pneumonia due to other aerobic Gram-negative bacteria A48.1 Legionnaires' disease J15.8 Pneumonia due to other specified bacteria	

	J15.9 Unspecified bacterial pneumonia J15.7 Pneumonia due to Mycoplasma pneumoniae J16.0 Chlamydial pneumonia J16.8 Pneumonia due to other specified infectious organisms J18.0 Bronchopneumonia, unspecified organism J18.9 Pneumonia, unspecified organism J11.00 Influenza due to unidentified influenza virus with unspecified type of pneumonia J12.9 Viral pneumonia, unspecified J10.08 Influenza due to other identified influenza virus ICD-10 codes that define patients with aspiration pneumonia: J69.0 Pneumonitis due to inhalation of food and vomit ICD-10 codes that define patients with sepsis (not including severe sepsis [ICD-9 995.92 or 785.52]) (Cohort requires principal discharge diagnosis of sepsis combined with a secondary discharge diagnosis of pneumonia or aspiration pneumonia coded as POA but no secondary discharge diagnosis of severe sepsis): A40.9 Streptococcal sepsis, unspecified A41.2 Sepsis due to unspecified staphylococcus A41.01 Sepsis due to Methicillin susceptible Staphylococcus A41.02 Sepsis due to Methicillin resistant Staphylococcus A41.1 Sepsis due to other specified staphylococcus A40.3 Sepsis due to Streptococcus pneumoniae A41.4 Sepsis due to anaerobes A41.50 Gram-negative sepsis, unspecified A41.3 Sepsis due to Hemophilus influenzae A41.51 Sepsis due to Escherichia coli [E. coli] A41.52 Sepsis due to Pseudomonas A41.53 Sepsis due to Serratia A41.59 Other Gram-negative sepsis A41.89 Other specified sepsis	

	A41.9 Sepsis, unspecified organism An ICD-9 to ICD-10 crosswalk is attached in field S.2b. (Data Dictionary or Code Table).	
Exclusions	The mortality measures exclude index admissions for patients: 1. Discharged alive on the day of admission or the following day who were not transferred to another acute care facility; 2. With inconsistent or unknown vital status or other unreliable demographic (age and gender) data; 3. Enrolled in the Medicare hospice program or used VA hospice services any time in the 12 months prior to the index admission, including the first day of the index admission; or 4. Discharged against medical advice (AMA). For patients with more than one admission for a given condition in a given year, only one index admission for that condition is randomly selected for inclusion in the cohort.	Exclude cases: • transferring to another short-term hospital (DISP=2) • MDC 14 (pregnancy, childbirth, and puerperium) • with missing discharge disposition (DISP=missing), gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing) or principal diagnosis (DX1=missing)
Exclusion Details	1. The discharge disposition indicator is used to identify patients alive at discharge. Transfers are identified in the claims when a patient with a qualifying admission is discharged from an acute care hospital and admitted to another acute care hospital on the same day or next day. Patient length of stay and condition is identified from the admission claim. 2. Inconsistent vital status or unreliable data are identified if any of the following conditions are met 1) the patient's age is greater than 115 years; 2) if the discharge date for a hospitalization is before the admission date; 3) if the patient has a sex other than 'male' or 'female'. 3. Hospice enrollment in the 12 months prior to or on the index admission is identified using hospice enrollment data. 4. Discharges against medical advice (AMA) are identified using the discharge disposition indicator. After all exclusions are applied, the measure randomly selects one index admission per patient per year for inclusion in the cohort so that each episode of care is mutually independent with the same	Exclude cases: • transferring to another short-term hospital (DISP=2) • MDC 14 (pregnancy, childbirth, and puerperium) • with missing discharge disposition (DISP=missing), gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing) or principal diagnosis (DX1=missing)

	probability of the outcome. For each patient, the probability of death increases with each subsequent admission, and therefore, the episodes of care are not mutually independent. Also, for the three year combined data, when index admissions occur during the transition between measure reporting periods (June and July of each year) and both are randomly selected for inclusion in the measure, the measure includes only the June admission. The July admissions are excluded to avoid assigning a single death to two admissions.	
Risk Adjustment	Statistical risk model Our approach to risk adjustment is tailored to and appropriate for a publicly reported outcome measure, as articulated in the American Heart Association (AHA) Scientific Statement, "Standards for Statistical Models Used for Public Reporting of Health Outcomes" (Krumholz et al., 2006). The measure employs a hierarchical logistic regression model to create a hospital-level 30-day RSMR. In brief, the approach simultaneously models data at the patient and hospital levels to account for the variance in patient outcomes within and between hospitals (Normand & Shahian, 2007). At the patient level, the model adjusts the log-odds of mortality within 30 days of admission for age, sex, and selected clinical covariates. At the hospital level, the approach models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of death at the hospital, after accounting for patient risk. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. Candidate and Final Risk-adjustment Variables: Candidate variables were patient-level risk-adjustors that were expected to be predictive of mortality, based on empirical analysis, prior literature, and clinical judgment, including age, sex, and indicators of comorbidity and disease severity. For each patient, covariates are obtained from claims records extending 12	Statistical risk model The predicted value for each case is computed using a hierarchical model (logistic regression with hospital random effect) and covariates for gender, age in years (in 5-year age groups), Major Diagnostic Category (MDC), transfer status, All Patient Refined-Diagnosis Related Group (APR-DRG) and APR-DRG risk-of-mortality subclass. The reference population used in the model is the universe of discharges for states that participate in the Healthcare Cost and Utilization Project (HCUP) State Inpatient Databases (SID) for the year 2008 (updated annually), a database consisting of 43 states and approximately 30 million adult discharges and 4,000 hospitals. The expected rate is computed as the sum of the predicted value for each case divided by the number of cases for the unit of analysis of interest (i.e., hospital). The risk adjusted rate is computed using indirect standardization as the observed rate divided by the expected rate, multiplied by the reference population rate. Specific covariates used for this measure: Sex Female Age 18 to 24 Age 25 to 29 Age 30 to 34 Age 35 to 39 Age 40 to 44 Age 45 to 49

	months prior to and including the index admission. For the measure currently implemented by CMS, these risk-adjusters are identified using both inpatient and outpatient Medicare FFS claims data. However, in the all-payer hospital discharge database measure, the risk-adjustment variables can be obtained only from inpatient claims in the prior 12 months and the index admission. The model adjusts for case-mix differences based on the clinical status of patients at the time of admission. We use condition categories (CCs), which are clinically meaningful groupings of more than 15,000 ICD-9-CM diagnosis codes (Pope et al., 2000). A file that contains a list of the ICD-9-CM codes and their groupings into CCs is attached in data field S.2b (Data Dictionary or Code Table). In addition, only comorbidities that convey information about the patient at admission or in the 12 months prior, and not complications that arise during the course of the index hospitalization, are included in the risk adjustment. Hence, we do not risk adjust for CCs that may represent adverse events of care when they are only recorded in the index admission. The final set of risk adjustment variables is: Demographics Male Age-65 (years, continuous) for patients aged 65 or over cohorts; or Age (years, continuous) for patients aged 18 and over cohorts. Comorbidities History of Percutaneous Transluminal Coronary Angioplasty (PTCA) (ICD-9 codes V45.82, 00.66, 36.06, 36.07) History of Coronary Artery Bypass Graft (CABG) (ICD-9 codes V45.81, 36.10–36.16) Congestive heart failure (CC 80) Acute myocardial infarction (CC 81) Other acute/subacute forms of ischemic heart disease (CC 82) Coronary atherosclerosis or angina (CC 83-84) Cardio-respiratory failure or shock (CC 78-79)	Age 50 to 54 Age 55 to 59 Age 80 to 84 Age 85+ APR-DRG '121-1' APR-DRG '121-2' APR-DRG '121-3' APR-DRG '121-4' APR-DRG '130-1' APR-DRG '130-2' APR-DRG '130-3' to '130-4' APR-DRG '137-1' APR-DRG '137-2' APR-DRG '137-3' APR-DRG '137-4' APR-DRG '139-2' APR-DRG '139-3' APR-DRG '139-4' MDC 4 (Diseases & Disorders Of The Respiratory System) MDC 25 (Human Immunodeficiency Virus Infections) TRNSFER Transfer-in APR-DRG 121 Other Respiratory & Chest Procedures APR-DRG 130 Respiratory System Diagnosis w/ Ventilator Support 96+ Hours APR-DRG 137 Major Respiratory Infections and Inflammations APR-DRG 139 Other Pneumonia APR-DRG Risk of Mortality Subclass: 1 - Minor 2 - Moderate 3 - Major

	Hypertension (CC 89, 91) Stroke (CC 95-96) Cerebrovascular disease (CC 97-99, 103) Renal failure (CC 131) Chronic obstructive pulmonary disease (COPD) (CC 108) Pneumonia (CC 111-114) Protein-calorie malnutrition (CC 21) Dementia or other specified brain disorders (CC 49-50) Hemiplegia, paraplegia, paralysis, functional disability (CC 67-69, 100-102, 177-178) Vascular disease and complications (CC 104-105) Metastatic cancer, acute leukemia and other severe cancers (CC 7-8) Trauma in last year (CC 154-156, 158-162) Major psychiatric disorders (CC 54-56) Chronic liver disease (CC 25-27) Severe hematological disorders (CC 44) Iron deficiency or other unspecified anemias and blood disease (CC 47) Depression (CC 58) Parkinson's or Huntington's diseases (CC 73) Seizure disorders and convulsions (CC 74) Fibrosis of lung or other chronic lung disorders (CC 109) Asthma (CC 110) Vertebral fractures (CC 157) Septicemia/sepsis (CC 2) Respirator dependence/tracheostomy (CC 77) Disorders of fluid/electrolyte/acid-base (CC 23) Delirium and encephalopathy (CC 48) Decubitus ulcer of skin (CC 148) References:	4 - Extreme For additional information on the method, please access the Empirical Methods document: http://www.qualityindicators.ahrq.gov/Downloads/Resources/Publications/2011/QI_Empirical_Methods_03-31-14.pdf The Empirical Methods are also attached as "supplemental materials". Available in attached Excel or csv file at S.2b

	Krumholz HM, Brindis RG, Brush JE, et al. 2006. Standards for Statistical Models Used for Public Reporting of Health Outcomes: An American Heart Association Scientific Statement From the Quality of Care and Outcomes Research Interdisciplinary Writing Group: Cosponsored by the Council on Epidemiology and Prevention and the Stroke Council Endorsed by the American College of Cardiology Foundation. Circulation 113: 456-462. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22 (2): 206-226. Pope GC, et al. 2000. Principal Inpatient Diagnostic Cost Group Models for Medicare Risk Adjustment. Health Care Financing Review 21(3): 93-118. Available in attached Excel or csv file at S.2b	
Stratification	N/A	Not applicable
Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score
Algorithm	The measure estimates hospital-level 30-day all-cause RSMRs following hospitalization for pneumonia using hierarchical logistic regression models. In brief, the approach simultaneously models data at the patient and hospital levels to account for variance in patient outcomes within and between hospitals (Normand and Shahian, 2007). At the patient level, it models the log-odds of mortality within 30 days of index admission using age, sex, selected clinical covariates, and a hospital-specific intercept. At the hospital level, it models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of a mortality at the hospital, after accounting for patient risk. The hospital-specific intercepts are given a distribution to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.	The measure is expressed as a rate, defined as (outcome of interest / population at risk) or (numerator / denominator). The AHRQ Quality Indicators (AHRQ QI) software performs six steps to produce the rate 1) Discharge-level data is used to identify inpatient records containing the outcome of interest and 2) the population at risk. 3) Calculate observed rates. Using output from steps 1 and 2, observed rates are calculated for user-specified combinations of stratifiers. 4) Calculate expected rates. Use the risk-adjustment model to calculate the rate one would expect at the hospital based on the hospital´s case-mix and the average performance for that case-mix in the reference population. 5) Calculate risk-adjusted rate. Use the indirect standardization to account for case-mix. For indicators that are not risk-adjusted, the risk-adjusted rate is the same as the observed rate. 6) Calculate smoothed rate. A Univariate shrinkage estimator is applied to the risk-adjusted rates. The shrinkage estimator reflects a reliability adjustment unique to

	The RSMR is calculated as the ratio of the number of "predicted" to the number of "expected" deaths at a given hospital, multiplied by the national observed mortality rate. For each hospital, the numerator of the ratio is the number of deaths within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator is the number of deaths expected based on the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case mix to an average hospital's performance with the same case mix. Thus, a lower ratio indicates lower-than-expected mortality rates or better quality, and a higher ratio indicates higher-than-expected mortality rates or worse quality. The "predicted" number of deaths (the numerator) is calculated by using the coefficients estimated by regressing the risk factors and the hospital-specific intercept on the risk of mortality. The estimated hospital-specific intercept is added to the sum of the estimated regression coefficients multiplied by the patient characteristics. The results are transformed and summed over all patients attributed to a hospital to get a predicted value. The "expected" number of deaths (the denominator) is obtained in the same manner, but a common intercept using all hospitals in our sample is added in place of the hospital-specific intercept. The results are transformed and summed over all patients in the hospital to get an expected value. To assess hospital performance for each reporting period, we re-estimate the model coefficients using the years of data in that period. This calculation transforms the ratio of predicted over expected into a rate that is compared to the national observed readmission rate. The hierarchical logistic regression models are described fully in the original methodology report (Krumholz et al., 2005). References: Krumholz H, Normand S, Galusha D, et al. Risk-Adjustment Models	each indicator and provider. The estimator is the signal-to-noise ratio, where signal is the between provider variance and noise is the within provider variance. URL

	for AMI and HF 30-Day Mortality Methodology. 2005. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22(2): 206-226. No diagram provided	
Submission items	5.1 Identified measures: 0708: Proportion of Patients with Pneumonia that have a Potentially Avoidable Complication (during the episode time window) 0231: Pneumonia Mortality Rate (IQI #20) 0506: Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following p 5a.1 Are specs completely harmonized? No 5a.2 If not completely harmonized, identify difference, rationale, impact: The pneumonia mortality measure cohort, version 9.0, is harmonized with the hospital-level, risk-standardized payment associated with a 30-day episode of care for pneumonia cohort. Version 9.2 of the pneumonia mortality measure cohort is, however, not harmonized with the pneumonia payment measure cohort. There is intention to harmonize the pneumonia mortality and payment measure cohorts in the future. We did not include in our list of related measures any non-outcome (for example, process) measures with the same target population as our measure. Because this is an outcome measure, clinical coherence of the cohort takes precedence over alignment with related non-outcome measures. Furthermore, non-outcome measures are limited due to broader patient exclusions. This is because they typically only include a specific subset of patients who are eligible for that measure (for example, patients who receive a specific medication or undergo a specific procedure). Lastly, this measure and the NQF Inpatient Pneumonia Mortality (AHRQ) Measure #0231 are complementary rather than competing measures. Although they both assess mortality for patients admitted to acute care hospitals with a principal discharge diagnosis of pneumonia,	5.1 Identified measures: 0468: Hospital 30-day, all-cause, risk-standardized mortality rate (RSMR) following pneumonia hospitalization 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: AHRQ and CMS engaged in a harmonization process when both measures were submitted for endorsement. In-hospital mortality and 30-day mortality measures are complementary and provide alternative perspectives on hospital performance. In-hospital mortality measures may be calculated by the hospital in real time without the need to link to vital records or other sources of mortality data.

	the specified outcomes are different. This measure assesses 30-day mortality while #0231 assesses inpatient mortality. Assessment of 30-day and inpatient mortality outcomes have distinct advantages and uses which make them complementary as opposed to competing. For example the 30-day period provides a broader perspective on hospital care and utilizes standard time period to examine hospital performance to avoid bias by differences in length of stay among hospitals. However, in some settings it may not be feasible to capture post-discharge mortality making the inpatient measure more useable. We have previously consulted with AHRQ to examine harmonization of complementary measures of mortality for patients with AMI and stroke. We have found that the measures are harmonized to the extent possible given that small differences in cohort inclusion and exclusion criteria are warranted on the basis of the use of different outcomes. However, this current measure has been modified from the last endorsed version to include patients with a principal discharge diagnosis of sepsis and a secondary discharge diagnosis of pneumonia that is present on admission. The cohort was also expanded to include patients with a principal discharge diagnosis of aspiration pneumonia. Thus the current measure cohort is no longer harmonized with measure #0231. 5b.1 If competing, why superior or rationale for additive value: N/A	

Optimal Asthma Control: Comparison of NQF #2794 and NQF #2852

	2794 Rate of Emergency Department Visit Use for Children Managed for Identifiable Asthma: A PQMP Measure	2816 Appropriateness of Emergency Department Visits for Children and Adolescents with Identifiable Asthma: A PQMP Measure	2852 Optimal Asthma Control
Steward	University Hospitals Cleveland Medical Center	University Hospitals Cleveland Medical Center	Minnesota Community Measurement

Description	This measure estimates the rate of emergency department visits for children ages 2 – 21 who are being managed for identifiable asthma. The measure is reported in visits per 100 child-years.	This measure estimates the proportion of emergency department (ED) visits that meet criteria for the ED being the appropriate level of care, among all ED visits for identifiable asthma in children and adolescents.	The percentage of pediatric (5-17 years of age) and adult (18-50 years of age) patients who had a diagnosis of asthma and whose asthma was optimally controlled during the measurement period as defined by achieving BOTH of the following: • Asthma well-controlled as defined by the most recent asthma control tool result available during the measurement period • Patient not at elevated risk of exacerbation as defined by less than two emergency department visits and/or hospitalizations due to asthma in the last 12 months
Type	Outcome	Process	Composite

Data Source	Administrative claims, Electronic Clinical Data : Electronic Health Record, Paper Medical Records N/A No data collection instrument provided Attachment FINAL_CAPQuaM_ASTHMA_ICD9_and_ICD10.xlsx	Administrative claims, Electronic Clinical Data : Electronic Health Record, Paper Medical Records N/A No data collection instrument provided Attachment FINAL_CAPQuaM_ASTHMA_ICD9_and_ICD10-635802445620975487.xlsx	Electronic Clinical Data, Electronic Clinical Data : Electronic Health Record, Paper Medical Records An excel template with formatted columns for data fields is provided. Please refer to the attached data dictionary for data field definitions. All data is uploaded in electronic format (.csv file) to a HIPAA secure, encrypted and password protected data portal. 1. Asthma Control Test (ACT) and Childhood Asthma Control Test (C-ACT) MNCM has secured permission for use of the ACT and C-ACT from GlaxoSmithKline for providers participating in quality measurement reporting to MNCM, under the following conditions: • you will administer the instrument in a paper format only; • permissible uses include only clinical care and quality measurement activities not related to research or publication; • you may not modify the instrument or combine it with other instruments without prior written approval; • the questions of the instrument must appear verbatim, in order, and together as they are presented and not divided on separate pages; • for the ACT: the following trademark and copyright information must appear on the bottom of each page of the instrument and on all copies of the instrument; “Copyright 2002 by QualityMetric Incorporated. Asthma Control Test is a trademark of QualityMetric Incorporated.” • for the C-ACT: the following acknowledgment be made as to the source and authorization for use of this material: “Copyright GSK. Used with permission.” • you must utilize the instrument in its entirety; • you agree to utilize only the most current version of the instrument as provided on MNCM’s Resource page. • you agree to display the GSK logo as part of the instrument; Of note, it IS permissible to record item responses and scores in an electronic

Level	Population : Community, Population : County or City, Health Plan, Integrated Delivery System, Population : National, Population : Regional, Population : State	Population : Community, Population : County or City, Health Plan, Integrated Delivery System, Population : National, Population : Regional, Population : State	Clinician : Group/Practice
Setting	Ambulatory Care : Clinician Office/Clinic, Emergency Medical Services/Ambulance, Hospital/Acute Care Facility, Other, Pharmacy, Ambulatory Care : Urgent Care Claims data from all settings in New York State Medicaid data were tested.	Ambulatory Care : Clinician Office/Clinic, Hospital/Acute Care Facility, Other Emergency Department	Ambulatory Care : Clinician Office/Clinic
Time Window	This data requires 2 years of data, the reporting year and the 12 month period before the reporting year. (See Appendix 1, Figure 1)	Two years of administrative data are needed for this analysis: the reporting year and the 12 months preceding the reporting year.	1 year

Numerator Statement	The numerator uses the number of undesirable utilization outcomes (i.e., claims for ED visits or hospitalizations for asthma) experienced by children who are managed for identifiable asthma to estimate the number of emergency room visits	The numerator is the number of eligible asthma ED visits in the random sample that also satisfy at least one of the explicit criteria to indicate that the ED is an appropriate level of care. Distinct numerators are reported for children ages 2-5, 6-11, 12-18, and optionally, 19 - 21.	The number of patients in the denominator whose asthma was optimally controlled during the measurement period as defined by achieving BOTH of the following: • Asthma well-controlled as defined by the most recent asthma control tool result during the measurement period: -Asthma Control Test (ACT) greater than or equal to 20 (patients 12 years of age and older) -Childhood Asthma Control Test (C-ACT) greater than or equal to 20 (patients 11 years of age and younger) -Asthma Control Questionnaire (ACQ) less than or equal to 0.75 (patients 17 years of age and older) -Asthma Therapy Assessment Questionnaire (ATAQ) equal to 0 – Pediatric (5 to 17 years of age) or Adult (18 years of age and older). AND • Patient not at elevated risk of exacerbation as defined by less than two patient reported emergency department visits and/or hospitalizations due to asthma in the last 12 months

Numerator Details	Numerator Elements: Date and count of all emergency visits with a primary or secondary diagnosis of asthma. ED visits should be identified as a visit that is associated with: 1) At least one of the following CPT codes: 99281, 99282, 99283, 99284, 99285 OR 2) At least one of the following revenue codes 0450 Emergency Room 0451 Emergency Room: EM/EMTALA 0452 Emergency Room: ER/ Beyond EMTALA 0456 Emergency Room: Urgent care 0459 Emergency Room: Other emergency room 450 Emergency Room 451 Emergency Room: EM/EMTALA 452 Emergency Room: ER/ Beyond EMTALA 456 Emergency Room: Urgent care 459 Emergency Room: Other emergency room 0981 Professional fees (096x) Emergency room 981 Professional fees emergency room Inpatient Hospitalizations are identified as an encounter that is associated with: At least one of the following CPT codes: Hospitalization: CPT 99238 CPT 99232 CPT 99239 CPT 99233 CPT 99221 CPT 99234 CPT 99222 CPT 99235 CPT 99223 CPT 99236 CPT 99356 CPT 99218 CPT 99357 CPT 99219 CPT 99231 CPT 99220 OR At least one of the following revenue codes	Children and adolescents who have a qualifying ED visit associated with asthma as the first or second diagnosis; AND have at least one of the following: •Disposition of the ED visit was admission to the hospital •Documented physical findings consistent with respiratory distress, including any of the following: o Labored breathing (including moderate or severe increased work of breathing); o Retractions, grunting, and/or evidence of accessory muscle use; o Markedly decreased breath sounds; •Low oxygen (O2) saturation level (dichotomized, < 90% qualifies); •An arterial blood gas (ABG) was obtained in the emergency department; •The child had a consultation with a pulmonologist or asthma specialist that was ordered and provided in the ED; • There is clear documentation that prior to arrival in the ED any of the following occurred: o The child was referred to the ED after evaluation by the PCP or other clinician - note: assessment of breathing over the telephone is allowed by this criterion; o The child received two or more doses of inhaled rescue medications without sufficient clinical improvement. Note: parental report of this criterion is acceptable. Report may have been made at triage, to the nursing staff, or by the clinician during the chief complaint or history of present illness; o The child was assessed with an objective instrument such as a peak flow meter and was found to be in a pre-defined “red zone” of peak flow measurement as part of an asthma action or similar plan. Documentation is needed that the patient/family OR physician report or the chart documents ALL of the following - a written asthma action plan exists AND defines a “red zone” for which urgent assessment by a clinician is indicated;	Asthma control test date Enter the date of the most recent asthma control test on or prior to 06/30/2015. Leave BLANK if an asthma control test was never performed. • Do NOT enter any test date that occurred after 06/30/2015. A date after the measurement period will create an ERROR upon submission. • Enter the date of the visit, telephone call, e-visit or other contact during which the asthma control test was administered (e.g., a test administered to the patient via phone). • Test from another provider is acceptable (not required) if documented in the reporting clinic’s record and is more recent than the reporting clinic’s test. • The following are approved, valid asthma control tests and must be giving according to validated age ranges. Age should be calculated as the date the asthma control test was administered. Tests other than the ones listed below will not be accepted. o ACT (Asthma Control Test); valid for patients 12 and older. o CACT (Child-Asthma Control Test); valid for patients 11 and younger. o ACQ (Asthma Control Questionnaire); valid for patients 17 and older. o ATAQ (Asthma Therapy and Assessment Questionnaire); valid for patients 5 to 50. Asthma control test name Enter a code to indicate the most recent asthma control test (on or prior to 06/30/2015) given to the patient using the codes below. This test name should correspond to the test given on the date in Column U. Leave BLANK if an asthma control test was never performed. Leave BLANK if the wrong test was administered to the patient at the visit (e.g., a 12-year-old patient received the C-ACT instead of the ACT). 1 = Asthma Control Test (ACT) 2 = Child-Asthma Control Test (C-ACT) 3 = Asthma Control Questionnaire (ACQ) 4 = Asthma Therapy Assessment

Denominator Statement	The denominator represents the person time experience among eligible children with identifiable asthma. Assessment of eligibility is determined for each child monthly. The total number of child months experienced is summed and divided by 1200 to achieve the units of 100 child years.	The denominator represents a random sample of the patients in each age stratum who have visited the emergency department for asthma (as a first or second diagnosis) and meet the specified criteria for having identifiable asthma (Appendix Table 1). Separate numerators and denominators are reported for children age 2-5, 6-11, 12-18, and, optionally, 19-21 years. An overall rate across strata is not reported.	Patients aged 5 - 50 years at the start of the measurement period who were seen for asthma by an eligible provider in an eligible specialty face-to-face visit at least 2 times during the current or prior year measurement periods AND who were seen for any reason at least once during the measurement period.

Denominator Details	The denominator seeks to identify children who have been managed with identifiable asthma. A descriptive definition for being managed for Identifiable asthma follows. Identifiable asthma needs to be identified in the assessment period for the specific reporting month being assessed. Specifications follow the descriptive definitions: a. Any prior hospitalization with asthma as primary or secondary diagnosis b. Other qualifying events after the fifth birthday (age is age at occurrence): i. One or more prior ambulatory visits with asthma as the primary diagnosis (this criterion implies an asthma ED visit in the reporting month), OR ii. Two or more ambulatory visits with asthma as a diagnosis, OR iii. One ambulatory visit with asthma as a diagnosis AND at least one asthma-related prescription, OR iv. Two or more ambulatory visits with a diagnosis of bronchitis c. Other qualifying events, any age: v. Three or more ambulatory visits with diagnosis of asthma or bronchitis, OR vi. Two or more ambulatory visits with a diagnosis of asthma and/or bronchitis AND one or more asthma- related prescriptions. For eligibility purposes, asthma-related medicine means long-acting beta-agonist (alone or in combination) or inhaled corticosteroid (alone or in combination), anti-asthmatic combinations, methylxanthines (alone or in combination), and/or mast cell stabilizers. If pharmacy data are not available, the measure should be reported with	Denominator Elements: The presence of identifiable asthma (see table 1) is established each month from administrative data using the specified algorithm. Descriptive definitions for being managed for identifiable asthma are as follows. Specifications follow the descriptive definitions. Identifiable asthma is present in any child who has: • Any prior hospitalization with asthma as primary or secondary diagnosis; or, • Other qualifying events, all ages: o Three or more ambulatory visits with diagnosis of asthma or bronchitis, OR o Two or more ambulatory visits with a diagnosis of asthma and/or bronchitis AND one or more asthma-related prescriptions • OR For children older than five who have an ED visit for asthma (as first or second diagnosis) in the reporting month and prior to the reporting month who have had: o One or more prior ambulatory visits with asthma as the primary diagnosis after the fifth birthday, OR o Two or more ambulatory visits after the fifth birthday with asthma as a diagnosis, OR o One ambulatory visit with asthma as a diagnosis AND at least one asthma-related prescription, both occurring after the fifth birthday OR o Two or more ambulatory visits with a diagnosis of bronchitis after the fifth birthday For eligibility purposes, asthma-related medicine means long-acting beta-agonist (alone or in combination) or inhaled corticosteroid (alone or in combination), anti- asthmatic combinations, methylxanthines (alone or in combination), and/or mast cell stabilizers. See below further regarding this specification. Note that leukotriene modifiers and short term beta agonists are excluded for the purpose of establishing identifiable asthma. Data	Patients who meet each of the following criteria are included in the population: • Patient was age 5 to 50 years at the start of the measurement period (date of birth was on or between 07/01/1964 to 07/01/2009). o Age 5 to 17 years at the start of the measurement period (date of birth was on or between 07/01/1997 to 07/01/2009). o Age 18 to 50 years at the start of the measurement period (date of birth was one or between 07/01/1964 to 06/30/1997). • Patient was seen by an eligible provider in an eligible specialty face-to-face visit at least two times during the last two measurement periods (07/01/2013 to 06/30/2015) with visits coded with an asthma ICD-9 code (in any position, not only primary). Use this date of service range when querying the practice management or EMR system to allow a count of the visits. • Patient was seen by an eligible provider in an eligible specialty face-to-face visit at least one time during the measurement period (07/01/2014 to 06/30/2015) for any reason. This may or may not include a face-to-face visit with an asthma ICD-9 code. • Diagnosis of asthma; ICD-9 diagnosis codes include: 493.00 to 493.12, 493.81 to 493.92. Eligible specialties: Family Practice, General Practice, Internal Medicine, Pediatrics, Allergy/Immunology, and Pulmonology. Eligible providers: Medical Doctor (MD), Doctor of Osteopathy (DO), Physician Assistant (PA), Advanced Practice Registered Nurses (APRN).

Exclusions	Children with concurrent or pre-existing: Chronic Obstructive Pulmonary Disease (COPD) diagnosis (ICD-9 Code: 496), Cystic Fibrosis diagnosis (ICD-9 code 277.0, 277.01. 277.02, 277.03, 277.09), or Emphysema diagnosis (ICD-9 code 492xx). These exclusion incorporate ICD-9 codes only. For the specified ICD-10 codes and a detailed listing of ICD 9 codes see attached spreadsheet in S2.b. Children who have not been consecutively enrolled in the reporting plan for at least two months prior to the index reporting month and for the reporting month (a total of three consecutive months ending in the reporting month).	ED visits that are already in the sample OR Children that fall outside of specified age range of 2-21 OR do not meet time enrollment criteria OR do not meet identifiable asthma prior to the ED visit, OR children with concurrent or pre-existing COPD, Cystic Fibrosis or Emphysema. Identifiable asthma is defined is section S.9. At the discretion of the accountability entity, the denominator may be restricted to children 2-18. These details incorporate ICD-9 codes only. For the specified ICD-10 codes and a detailed listing of ICD 9 codes see attached spreadsheet in S2.b.	Valid exclusions include patients who are nursing home residents, in hospice or palliative care, have died or who have COPD, emphysema, cystic fibrosis or acute respiratory failure.

Exclusion Details	See S.10 above. Also, for entities that use AHRQ's Clinical Classifications Software, apply the exclusion after identifying visits that satisfy CCS class 128. These details incorporate ICD-9 codes only. For the specified ICD-10 codes and a detailed listing of ICD 9 codes see attached spreadsheet in S2.b.	Denominator Exclusions 1) Children with concurrent or pre-existing: a. Chronic Obstructive Pulmonary Disease (COPD) diagnosis (ICD-9 code: 496); b. Cystic Fibrosis diagnosis (ICD-9 code 277.0, 277.01. 277.02, 277.03,277.09) ; c. Emphysema diagnosis (ICD-9 code 492xx) 2) Children without identifiable asthma as defined in S.9 by the month before the ED visit 3) Outside of specified age range 4) Events occurring in patients who have not been enrolled in the reporting plan for at least two consecutive months before the index reporting month (a total of 3 consecutive months, including the reporting month).	Patient was a permanent nursing home resident during the measurement period. Patient was in hospice or palliative care at any time during the measurement period. Patient died prior to the end of the measurement period. Documentation that diagnosis was coded in error. Patient has COPD (codes 491.2, 493.2x, 496, 506.4) Patient has emphysema (codes 492, 506.4, 518.1, 518.2) Patient has cystic fibrosis (code 277.0) Patient has acute respiratory failure (code 518.81)

Risk Adjustment	Other In order to allow for more granular comparisons this measure is specified to be stratified. Stratification for risk adjustment of this measure would not be justified by the literature. Although epidemiological findings support our stratification schema, n N/A	Stratification by risk category/subgroup The rate should be reported stratified by age and within age strata stratified and by each of the stratification variables. Additional cross tabulation may be requested by the accountability entity. Biological risk for asthma ED use has not been shown to be associated with the specified sub-stratifying variables, but social determinants of health are associated with asthma care and utilization. Therefore we specify the measure to be reported as BOTH a single value for each age group and stratified by key covariates (e.g. race/ethnicity, insurance status, urbanicity, and poverty of county of residence). Provided in response box S.15a	Statistical risk model Risk adjustment model is estimated using a logistic model implemented in the SAS Procedure Glimmix that accounts for the measure´s non-continuous (binary) nature. The dependent variable is Optimal Asthma Control. Risk factor variables include patient age, gender, insurance product, patient´s zip code, race/ethnicity and preferred language. Risk Model is available in attached Excel or csv file at S.2b
Stratification	Specifications for this measure requires stratification by age group and race/ethnicity. Several additional stratifications are optional but may be required by the accountability entity or reported by the reporting entity. These variables include rurality	Specifications for this measure requires stratification by age group. Several additional stratifications are optional but may be required by the accountability entity. These variables include race/ethnicity, rurality/urbanicity and county level of poverty	Patient age group (children 5-17 years, adults 18-50 years) Patient gender Patient 5 digit zip code, primary residence Race and ethnicity code or codes (up to 5) as defined in the MNCM REL Data Field Specifications and Codes Country of origin as defined in the MNCM REL Data Field Specifications and Codes Primary language as defined in the MNCM REL Data Field Specifications and Codes Insurance coverage code as defined in the MNCM Insurance Coverage Data Field Specifications and Codes

Type Score	Rate/proportion better quality = lower score	Rate/proportion better quality = lower score	Rate/proportion better quality = higher score

Algorithm	Step 1: Measure person-time eligible for each patient and record by month. a. For each month in the reporting year, identify all children ages 2 – 21 years who meet the criteria for Identifiable asthma during the assessment period. The assessment period is defined as the year prior to the reporting year plus all months in the reporting year prior to the reporting month. Identify and maintain a unique patient identifier and all stratification variables. To illustrate: if the goal is to report for January 2011, first one would identify children with Identifiable asthma using the criteria, and analyze all of calendar year 2010 when doing so. Continuous enrollment criterion requires that the child was enrolled in November and December of 2010, as well as January 2011. This total represents the number of person-months (child-months) for January. Next, for February: one would identify children with Identifiable asthma using the criteria, and analyze all of calendar year 2010 AND January 2011 when doing so. Continuous enrollment criterion requires that the child was enrolled in December 2010 and January 2011, as well as February 2011. This is the number of person-months (child-months) for February. Repeat this progression monthly so that for December, one would identify children with Identifiable asthma and analyze all of calendar year 2010 AND January through November 2011 when doing so. Continuous enrollment criterion requires that the child was enrolled in October 2011 and November 2011, as well as December 2011. This is the number of person-months (child-months) for December. b. Sum all months that are eligible from the reporting year. This sum is the denominator in people-	Step 1: Select starting cohort Identify the upper age limit to be used, either 18 or 21. The measure is specified from 2 to 21 years, with 19-21 year olds considered optional at the discretion of the accountability entity. Appendix Figures 1 and 2 and Appendix Table 1 provide an overview and guide for eligibility and sample selection. Step 2: Conduct analysis of administrative data using the specifications described in denominator description to identify children within the specified age range with identifiable asthma. The analysis should be conducted on a month by month basis as described herein: Determine eligibility for each patient, as of the last day of the month prior to the reporting month. For example, if the goal is to report for January 2011, first identify children with identifiable asthma (above), and analyze all of calendar year 2010 when doing so. Continuous enrollment criterion requires that the child was enrolled in November and December of 2010. Next, for February analyze all of calendar year 2010 AND January 2011. Continuous enrollment criterion requires that the child was enrolled in December 2010 and January 2011. Repeat this progression monthly so that for December, one would identify children with identifiable asthma and analyze all of calendar year 2010 AND January through November 2011 when doing so. Continuous enrollment criterion requires that for December the child was also enrolled in October 2011 and November 2011. Appendix Figure A.1.a describes and illustrates the month by month analysis. Step 3: Identify ED Visits and hospitalizations for asthma in eligible children. Considering only the children who were identified as eligible in the given month according to Step 2, perform a month-by-month analysis to identify and log all ED visits with asthma as a primary or secondary diagnosis and all hospitalizations with asthma as a primary	"The measure is calculated by submitting a file of individual patient values through a HIPAA secure data portal. Programming within the data portal determines if each patient is a numerator case and then a rate is calculated for each clinic site. 1)Is the patient's DOB within the allowable time frame? Yes>>Continue No>>Patient not included in denominator 2)Has the patient had two office visits coded with an asthma diagnosis during the current and year prior to the measurement period? Yes>>Continue No>>Patient not included in denominator 3) Has the patient had one office visit for any reason during the measurement period? Yes>> Patient included in denominator, continue No>> Patient not included in denominator 4) Did the patient have an asthma control test within the measurement period? Yes>> Continue No>> Patient not included in numerator 5) Is the asthma control test tool used acceptable for the patient's age? Yes>> Continue No>> Patient not included in numerator 6) Is the value of the control test equivalent to ""in control""? Yes>> Continue No>> Patient not included in numerator 7) During the measurement period, was the patient asked about any hospitalizations or emergency department visits due to asthma in the 12 months prior? Yes>>Continue No>> Patient not included in numerator

Submission items	5.1 Identified measures: 5a.1 Are specs completely harmonized? No 5a.2 If not completely harmonized, identify difference, rationale, impact: Our definition of identifiable asthma is more inclusive than, for example, NCQA's persistent asthma construct. We use similar medication definitions as NCQA, except we exclude leukotriene inhibitors from asthma-related medications because our expert panel felt that these medications were used frequently for allergy patients and judged that the small gain in sensitivity of identifying children (considering all criteria) would be less than the loss in sensitivity and likelihood to include non-asthmatic children with allergies. Our specifications have been validated by an expert panel in the context of a peer reviewed process commissioned by AHRQ and CMS to advance the field and science of pediatric quality measurement beyond the state represented in pre-existing measures. The specification of a person-time denominator allows for the measure to have a shorter requirement for continuous enrollment than other measures with less risk of bias than previous measures. 5b.1 If competing, why superior or rationale for additive value:	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:	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:
