Pulmonary and Critical Care Consensus Standards Endorsement Maintenance

ADDENDUM DRAFT TECHNICAL REPORT FOR REVIEW

November 1, 2012

NATIONAL QUALITY FORUM

Contents

Pulmonary and Critical Care Consensus Standards Endorsement Maintenance

ADDENDUM DRAFT TECHNICAL REPORT

Introduction

In the draft report, National Voluntary Consensus Standards: Pulmonary and Critical Care Endorsement Maintenance, three measures received comments prompting actions that required additional information from the developers and consideration by the Steering Committee. To accommodate these issues, primarily addressing harmonization and exclusions for planned readmissions, the Committee has reviewed the additional information and completed its evaluation of the measures. The final evaluations and recommendations are included in this addendum report.

Measure Evaluation Summary

Measures recommended

Measure not recommended

NOTE: The measure submission form can be accessed by clicking on the NQF measure number in the table below.

Measures Recommended

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

0506 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization

Status: Maintenance, Original Endorsement: Oct 28, 2008

Description: The measure estimates a hospital-level risk-standardized readmission rate (RSRR) defined as readmission for any cause within 30 days of the discharge date for the index hospitalization for patients discharged from the hospital with a principal diagnosis of pneumonia. The target population is patients 18 and over. CMS annually reports the measure for patients who are 65 years or older and are either enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are hospitalized in Veterans Health Administration (VA) facilities.

Since NQF-endorsement, the measure has been tested and shown to perform well in an all-payer population aged 18 and older and has been re-specified for this broader age group. The full details of the all-payer analysis and testing are attached.

Numerator Statement: The outcome for this measure is 30 day all-cause readmission. We define all-cause readmission as an inpatient admission for any cause within 30 days from the date of discharge from the index pneumonia admission. If a patient has one or more admissions (for any reason) within 30 days of the date of discharge of the index admission, only one was counted as a readmission. For the detailed definition of planned readmissions, please refer to the attached report, Respecifying the Hospital 30-Day Pneumonia and 30-Day Chronic Obstructive Pulmonary Disease Readmission Measures by adding a Planned Readmission Algorithm.

The numerator of the risk-adjusted ratio is the predicted number of readmissions within 30 days given the hospital's performance with its observed case mix. The term "predicted" describes the numerator result, which is calculated using the hospital-specific intercept term. (See details below in the 2a1.13 Statistical risk model and variables.)

Denominator Statement: The cohort includes admissions for patients 18 and over hospitalized for pneumonia. The measure is currently publicly reported by CMS for patients 65 years and older who are either enrolled in Medicare FFS and admitted to non-federal hospitals, or admitted to VA hospitals.
The measure includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia and with a complete claims history for the 12 months prior to admission.

Exclusions: The measure excludes admissions for patients:

For all cohorts, the measure excludes admissions for patients:

- with an in-hospital death (because they are not eligible for readmission);
- transferred to another acute care hospital (because the readmission is attributed to the hospital that discharges the patient to a non-acute setting);
- discharged against medical advice (AMA) (because providers did not have the opportunity to deliver full care and prepare the patient for discharge);
- admitted with pneumonia within 30 days of discharge from a qualifying index admission (Admissions within 30 days of discharge of an index admission will be considered readmissions. No admission is counted as a readmission and an index admission. The next eligible admission after the 30-day time period following an index admission will be considered another index admission.)

For Medicare FFS patients, the measure additionally excludes admissions for patients:

- without at least 30 days post-discharge enrollment in FFS Medicare (because the 30-day readmission outcome cannot be assessed in this group).

Adjustment/Stratification: 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 proposed measure employs a hierarchical logistic regression model to create a hospital level 30-day RSRR. In

brief, the approach simultaneously models two levels (patient and hospital) to account for the variance in patient outcomes within and between hospitals (Normand & Shahian, 2007). At the patient level, each model adjusts the log-odds of readmission within 30-days of discharge for age and selected clinical covariates. The second level models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission, after accounting for patient risk. See section 2a1.20. Calculation Algorithm/Measure Logic for more detail.

Candidate and Final Risk-adjustment Variables: Candidate variables were patient-level risk-adjustors that were expected to be predictive of readmission, based on empirical analysis, prior literature, and clinical judgment, including age and indicators of comorbidity and disease severity. For each patient, covariates are obtained from Medicare claims extending 12 months prior to and including 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. A file which contains a list of the ICD-9-CM codes and their groupings into CCs is available at http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier3&cid=1182785083979. 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 hospitalization, are included in the risk-adjustment. Hence, we do not risk adjust for CCs that may represent adverse events of care and that are only recorded in the index admission.

The final set of risk-adjustment variables is:

Demographics

Age-65 (years above 65, continuous)

Male

Comorbidities

History of coronary artery bypass graft (CABG) surgery

History of infection (CC 1, 3-6)

Septicemia/shock (CC 2)

Metastatic cancer and acute leukemia (CC7)

Lung, upper digestive tract, and other severe cancers (CC8)

Lymphatic, head and neck, brain, and other major cancers; breast, prostate, colorectal and other cancers and tumors (CC 9-10)

Diabetes mellitus (DM) and DM complications (CC 15-20, 119-120)

Protein-calorie malnutrition (CC 21)

Disorders of fluid/electrolyte/acid-base (CC 22-23)

Other gastrointestinal disorders (CC 36)

Severe hematological disorders (CC 44)

Iron deficiency and other/unspecified anemias and blood disease (CC 47)

Dementia and senility (CC 49-50)

Drug/alcohol abuse/dependence/psychosis (CC 51-53)

Major psychiatric disorders (CC 54-56)

Other psychiatric disorders (CC 60)

Hemiplegia, paraplegia, paralysis, functional disability (CC67-69, 100-102, 177-178)

Cardio-respiratory failure and shock (CC 79)

Congestive heart failure (CC 80)

Acute coronary syndrome (CC 81-82)

Chronic atherosclerosis (CC 83-84)

Valvular and rheumatic heart disease (CC 86)

Arrhythmias (CC 92-93)

Stroke (CC 95-96)

Vascular or circulatory disease (CC 104-106)

Chronic obstructive pulmonary disease (CC 108)

Fibrosis N/A

0506 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization

Level of Analysis: Facility

Type of Measure: Outcome

Data Source: Administrative claims

Measure Steward: Centers for Medicare & Medicaid Services **Other organizations:** MPR: Mathematica Policy Research; RTI-Research Triangle Institute

IMPLEMENTATION COMMENTS

- None of the ACCP QIC members use this measure at their institution and have never seen any data related to this measure. The QIC questions whether or not this measure sees widespread use.

Steering Committee Evaluations

Importance to Measure and Report (***based on decision logic***)**: Passed all three subcriteria**

1a. Impact: H-19; M-0; L-0; I-0; **1b. Performance Gap: H-13; M-5; L-0; I-1**

Rationale:

- Clear measure of quaity and companion to measure 0458 30-day mortality rate - both are needed.
- Current readmission rate is 18.2% for Medicare patients.

1c. Evidence (*based on decision logic*): **Y-19; N-0; I-0**

Rationale:

- Need with 0458 for optimal quality assessment.
- This is an outcome measure.

2. Scientific Acceptability of Measure Properties (***based on decision logic***)**: Passed reliability and validity.**

2a. Reliability: H-14; M-5; L-0; I-0; 2b. Validity: H-11; M-7; L-0; I-1

Rationale:

- Extensive risk-adjustment with 12 month look-back for risk factors.
- Newly tested risk model to include all payer data is appropriate, reliable, and valid for use for all patients admitted with pneumonia.
- Standardization of the age to 18 years and older aligns with most other adult measures.
- For younger patients a readmission is less likely to be related to the pneumonia admission, except for cystic fibrosis patients, but the numbers will be rare and random.
    - The developer noted that the measure performs better in the younger age group perhaps due to fewer comorbidities.
- CMS is now tracking patients who go in to observation and are not formally admitted to see if this impacts the measure. Data will be provided when made publicly available.

3. Usability: H-9; M-6; L-3; I-2

(*Meaningful, understandable, and useful to the intended audiences for 3a. Public Reporting and 3b. Quality Improvement)*

Rationale:

- This measure is publicly reported on Hospital Compare.

4. Feasibility: H-17; M-2; L-1; I-0

(4a. Clinical data generated during care process; 4b. Electronic data; 4c.Susceptibility to inaccuracies/ unintended consequences identified 4d. Data collection strategy can be implemented)

Rationale:

- Uses administrative data.

Steering Committee Assessment of Criteria Met/Suitable for Endorsement: Y-18; N-2

Rationale:

- Publicly reported outcome measure that has been in use for several years.

0506 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization

- The measure has been expanded beyond the Medicare population.

Public & Member Comment

Comments included:

- Concerns that the claims-based definition of pneumonia lacks sufficient validity and requests that the definition be updated to reflect coding trends, noting that this measure does not include patients with a primary diagnosis of sepsis or respiratory failure and a secondary diagnosis of pneumonia. A recent published study shows that hospital admissions with a primary diagnosis of pneumonia are declining over time, while at the same time admissions with a primary diagnosis of sepsis or respiratory failure and a secondary diagnosis of pneumonia are on the rise possibly due to the performance measure.

  Developer response: The recent paper by Dr. Lindenauer is useful and informative. CMS has an annual process to maintain and re-evaluate the measures and this process incorporates any important recent literature. The analyses in Dr. Lindenauer's paper suggest some additional cohort codes that could be incorporated into the measure in the future. Because the pneumonia mortality measure has been successfully used in public reporting for four years now and changes to the cohort will have an impact on hospitals and stakeholders, any potential changes must be undertaken with careful consideration. Dr. Lindenauer's paper was a patient-level analysis and our maintenance evaluation will need to take into account the implications for hospital results as well as the potential benefits and risks of changing the cohort definition.

- Request for data on the performance of the risk adjustment model for this measure. It is not clear how readmissions unrelated to the index admission are mitigated in this measure.

  Developer resposne: The NQF application includes substantial data on the performance of the risk-model. As to the question of "unrelated" readmissions, CMS recently developed the algorithm for identifying planned readmissions that is used in the hospital-wide readmission measure. CMS plans to adapt the algorithm for use in the COPD and pneumonia readmission measures. We will bring the updated algorithm and measure results back to the subsequent Steering Committee meeting.

- AHA submitted a letter which is posted on the NQF project page outlining concerns with the following issues:
  - Failure to adjust for factors beyond the hospital's control such as patient characteristics, extreme circumstances, patient compliance and quality of post-acute care.
  - Reliability – A recent CMS study required by the Accountable Care Act "shows the claims-based measures are unreliable." Additional reliability analyses are provided by KNG showing similar results.
  - Harmonization with the recently endorsed measure 1789: Hospital-wide all-cause readmission measure to exclude planned readmissions; harmonization of exclusions in the COPD measures compared to the pneumonia measures that include exclusions for discharged alive on day 0 or 1.
  - Exclusions for all Medicare patients in Hospice rather than just FFS Medicare patients enrolled in hospice.

  Developer response: Detailed responses to the AHA comments from the developer are posted on the NQF project page. CMS will provide additional information on including exclusions for planned readmissions by July 11 for the Committee to consider.

Steering Commitee Response:

- The Committee reviewed the extensive responses provided by the developer. The Committee indicated that the responses adequately addressed the issues raised by AHA.
- The Committee supports the plan of Yale/CMS to include the algorithm for planned readmissions in

0506 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization
measures 0506 and 1891 and looks forward to reviewing the additional data in the next few weeks. • In response to the comment, CMS/Yale requested additional time to work on harmonization of exclusions using a new algorithm for planned readmission for the all readmission measures, including pneumonia and COPD. **Steering Committee Review – October 16, 2012** • The Committee reviewed the additional information on the algorithm for planned readmissions submitted by Yale CORE. • The Committee agreed that the list of planned readmission exclusions were reasonable and noted the change in raw readmission rate was less than 1% and the minimal impact on the risk model. • The Committee unanimously maintained their recommendation for endorsement. **Steering Committee Reassessment of Criteria Met/Suitable for Endorsement: Y-14; N-0**
RECOMMEND FOR ENDORSEMENT

1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
Status: New Submission **Description:** The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as readmission for any cause within 30 days after the date of discharge of the index admission, for patients 18 and older discharged from the hospital with either a principal diagnosis of COPD or a principal diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. **Numerator Statement:** The outcome for this measure is 30-day all-cause readmission. We define all-cause readmission as an inpatient admissions for any cause within 30 days after the date of discharge from the index admission for patients 40 and older discharged from the hospital with either a principal diagnosis of COPD or a principal diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. If a patient has one or more admissions (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. **Denominator Statement:** This claims-based measure can be used in either of two patient cohorts: (1) patients aged 65 years or older or (2) patients aged 40 years or older. We have explicitly tested the measure in both age groups. The cohort includes admissions for patients discharged from the hospital with either a principal diagnosis of COPD (see codes below) OR a principal diagnosis of respiratory failure (see codes below) WITH a secondary discharge diagnosis of acute exacerbation of COPD (see codes below) and with a complete claims history for the 12 months prior to admission. **Exclusions:** An index admission is any eligible admission to an acute care hospital assessed in the measure for the outcome (readmitted within 30 days of the date of discharge from the initial admission). The measure excludes admissions for patients: • with an in hospital death (because they are not eligible for readmission). • transferred to another acute care facility (We assign the outcome for the acute episode of care to the hospital that discharges the patient to the non-acute care setting because the discharging hospital initiates the discharge and the transition to the outpatient setting. Therefore, the last admission in the acute care setting for the episode of care is eligible to be an index admission in the measure. The prior admissions in the same acute episode are excluded from the measure.) • who were discharged alive and against medical advice (AMA) (because providers did not have the opportunity to deliver full care and prepare the patient for discharge).

• without at least 30 days post-discharge claims data (because the 30-day readmission outcome cannot be assessed in this group).

Additionally, admissions that occur within 30 days of the discharge date of an earlier index admission are not themselves considered to be index admissions. Any COPD admission can only be an index admission or a readmission, but not both.

Of note, a patient may satisfy multiple exclusion criteria.

Adjustment/Stratification: 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"1.
The measure employs a hierarchical logistic regression model to create a hospital-level 30-day RSRR. This approach to modeling appropriately accounts for the structure of the data (patients clustered within hospitals), the underlying risk due to patients' comorbidities, and sample size at a given hospital when estimating hospital readmission rates. In brief, the approach simultaneously models two levels (patient and hospital) to account for the variance in patient outcomes within and between hospitals.2 At the patient level, the model adjusts the log-odds of readmission within 30 days of discharge for age and selected clinical covariates. The second level models hospital-specific intercepts as arising from a normal distribution. The hospital-specific intercepts represent the hospital contribution to the risk of readmission, after accounting for patient risk and sample size, and can be inferred as a measure of quality. The hospital-specific intercepts are given a distribution in order to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals.
The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case-mix to an average hospital's performance with the same case-mix. Thus, a lower ratio indicates lower-than-expected readmission or better quality and a higher ratio indicates higher-than-expected readmission or worse quality.
The predicted hospital outcome (the numerator) is the sum of predicted probabilities of readmission for all patients at a particular hospital. The predicted probability of each patient in that hospital is calculated using the hospital-specific intercept and patient risk factors. The expected number of readmissions (the denominator) is the sum of expected probabilities of readmission for all patients at a hospital. The expected probability of each patient in a hospital is calculated using a common intercept and patient risk factors.
Candidate and Final Risk-adjustment Variables: The measure was developed using Medicare FFS claims data. Candidate variables were patient-level risk-adjustors that were expected to be predictive of readmission, based on empirical analysis, prior literature, and clinical judgment, including age and indicators of comorbidity and disease severity. For each patient, covariates are obtained from Medicare claims extending 12 months prior to and including the index admission. The model adjusts for case mix differences based on the clinical status of patients at the time of admission. We used condition categories (CCs), which are clinically meaningful groupings of more than 15,000 ICD-9-CM diagnosis codes, and combinations of CCs as candidate variables. A file which contains a list of the ICD-9-CM codes and their groupings into CCs is available on www.qualitynet.org (http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier3&cid=1182785083979). We did not risk-adjust for CCs that were possible adverse events of care and that were only recorded in the index admission. Only comorbidities that conveyed information about the patient at that time or in the 12 months prior, and not complications that arose during the course of the hospitalization were included in the risk-adjustment.
References:
1. Krumholz HM, Brindis RG, Brush JE, et al. 2006. Standards for Statistical Models Used for Public Reporting of

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

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.
2. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22 (2): 206-226.
Frequencies and odds ratios for the model development sample (2008 Medicare FFS patients aged 65 and older; n=170,480 admissions) are presented below.
Table 1: Final set of risk-adjustment variables:
Variable//Frequency (%)//Odds Ratio (95% confidence interval)
Demographic
• Age-65 (years above 65, continuous) for 65 and over cohorts/Frequency = -/OR (95% CI)=1.00 (1.00-1.00); (this variable is Age (years, continuous) for 18 and over cohorts)
Cardiovascular/Respiratory
• Sleep Apnea (ICD-9 CM diagnosis codes: 327.20, 327.21, 327.23, 327.27, 327.29, 780.51, 780.53, 780.57) / Frequency=10.46% / OR (95% CI)=1.00 (0.96-1.03)
• History of mechanical ventilation (ICD-9 procedure codes: 93.90, 96.70, 96.71, 96.72)/ Frequency=7.33/ OR (95% CI)=1.13 (1.08-1.18)
• Respirator dependence/respiratory failure (CC 77-78)/ Frequency=1.38/ OR (95% CI)=1.12 (1.03-1.23)
• Cardio-respiratory failure and shock (CC 79)/ Frequency=29.84/ OR (95% CI)=1.21 (1.18-1.24)
• Congestive heart failure (CC 80)/ Frequency=43.86/ OR (95% CI)=1.21 (1.18-1.24)
• Chronic atherosclerosis (CC 83-84)/ Frequency=51.57/ OR (95% CI)=1.11 (1.08-1.13)
• Arrhythmias (CC 92-93)/ Frequency=37.2/ OR (95% CI)=1.17 (1.12-1.22)
• Vascular or circulatory disease (CC 104-106)/ Frequency=38.2/ OR (95% CI)=1.09 (1.05-1.14)
• Arrhythmias (CC 92-93)/ Frequency=38.48/ OR (95% CI)=1.14 (1.11-1.17)
• Other and Unspecified Heart Disease (CC 94)/ Frequency=19.45/ OR (95% CI)=1.08 (1.05-1.11)
• Vascular or Circulatory Disease (CC 104-106)/ Frequency=39.42/ OR (95% CI)=1.09 (1.06-1.11)
• Fibrosis of lung and other chronic lung disorder (CC 109)/ Frequency=18.12/ OR (95% CI)=1.09 (1.06-1.12)
• Pneumonia (CC 111-113)/ Frequency=51.51/ OR (95% CI)=1.10 (1.07-1.13)
Other Comorbid Conditions
• History of Infection (CC 1, 3-6)/ Frequency=32.16/ OR (95% CI)=1.08 (1.05-1.11)
• Metastatic cancer and acute leukemia (CC 7)/ Frequency=2.64/ OR (95% CI)=1.24 (1.15-1.33)
• Lung, upper digestive tract, and other severe cancers (CC 8)/ Frequency=5.91/ OR (95% CI)=1.19 (1.13-1.25)
• Lymphatic, head and neck, brain, and other major cancers; breast, prostate, colorectal and other cancers and tumors; other respiratory and heart neoplasms (CC 9-11)/ Frequency=13.88/ OR (95% CI)=1.04 (1.01-1.08)
• Other digestive and urinary neoplasms (CC 12)/ Frequency=7.06/ OR (95% CI)=0.96 (0.92-1.01)
• Diabetes and DM complications (CC 15-20, 119-120)/ Frequency=39.15/ OR (95% CI)=1.08 (1.05-1.11)
• Protein-calorie malnutrition (CC 21)/ Frequency=7.57/ OR (95% CI)=1.14 (1.09-1.19)
• Disorders of Fluid/Electrolyte/Acid-Base (CC 22-23)/ Frequency=34.57/ OR (95% CI)=1.17 (1.14-1.20)
• Other Endocrine/Metabolic/Nutritional Disorders (CC 24)/ Frequency=68.61/ OR (95% CI)=0.91 (0.89-0.94)
• Pancreatic Disease (CC 32)/ Frequency=4.85/ OR (95% CI)=1.12 (1.06-1.17)
• Peptic Ulcer, Hemorrhage, Other Specified Gastrointestinal Disorders (CC 34)/ Frequency=12.58/ OR (95% CI)=1.07 (1.03-1.11)
• Other Gastrointestinal Disorders (CC 36)/ Frequency=58.29/ OR (95% CI)=1.04 (1.02-1.07)
• Severe Hematological Disorders (CC44)/ Frequency=2.07 /OR (95% CI)=1.12 (1.04-1.20)
• Iron Deficiency and Other/Unspecified Anemias and Blood Disease (CC 47)/ Frequency=42.09/ OR (95% CI)=1.13 (1.10-1.16)
• Dementia and senility (CC 49-50)/ Frequency=17.07 /OR (95% CI)=1.00 (0.97-1.04)
• Drug/Alcohol Induced Dependence/Psychosis (CC 51-52)/ Frequency=3.67/ OR (95% CI)=1.15 (1.09-1.22)
• Major Psych Disorders (CC 54-56)/ Frequency=10.79/ OR (95% CI)=1.08 (1.04-1.12)
• Depression (CC 58)/ Frequency=19.63/ OR (95% CI)=1.06 (1.03-1.09)

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

• Anxiety Disorders (CC 59)/ Frequency=3.27/ OR (95% CI)=1.15 (1.08-1.22)
• Other Psychiatric Disorders (CC 60)/ Frequency=18.37/ OR (95% CI)=1.11 (1.08-1.15)
• Quadriplegia, paraplegia, functional disability (CC 67-69, 100-102, 177-178)/ Frequency=5.02/ OR (95% CI)=1.08 (1.02-1.13)
• Polyneuropathy (CC 71)/ Frequency=7.91/ OR (95% CI)=1.11 (1.06-1.16)
• Acute Coronary Syndrome (CC 81-82)/ Frequency=9.54/ OR (95% CI)=1.08 (1.04-1.12)
• Hypertensive Heart and Renal Disease or Encephalopathy (CC 89)/ Frequency=13.20/ OR (95% CI)=1.13 (1.09-1.17)
• Stroke (CC 95-96)/ Frequency=6.84/ OR (95% CI)=1.04 (1.00-1.09)
• Renal Failure (CC 131)/ Frequency=18.61/ OR (95% CI)=1.10 (1.06-1.14)
• Decubitus ulcer or chronic skin ulcer (CC 148-149)/ Frequency=7.43/ OR (95% CI)=1.03 (0.99-1.08)
• Cellulitis, Local Skin Infection (CC 152)/ Frequency=12.50/ OR (95% CI)=1.07 (1.03-1.11)
• Vertebral Fractures (CC 157)/ Frequency=5.24/ OR (95% CI)=1.14 (1.08 -1.19)
ICD-10-CM codes for model variables (for those variables defined by ICD-9 CM codes rather than CCs)
Mechanical Ventilation
• 5A09357 Assistance with Respiratory Ventilation, Less than 24 Consecutive Hours, Continuous Positive Airway Pressure
• 5A09457 Assistance with Respiratory Ventilation, 24-96 Consecutive Hours, Continuous Positive Airway Pressure
• 5A09557 Assistance with Respiratory Ventilation, Greater than 96 Consecutive Hours, Continuous Positive Airway Pressure
• 5A1935Z Respiratory Ventilation, Less than 24 Consecutive Hours
• 5A1945Z Respiratory Ventilation, 24-96 Consecutive Hours
•5A1955Z Respiratory Ventilation, Greater than 96 Consecutive Hours
Sleep Apnea
• G4730 Sleep apnea, unspecified
• G4731 Primary central sleep apnea
• G4733 Obstructive sleep apnea (adult) (pediatric)
• G4737 Central sleep apnea in conditions classified elsewhere
• G4739 Other sleep apnea Results of this measure will not be stratified.

Level of Analysis: Facility

Type of Measure: Outcome

Data Source: Administrative claims

Measure Steward: Centers for Medicare & Medicaid Services (CMS) **Other organizations:** MPR: Mathematica Policy Research; RTI: Research Triangle Institute

Steering Committee Evaluations

Importance to Measure and Report (***based on decision logic***)**: PASSED all three sub-criteria**

1a. Impact: H-17; M-1; L-0; I-0; **1b. Performance Gap: H-15; M-3; L-0; I-0**

Rationale:

- COPD is a leading cause of readmissions to the hospital.
- 1a: The developer presented data demonstrating significant poor outcomes (readmissions) and high cost.
- 1b: The submission describes the 30-day readmission rate among patients hospitalized for COPD is 22.6%, accounting for 4% of all 30-day readmissions. Analysis of Medicare FFS patients, crude readmission rates of a national sample of 176,481 patients across 4,547 hospitals demonstrates that hospital readmission rates for COPD patients are generally high, at a mean of 21.8%, and that there is a large amount of variation in outcomes, with the rates ranging from 10.8-32.6% (5th and 95th percentiles

respectively).

1c. Evidence (*based on decision logic*): **Y-18; N-1; I-0**

Rationale:

- This is an outcome measure.
- Strong evidence base exists for interventions to improve outcomes such as readmission rates.

2. Scientific Acceptability of Measure Properties (***based on decision logic***)**: PASSED reliability and validity**

2a. Reliability: H-15; M-4; L-0; I-0; 2b. Validity: H-3; M-10; L-5; I-1

Rationale:

- 2a: Measure specifications are clear and consistent and can be reliably measured.
  - 30 days begins at discharge from acute care regardless of whether patient goes to a LTAC, SNF or rehabilitation facility.
- 2b: Risk adjustment methodology is robust.
  - Individual risk factors should include rate of previous exacerbations and active smoking status if available. Institutional risk "factors" should include regional long term particle pollution levels and if individual active smoking rates are not available, regional smoking rates. All are known to contribute to exacrbations of COPD.
  - Concerns about risk adjustment for patients who had exacerbations and were ventilated but not for patients with previous admissions with exacerbations.
  - The numbers of patients with COPD diagnosis between 18-40 years is very small.
  - Multiple readmissions within the 30-day window only count once.
  - A patient may be counted more than once if they have multiple admissions during the year.

3. Usability: H-7; M-11; L-1; I-0

(*Meaningful, understandable, and useful to the intended audiences for 3a. Public Reporting and 3b. Quality Improvement)*

Rationale:

- 3a-3b: Similar measures have been used for other clinical conditions (e.g., AMI, HF, PN) and have been demonstrated to support both public reporting and quality improvement
- Measure was recently tested and expanded to include those beyond the Medicare population (18 years and above).
- CMS is monitoring observation stays to assess whether use of the readmission measure would incentivize hospitals potentially to increase their use of observation stays in lieu of admitting patients who come back to the hospital within the 30-day time frame.
- The measure publicly reported by CMS rolls up 3 years of data so the results are not timely which hampers quality improvement activities.

4. Feasibility: H-14; M-5; L-0; I-0

(4a. Clinical data generated during care process; 4b. Electronic data; 4c.Susceptibility to inaccuracies/ unintended consequences identified 4d. Data collection strategy can be implemented)

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

Rationale:

- The measure is based on adminstrative data.

Steering Committee Assessment of Criteria Met/Suitable for Endorsement: Y-17; N-2

Rationale:

- Outcome measure.
- Variation in outcomes demonstrate opportunity for improvement.
- Unknown impact of local air quality should be explored for possible impact on the measure results.

Additional Comments/Questions:

- The Committee requested a commitment from CMS to explore the possible effect of differences in air quality at hospital locations on the results of the measures for 30-day Mortality and 30-day Readmissions for COPD.
- The Committee requested additional information about the 18-40 year population.

Measure Developer Response:

CMS appreciates the Committee members' suggestion that we consider adjusting the COPD measures for ambient particulate levels using monitoring data available from the US Environmental Protection Agency (EPA). We asked the measure developer, YNHHSC/CORE, to conduct a brief literature review and consult with 2-3 experts to explore this suggestion. YNHHSC/CORE found that, as noted by the Committee, the literature suggests that ambient levels of particulate matter affect short-term mortality and admission rates for COPD (and for other cardiovascular and respiratory conditions). EPA considered these effects in its most recent revision to its health-based national ambient air quality standard for particulates. Although important from a public health standpoint, these increases are relatively small. YNHHSC/CORE did not find any studies of the effect of ambient particulates on mortality and readmission rates among hospitalized patients for COPD.

The purpose of risk adjustment is to account for differences across hospitals in factors unrelated to quality, such as patient comorbidities, that may affect the outcome of mortality and readmission. It is important to risk adjust for factors that could bias the measure results (e.g. could favor hospitals in low pollution areas). Adjusting for particulates would make sense if it were technically feasible and if it would improve the model by reducing or eliminating a potential bias.

Based on its review, YNHHSC/CORE does not recommend adding a PM variable as it is unlikely to affect hospital-level risk-standardized rates. The studies to date focus on the general non-hospitalized population, and it is not clear how they apply to the patients in our models – that is, patients hospitalized with an acute exacerbation of COPD. YNHHSC/CORE reported that the experts felt the effect of adjusting for PM would likely be small or negligible given that the model applies to patients already hospitalized for COPD. Second, there are feasibility issues. Modeling the effect appropriately would be complex. YNHHSC/CORE's preliminary review of the issues suggests it would be inappropriate to use ambient air quality levels as a risk adjuster without also adjusting for other factors that affect the strength and direction of the potential association between particulate levels and the outcomes, including temperature, humidity, seasonal variation, and city-level factors such as smoking and air conditioning use rates. Given these challenges, and our expectation that building particulate levels into the model is not likely to significantly improve the models' performance even with the best methods, CMS does not plan to pursue adding air pollution variables to the models at this time.

Public & Member Comment

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

Comments included:

- Concerns about the reliably and validly of the ICD-9-CM coding used to identify the intended target population.

  Developer response: In the development of the COPD measures we followed a careful process aimed at selecting a cohort that is both clinically coherent and comprehensive. The cohort codes were informed by a thorough literature review and a review of codes used for other COPD measures. They have also been reviewed by both a working group of experts knowledgeable about ICD-9 coding for the COPD population and a national Technical Expert Panel. This group, for example, made the decision to include patients with primary discharge diagnosis codes of respiratory failure and secondary codes for COPD in order to increase the sensitivity of case selection. Finally, a study by Brian Stein et al, published in Chest 2012 suggests that a set of ICD-9 codes similar to the ones we used to define the cohort has high positive predictive value. The commenter also refers to the medical record validation process used in prior CMS measures (e.g. pneumonia mortality and readmission). Previously, CMS has undergone medical record validation to confirm the adequacy of administrative codes for risk-adjustment but not to assess cohort selection. The selection of the appropriate codes for identifying the cohort is based on face validity and review of experts with knowledge of coding practices. CMS has a process for yearly maintenance of the measures, at which time the cohort codes will be reassessed to evaluate any need for changes or updates.
- Suggest measure 1891 only be reported as a paired measure along with 1893 in order to more accurately reflect both outcomes of interest, the overall quality of care provided, and to enhance usability.

  Developer response: CMS agrees that they are complementary and that reporting both measures provides a fuller picture of care; however, CMS has submitted the measures to NQF as independent measures. CMS will consider this preference in its approach to implementation.
- AHA submitted a letter which is posted on the NQF project page outlining concerns with the following issues:
  - Failure to adjust for factors beyond the hospital's control such as patient characteristics, extreme circumstances, patient compliance and quality of post-acute care.
  - Reliability – A recent CMS study required by the Accountable Care Act "shows the claims-based measures are unreliable." Additional reliability analyses are provided by KNG showing similar results.
  - Harmonization with the recently endorsed measure 1789: Hospital-wide all-cause readmission measure to exclude planned readmissions; harmonization of exclusions in the COPD measures compared to the pneumonia measures that include exclusions for discharged alive on day 0 or 1.
  - Exclusions for all Medicare patients in Hospice rather than just FFS Medicare patients enrolled in hospice.

  Developer response: Detailed responses to the AHA comments from the developer are posted on the NQF project page addressing all four issues. CMS will provide additional information on including exclusions for planned readmissions by July 11 for the Committee to consider.
- CMS/Yale advised the Committee that, in response by a recommendation from this Committee, the age range for measures 1891 and 1893 was changed to 40 years and above. The developers note that COPD is rare in the less than 40 age group (1.5% of patients in our 2006 California all payer dataset), and a diagnosis at younger ages is likely to represent the misclassification of patients with asthma or other pulmonary conditions. This approach is commonly used in the research literature.

Steering Commitee response:

1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
• The Committee agrees with the change in age to 40 and above for measures 1891 and 1893. • The Committee reviewed the extensive responses provided by the developer. The Committee indicated that the responses adequately addressed the issues raised by AHA. • The Committee supports the plan of Yale/CMS to include the algorithm for planned readmissions in measures 0506 and 1891 and looks forward to reviewing the additional data in the next few weeks. • In response to the comment, CMS/Yale requested additional time to work on harmonization of exclusions using a new algorithm for planned readmission for the all readmission measures, including pneumonia and COPD. **Additional Steering Committee Review – October 16, 2012** • The Committee reviewed the additional information on the algorithm for planned readmissions provided by Yale CORE. • The Committee agreed that the list of planned readmission exclusions were reasonable and noted the change in raw readmission rate was less than 1% and the minimal impact on the risk model. • The Committee unanimously maintained their recommendation for endorsement. **Steering Committee Reassessment of Criteria Met/Suitable for Endorsement: Y-14; N-0**
RECOMMEND FOR ENDORSEMENT

Measure Not Recommended

0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival

Status: Maintenance, Original Endorsement: May 15, 2008

Description: Percent of pneumonia patients, age 18 years or older, transferred or admitted to the ICU within 24 hours of hospital arrival who had blood cultures performed within 24 hours prior to or 24 hours after arrival at the hospital.

Numerator Statement: Number of pneumonia patients transferred or admitted to the ICU within 24 hours of hospital arrival who had blood cultures performed within 24 hours prior to or 24 hours after arrival at the hospital

Denominator Statement: Patients, age 18 years or older, discharged with: ICD-9-CM principal diagnosis code of pneumonia OR ICD-9-CM principal diagnosis code of septicemia or respiratory failure (acute or chronic) AND an ICD-9-CM Other diagnosis code of pneumonia
Table 3.1 Pneumonia (PN)
ICD-9 Code Shortened Description
481 PNEUMOCOCCAL PNEUMONIA
482.0 K. PNEUMONIAE PNEUMONIA
482.1 PSEUDOMONAL PNEUMONIA
482.2 H.INFLUENZAE PNEUMONIA
482.30 STREPTOCOCCAL PNEUMN NOS
482.31 PNEUMONIA STRPTOCOCCUS A
482.32 PNEUMONIA STRPTOCOCCUS B
482.39 PNEUMONIA OTH STREP
482.40 STAPHYLOCOCCAL PNEU NOS
482.41 METH SUS PNEUM D/T STAPH
482.42 METH RES PNEU D/T STAPH
482.49 STAPH PNEUMONIA NEC
482.82 PNEUMONIA E COLI
482.83 PNEUMO OTH GRM-NEG BACT
482.84 LEGIONNAIRES´ DISEASE
482.89 PNEUMONIA OTH SPCF BACT
482.9 BACTERIAL PNEUMONIA NOS
483.0 PNEU MYCPLSM PNEUMONIAE
483.1 PNEUMONIA D/T CHLAMYDIA
483.8 PNEUMON OTH SPEC ORGNSM
485 BRONCHOPNEUMONIA ORG NOS
486 PNEUMONIA, ORGANISM NOS
Table 3.2 Septicemia
ICD-9 Code Shortened Description
038.0 STREPTOCOCCAL SEPTICEMIA
038.10 STAPHYLCOCC SEPTICEM NOS
038.11 METH SUSC STAPH AUR SEPT
038.12 MRSA SEPTICEMIA
038.19 STAPHYLCOCC SEPTICEM NEC
038.2 PNEUMOCOCCAL SEPTICEMIA
038.3 ANAEROBIC SEPTICEMIA
038.40 GRAM-NEG SEPTICEMIA NOS
038.41 H. INFLUENAE SEPTICEMIA
038.42 E COLI SEPTICEMIA
038.43 PSEUDOMONAS SEPTICEMIA
038.44 SERRATIA SEPTICEMIA

0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
038.49 GRAM-NEG SEPTICEMIA NEC
038.8 SEPTICEMIA NEC
038.9 SEPTICEMIA NOS
995.91 SEPSIS
995.92 SEVERE SEPSIS
Table 3.3 Respiratory Failure
ICD-9 Code Shortened Description
518.81 ACUTE RESPIRATRY FAILURE
518.84 ACUTE & CHRONC RESP FAIL
Table 3.1 Pneumonia (PN)
ICD-10 Code Shortened Description
J 13 Pneumonia due to Streptococcus pneumoniae
J 18.1 Lobar pneumonia, unspecified organism
J 15.0 Pneumonia due to Klebsiella pneumoniae
J 15.1 Pneumonia due to Pseudomonas
J 14 Pneumonia due to Hemophilus influenzae
J 15.4 Pneumonia due to other streptococci
J 15.3 Pneumonia due to streptococcus, group B
J 15.20 Pneumonia due to staphylococcus, unspecified
J 15.21 Pneumonia due to staphylococcus aureus
Z 16 Infection and drug resistant microorganisms
J 15.29 Pneumonia due to other staphylococcus
J 15.5 Pneumonia due to Escherichia coli
J 15.6 Pneumonia due to other aerobic Gram-negative bacteria
A 48.1 Legionnaires' disease
J 15.8 Pneumonia due to other specified bacteria
J 15.9 Unspecified bacterial pneumonia
J 15.7 Pneumonia due to Mycoplasma pneumoniae
J 16.0 Chlamydial pneumonia
J 16.8 Pneumonia due to other specified infectious organisms
J 18.0 Bronchopneumonia, unspecified organism
J 18.8 Other pneumonia, unspecified organism
J 18.9 Pneumonia, unspecified organism
J 17 Pneumonia in diseases classified elsewhere
J 18.2 Hypostatic pneumonia, unspecified organism
J 85.1 Abscess of lung with pneumonia
Table 3.2 Septicemia
ICD-10 Code Shortened Description
A 40.0 Sepsis due to streptococcus, group A
A 40.1 Sepsis due to streptococcus, group B
A 40.3 Sepsis due to Streptococcus pneumoniae
A 40.8 Other streptococcal sepsis
A 40.9 Streptococcal sepsis, unspecified
A 41.9 Sepsis unspecified
A 41.2 Sepsis due to other unspecified specified staphylococcus
A 41.0 Sepsis due to Staphylococcus aureus
A 41.0 AND U80.1 Sepsis due to Staphylococcus aureus AND Methicillin-resistant staph aureus infection
A 41.1 Sepsis due to other specified staphylococcus
A 41.89 Other specified sepsis
A 41.4 Sepsis due to anaerobes

0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival

A 41.50 Gram-negative sepsis, unspecified
A 41.3 Sepsis due to Hemophilus influenzae
A 41.51 Sepsis due to Escherichia coli (E coli)
A 41.52 Sepsis due to pseudomonas
A 41.53 Sepsis due to Serratia
A 41.59 Other Gram-negative sepsis
A 41.81 Sepsis due to Enterococcus
A 42.7 Actinomycotic sepsis
A 41.9 Sepsis, unspecified
R65.20 Severe sepsis without septic shock
R65.21 Severe sepsis with septic shock
Table 3.3 Respiratory Failure
ICD-10 Code Shortened Description
J 96.0 Acute respiratory failure
J 96.9 Respiratory failure, unspecified
J 96.2 Acute and chronic respiratory failure
J 96.1 Chronic respiratory failure
J 80 Acute respiratory syndrome
J 22 Unspecified acute lower respiratory infection
J 98.8 Other specified respiratory disorders

Exclusions: Patients less than 18 years of age,

Patients with a length of stay greater than 120 days,

Patients with Cystic Fibrosis,

Patients who had not chest x-ray or CT scan that indicated abnormal findings within 24 hours prior to hospital arrival or anytime during this hospitalization,

Patients with Comfort Measures Only,

Patients enrolled in clinical trial,

Patients received as a transfer from emergency/observation department of another hospital,

Patients received as a transfer from an inpatient or outpatient department of another hospital,

Patients received as a transfer from an ambulatory surgery center,

Patients who had no diagnosis of pneumonia either as an ED final diagnosis/impression or direct admission diagnosis/impression and

Patients who have a duration of stay less than or equal to one day

Adjustment/Stratification: No risk adjustment or risk stratification N/A This measure is not stratified.

Level of Analysis: Facility, Population : National, Population : Regional, Population : State

Type of Measure: Process

Data Source: Administrative claims, Paper Records

Measure Steward: Centers for Medicare & Medicaid Services **Other organizations:** The Joint Commission, Centers for Disease Control and Prevention, Infectious Diseases Society of America, American Thoracic Society, Johns Hopkins University, Northeastern Ohio Univ. College of Medicine, Pneumonia Patient Outcomes Team, New Jersey Medical

IMPLEMENTATION COMMENTS

- APIC does not approve measure 0356. As outlined with our comment on measure 0148, we recommend NQF engage IDSA/ATS and other societies that represent intensivists on the value of use of this measure to assess and compare provider performance in relationship to timing. We agree that samples of blood

and sputum for culture and urinary antigen testing are clear-cut for those with severe CAP who need critical care. We're not as sure of use of the timing of such testing for performance measurement.

- Developer response: The performance measure simply asks whether a blood culture was obtained within 24 hours of hospital arrival for those patients who are admitted to the ICU within 24 hours of hospital arrival. This is consistent with recommendations from the IDSA/ATS 2007 guidelines for management of community-acquired pneumonia (see Table 5) that recommend routine blood cultures in ICU-admitted pneumonia patients. There are representatives of both the IDSA and ATS that participate on the technical expert panel that developed this performance measure.

- None of the ACCP QIC members use this measure at their institution and have never seen any data related to this measure. The QIC questions whether or not this measure sees widespread use.
  - Developer response: First Quarter of 2011, 3,152 hospitals reported this measure. The quarterly national rates and benchmarks for PN-3a are publicly available as a downloadable Excel of PDF files at the bottom of this CMS webpage: http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier2&cid=1228768205297

Steering Committee Evaluations

Importance to Measure and Report (***based on decision logic***)**: Passed all three subcriteria**

1a. Impact: H-16; M-3; L-0; I-0; **1b. Performance Gap: H-8; M-10; L-1; I-0**

Rationale:

- The impact and need for improvement in compliance is well documented in the Hospital Inpatient Quality Reporting Program.
- The performance indicates that a blood culture is performed 96.9% of the time on ICU patients.
- Data on disparities indicate variation across all demographic groups that could be reduced. The Steering Committee discussed the potential of the measure being topped out, but noted that if CMS determines a measure is topped out they do not include it in the Value Based Purchasing Program.

1c. Evidence (*based on decision logic*): **Y-18; N-1; I-0**

Rationale:

The joint guidelines by the Infectious Disease Society of America (IDSA) and American Thoracic Society (ATS) state "Pretreatment blood samples for culture and an expectorated sputum sample for stain and culture should be obtained from hospitalized patients with clinical indications listed on Table 5 (ICU is listed) but are optimal for patients without these conditions." Additionally, the quantity and quality of evidence is recent and reported in large datasets, consistent across reported outcomes. Taken together, the metric reflects scientific evidence and the opinion within the field.

2. Scientific Acceptability of Measure Properties (***based on decision logic***)**: Passed both subcriteria**

2a. Reliability: H-15; M-4; L-0; I-0; 2b. Validity: H-17; M-1; L-0; I-1

Rationale:

- The measure is precisely specified and targeted to a high risk population of patients transfered into the ICU for pneumonia.
- Challenges will always exist with administrative data but routine use for many years has likely decreased the variation in collection of the data.

0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival

3. Usability: H-16; M-3; L-0; I-0

(*Meaningful, understandable, and useful to the intended audiences for 3a. Public Reporting and 3b. Quality Improvement)*

Rationale:

- The measure has been nationally reported as part of the CMS performance measure set for the Hospital Inpatient Quality Reporting Program since 2002; however, it is not publicly reported.
- The national rate of this measure has been reported on a quarterly basis.
- It is also used by The Joint Commission for acceditation.

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

(4a. Clinical data generated during care process; 4b. Electronic data; 4c.Susceptibility to inaccuracies/ unintended consequences identified 4d. Data collection strategy can be implemented)

Rationale:

- The specificatins are modified every 6 months according to feedback from hosptial staff and clinicians.

Steering Committee Assessment of Criteria Met/Suitable for Endorsement: Y-19; N-0

Rationale:

- This measure has been widely reported and is in use by several sources.
- It has been proven to have a direct impact on patient care and is consistent with IDSA/ATS guidelines

Additional Comments/Questions:

- The Steering Committee requested that the title be further specified to state that it focuses on "pneumonia patients".

Public & Member Comment

Comments included:

- Lack of support for this measure from ACIP, SCCM and ACEP. Comments included the lack of high level evidence that this process measure is directly linked to improved patient outcomes for pneumonia patients; concerns the measure does not state that blood cultures should be obtained before the initiation of treatment; and the measure may create an unnecessary distraction from the delivery of more important care that needs to be delivered in the ED or ICU settings for not supporting this measure.

Developer response:

- Patients who are admitted to the ICU because of pneumonia are more likely to have positive blood cultures that reflect true pathogens. The performance measure does not require that all emergency department patients with pneumonia have a blood culture performed. But, if the patient is sick enough to require admission to the ICU and the reason for transfer to the ICU is pneumonia (both requirements for the denominator of this measure), a blood culture is more likely to provide information that will support pathogen-directed therapy. The IDSA/ATS guidelines for community-acquired pneumonia do recommend the performance of blood cultures for all patients who require admission to the ICU. Many of these patients are initially treated in the emergency department and subsequently require transfer to the ICU for their pneumonia because of clinical deterioration and these patients are included in the denominator of the performance measure to do blood cultures on ICU-admitted pneumonia patients.

Steering Commitee response:

- After reviewing the comments received on this measure, particularly the lack of support from APIC, SCCM and ACEP, the Committee changed their recommendation of this measure to "do not recommend" (Yes-5; No-10) due to not meeting the evidence criterion. In response to the second

0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
vote, the developer offered additional justification for this measure that was not previously presented to the Committee pertaining to antibiotic stewardship and that the measure focuses on a small group of critically ill patients admitted to the ICU. Additionally, staff has requested input from the guideline developer, IDSA, as well as offered the three organizations that commented against the measure to expand on their rationale for not supporting the measure. **Additional Steering Committee Review – October 16, 2012:** • The Committee reviewed the additional information submitted by the developer addressing issues of antibiotic stewardship and the focus of this measure on the highest risk patients. • The Committee reviewed the comments submitted by the three organizations that did not support the measure and again considered the evidence for blood cultures in patients with pneumonia. Committee members concluded that the arguments from the three organization on lack of evidence have merit and agreed that the evidence is not sufficient to meet the importance criterion. The Committee also agreed not to make an exception to the evidence criteria. **Steering Committee Reassessment of Importance Criteria Met/Suitable for Endorsement: Y-4; N-10**
DO NOT RECOMMEND FOR ENDORSEMENT

Appendix A: Measure Specifications

	0506 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization
Status	Maintenance, Original Endorsement: Oct 28, 2008, Most Recent Endorsement: Oct 28, 2008 Time-limited
Steward	Centers for Medicare and Medicaid Services Other organizations: MPR: Mathematica Policy Research; RTI-Research Triangle Institute
Description	The measure estimates a hospital-level risk-standardized readmission rate (RSRR) defined as unplanned readmissions for any cause within 30 days of the discharge date for the index hospitalization for patients discharged from the hospital with a principal diagnosis of pneumonia. The target population is patients 18 and over. CMS annually reports the measure for patients who are 65 years or older and are either enrolled in fee-for-service (FFS) Medicare and hospitalized in non-federal hospitals or are hospitalized in Veterans Health Administration (VA) facilities. Since NQF-endorsement, the measure has been tested and shown to perform well in an all-payer population aged 18 and older and has been re-specified for this broader age group. The full details of the all-payer analysis and testing are attached.
Type	Outcome
Data Source	Administrative claims Data sources for the FFS measure: 1. Medicare Part A inpatient and Part B outpatient claims: This database contains claims data for fee-for service inpatient and outpatient services including: Medicare inpatient hospital care, outpatient hospital services, skilled nursing facility care, some home health agency services, as well as inpatient and outpatient 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 dataset 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 Fisher et al., 1992). The measure was originally developed with claims data from a 2006 sample of 226,545 cases from 4,675 hospitals. We have maintained and re-evaluated the models each year since public reporting of the measure began in 2009. 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. Data sources for the all-payer update For our analyses, we used all-payer data from California in addition to CMS data for Medicare FFS 65+ patients 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 2006, there were approximately 3 million adult discharges from more than 450 non-Federal acute care hospitals.

	0506 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization
	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 publicly reported measures can be applied to all adult patients, including not only FFS Medicare patients aged 65+ but also non-FFS Medicare patients aged 65+ and younger patients aged 18-64 years at the time of admission. Attachment 508 compliant pneumonia ICD-10 map-634623950487720270.pdf URL Condition Category/ICD-9 Code Map available at: (http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier3&cid=1182785083979) See attached ICD-9 to ICD-10 crosswalk
Level	Facility
Setting	Hospital/Acute Care Facility
Numerator Statement	The outcome for this measure is 30 day all-cause readmission. We define all-cause readmission as an inpatient admission for any cause, with the exception of planned readmissions, within 30 days from the date of discharge from the index pneumonia admission. If a patient has one or more admissions (for any reason) within 30 days of the date of discharge of the index admission, only one was counted as a readmission. For the detailed definition of planned readmissions, please refer to the attached report, Respecifying the Hospital 30-Day Pneumonia and 30-Day Chronic Obstructive Pulmonary Disease Readmission Measures by adding a Planned Readmission Algorithm. The numerator of the risk-adjusted ratio is the predicted number of readmissions within 30 days given the hospital's performance with its observed case mix. The term "predicted" describes the numerator result, which is calculated using the hospital-specific intercept term. (See details below in the 2a1.13 Statistical risk model and variables.)
Numerator Details	Time Window: We define this as readmission for any cause within 30 days from the date of discharge of the index pneumonia hospitalization. Note: This outcome measure does not have a traditional numerator and denominator like a core process measure (e.g., percentage of adult patients with diabetes aged 18-75 years receiving one or more hemoglobin A1c tests per year); thus, we use this field to define the measure outcome. The measure counts readmissions to any acute care hospital for any cause within 30 days of the date of discharge of the index pneumonia admission. Planned admissions not counted as readmissions Unplanned readmissions are acute clinical events experienced by a patient that require urgent hospitalizations. Higher than expected unplanned readmission rates suggest lower quality of hospital and post-discharge care and are the focus of hospital quality measurement as part of quality improvement efforts. In contrast, planned readmissions are generally not a signal of quality of care. Furthermore, there is concern that including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures, unrelated to the quality of the prior admission, within 30 days of discharge. We have, therefore, developed an algorithm for using claims data to identify "planned readmissions" that will not count as outcomes in the readmission measure. In Medicare FFS data from the July 2008 to June 2011, 0.6% of index hospitalizations for pneumonia were followed by a planned readmission within 30 days of discharge. After accounting for planned readmissions, the crude 30-day measure readmission rate decreased from 18.5% to 17.8%. The detailed algorithm for identifying planned readmissions is in the attached report, Respecifying

	0506 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization
	the Hospital 30-Day Pneumonia and 30-Day Chronic Obstructive Pulmonary Disease Readmission Measures by adding a Planned Readmission Algorithm.
Denominator Statement	The cohort includes admissions for patients 18 and over hospitalized for pneumonia. The measure is currently publicly reported by CMS for patients 65 years and older who are either enrolled in Medicare FFS and admitted to non-federal hospitals, or admitted to VA hospitals. The measure includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia and with a complete claims history for the 12 months prior to admission.
Denominator Details	Time Window: This measure was developed with 12 months of data. Currently the measure is publicly-reported with three years of index hospitalizations. This outcome measure does not have a traditional numerator and denominator like a core process measure (e.g., percentage of adult patients with diabetes aged 18-75 years receiving one or more hemoglobin A1c tests per year); thus, we use this field to define the measure cohort. The denominator includes patients 18 and over hospitalized for pneumonia. The measure is currently publicly reported by CMS for patients 65 years and older who are either enrolled in Medicare FFS and admitted to non-federal hospitals, or admitted to a VA hospital. To be included in the Medicare FFS cohort the patients must have been continuously enrolled in Medicare FFS Parts A and B for the 12 months prior to the index hospitalization. The denominator includes admissions for patients discharged from the hospital with a principal diagnosis of pneumonia (ICD-9-CM codes 480.0, 480.1, 480.2, 480.3, 480.8, 480.9, 481, 482.0, 482.1, 482.2, 482.30, 482.31, 482.32, 482.39, 482.40, 482.41, 482.42, 482.49, 482.81, 482.82, 482.83, 482.84, 482.89, 482.9, 483.0, 483.1, 483.8, 485, 486, 487.0, and 488.11; ICD-10-CM codes J120, J121, J122, J1281, J1289, J129, J13, J181, J150, J151, J14, J154, J154, J153, J154, J1520, J1521, J1521, Z16, J1529, J158, J155, J156, A481, J158, J159, J157, J160, J168, J180, J189, J1100, J129, J09119).
Exclusions	The measure excludes admissions for patients: For all cohorts, the measure excludes admissions for patients: • with an in-hospital death (because they are not eligible for readmission); • transferred to another acute care hospital (because the readmission is attributed to the hospital that discharges the patient to a non-acute setting); • discharged against medical advice (AMA) (because providers did not have the opportunity to deliver full care and prepare the patient for discharge); • admitted with pneumonia within 30 days of discharge from a qualifying index admission (Admissions within 30 days of discharge of an index admission will be considered readmissions. No admission is counted as a readmission and an index admission. The next eligible admission after the 30-day time period following an index admission will be considered another index admission.) For Medicare FFS patients, the measure additionally excludes admissions for patients: • without at least 30 days post-discharge enrollment in FFS Medicare (because the 30-day readmission outcome cannot be assessed in this group).
Exclusion Details	Measure exclusions are determined as follows For all cohorts, the measure excludes admissions for patients: • Admissions with an in-hospital death are identified in the discharge disposition indicator in claims data. • Admissions for patients who were transferred to another acute care hospital or VA hospital 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;

	0506 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization
	• Discharges against medical advice (AMA) are identified by examining the discharge destination indicator in claims data; • Pneumonia admissions within 30 days of discharge from a qualifying index admission are identified by comparing the discharge date from the index admission with the readmission date For Medicare FFS patients, the measure additionally excludes admissions for patients who: • Admissions without at least 30 days post-discharge enrollment in FFS Medicare is obtained by examining the Medicare Enrollment Database (EDB)
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 proposed measure employs a hierarchical logistic regression model to create a hospital level 30-day RSRR. In brief, the approach simultaneously models two levels (patient and hospital) to account for the variance in patient outcomes within and between hospitals (Normand & Shahian, 2007). At the patient level, each model adjusts the log-odds of readmission within 30-days of discharge for age and selected clinical covariates. The second level models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission, after accounting for patient risk. See section 2a1.20. Calculation Algorithm/Measure Logic for more detail. Candidate and Final Risk-adjustment Variables: Candidate variables were patient-level risk-adjustors that were expected to be predictive of readmission, based on empirical analysis, prior literature, and clinical judgment, including age and indicators of comorbidity and disease severity. For each patient, covariates are obtained from Medicare claims extending 12 months prior to and including 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. A file which contains a list of the ICD-9-CM codes and their groupings into CCs is available at http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier3&cid=1182785083979. 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 hospitalization, are included in the risk-adjustment. Hence, we do not risk adjust for CCs that may represent adverse events of care and that are only recorded in the index admission. The final set of risk-adjustment variables is: Demographics Age-65 (years above 65, continuous) Male Comorbidities History of coronary artery bypass graft (CABG) surgery History of infection (CC 1, 3-6) Septicemia/shock (CC 2) Metastatic cancer and acute leukemia (CC7) Lung, upper digestive tract, and other severe cancers (CC8) Lymphatic, head and neck, brain, and other major cancers; breast, prostate, colorectal and other cancers and tumors (CC 9-10) Diabetes mellitus (DM) and DM complications (CC 15-20, 119-120) Protein-calorie malnutrition (CC 21) Disorders of fluid/electrolyte/acid-base (CC 22-23)

	0506 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization
	Other gastrointestinal disorders (CC 36) Severe hematological disorders (CC 44) Iron deficiency and other/unspecified anemias and blood disease (CC 47) Dementia and senility (CC 49-50) Drug/alcohol abuse/dependence/psychosis (CC 51-53) Major psychiatric disorders (CC 54-56) Other psychiatric disorders (CC 60) Hemiplegia, paraplegia, paralysis, functional disability (CC67-69, 100-102, 177-178) Cardio-respiratory failure and shock (CC 79) Congestive heart failure (CC 80) Acute coronary syndrome (CC 81-82) Chronic atherosclerosis (CC 83-84) Valvular and rheumatic heart disease (CC 86) Arrhythmias (CC 92-93) Stroke (CC 95-96) Vascular or circulatory disease (CC 104-106) Chronic obstructive pulmonary disease (CC 108) Fibrosis of lung and other chronic lung disorders (CC 109) Asthma (CC 110) Pneumonia (CC 111-113) Pleural effusion/pneumothorax (CC 114) Other lung disorders (CC 115) End-stage renal disease or dialysis (CC 129-130) Renal failure (CC 131) Urinary tract infection (CC 135) Other urinary tract disorders (CC 136) Decubitus ulcer or chronic skin ulcer (CC 148-149) Vertebral fractures (CC 157) Other injuries (CC 162) References: 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. URL http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841 N/A
Stratification	N/A
Type Score	Rate/proportion better quality = lower score
Algorithm	The proposed measure employs a hierarchical logistic regression model to create a hospital level 30-day RSRR. In brief, the approach simultaneously models two levels (patient and hospital) to

	0506 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following pneumonia hospitalization
	account for the variance in patient outcomes within and between hospitals (Normand & Shahian, 2007). At the patient level, each model adjusts the log-odds of readmission within 30-days of discharge for age and selected clinical covariates. The second level models the hospital-specific intercepts as arising from a normal distribution. The hospital intercept represents the underlying risk of readmission, after accounting for patient risk. The hospital-specific intercepts are given a distribution in order to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case-mix to an average hospital's performance with the same case-mix. Thus, a lower ratio indicates lower-than-expected readmission or better quality and a higher ratio indicates higher-than-expected readmission or worse quality. The predicted hospital outcome (the numerator) is the sum of predicted probabilities of readmissions for all patients at a particular hospital. The predicted probability of each patient in that hospital is calculated using the hospital-specific intercept and patient risk factors. The expected number of readmissions (the denominator) is the sum of expected probabilities of readmission for all patients at a hospital. The expected probability of each patient in a hospital is calculated using a common intercept and patient risk factors. References: Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22 (2): 206-226. URL http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1219069855841
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	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
Status	New Submission Time-limited
Steward	Centers for Medicare and Medicaid Services Other organizations: MPR: Mathematica Policy Research; RTI: Research Triangle Institute
Description	The measure estimates a hospital-level risk-standardized readmission rate (RSRR), defined as unplanned readmissions for any cause within 30 days after the date of discharge of the index admission, for patients 18 and older discharged from the hospital with either a principal diagnosis of COPD or a principal diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD.
Type	Outcome
Data Source	Administrative claims Administrative Claims To apply the measure to Medicare FFS patients, Medicare Part A inpatient and outpatient and Part B outpatient claims are used. To apply the measure to a non-Medicare population, inpatient

	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	claims data are used. The Medicare data sources used to create the measure were: 1. Medicare Part A Inpatient and Outpatient and Part B outpatient claims from the Standard Analytic File, including inpatient and outpatient 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 dataset was used to obtain information on several inclusion/exclusion indicators such as Medicare status on admission. The measure was subsequently tested in 2006 California Patient Discharge Data, a large, linked all-payer database of patient hospital admissions. Records are linked by a unique patient identification number allowing us to determine patient history from previous hospitalizations as well as whether the patient was readmitted to any hospital within 30 days. Attachment COPD ICD 9 to ICD10_Diag + Proc.pdf
Level	Facility
Setting	Hospital/Acute Care Facility
Numerator Statement	The outcome for this measure is 30-day all-cause readmission. We define all-cause readmission as an inpatient admissions for any cause, with the exception of planned readmissions, within 30 days after the date of discharge from the index admission for patients 18 and older discharged from the hospital with either a principal diagnosis of COPD or a principal diagnosis of respiratory failure with a secondary diagnosis of acute exacerbation of COPD. If a patient has one or more admissions (for any reason) within 30 days after discharge from the index admission, only one is counted as a readmission. For the detailed definition of planned readmissions, please refer to the attached report, Respecifying the Hospital 30-Day Pneumonia and 30-Day Chronic Obstructive Pulmonary Disease Readmission Measures by adding a Planned Readmission Algorithm.
Numerator Details	Time Window: Patients who are readmitted for any cause within 30 days from the date of discharge of the index COPD admission. This outcome measure does not have a traditional numerator and denominator like a core process measure (e.g., percentage of adult patients with diabetes aged 18-75 years receiving one or more hemoglobin A1c tests per year); thus, we are using this field to define the outcome. Measure includes readmissions to any acute care hospital for any cause within 30 days from the date of discharge of the index admission. Planned admissions not counted as readmissions Unplanned readmissions are acute clinical events experienced by a patient that require urgent hospitalizations. Higher than expected unplanned readmission rates suggest lower quality of hospital and post-discharge care and are the focus of hospital quality measurement as part of quality improvement efforts. In contrast, planned readmissions are generally not a signal of quality of care. Furthermore, there is concern that including planned readmissions in a readmission measure could create a disincentive to provide appropriate care to patients who are scheduled for elective or necessary procedures, unrelated to the quality of the prior admission, within 30 days of discharge. We have, therefore, developed an algorithm for using claims data to identify “planned readmissions” that will not count as outcomes in the readmission measure. In Medicare FFS data from the 2008 calendar year, 0.6% of index hospitalizations for COPD were followed by a planned readmission within 30 days of discharge. After accounting for planned readmissions, the crude 30-day measure readmission rate decreased from 21.9% to 21.3%. The detailed algorithm for identifying planned readmissions is in the attached report, Respecifying the Hospital 30-Day Pneumonia and 30-Day Chronic Obstructive Pulmonary Disease Readmission

	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	Measures by adding a Planned Readmission Algorithm.
Denominator Statement	This claims-based measure can be used in either of two patient cohorts: (1) patients aged 65 years or older or (2) patients aged 18 years or older. We have explicitly tested the measure in both age groups. The cohort includes admissions for patients discharged from the hospital with either a principal diagnosis of COPD (see codes below) OR a principal diagnosis of respiratory failure (see codes below) WITH a secondary discharge diagnosis of acute exacerbation of COPD (see codes below) and with a complete claims history for the 12 months prior to admission.
Denominator Details	Time Window: This measure was developed with 12 months of data. Note: This outcome measure does not have a traditional numerator and denominator like a core process measure (e.g., percentage of adult patients with diabetes aged 18-75 years receiving one or more hemoglobin A1c tests per year). We therefore use this field to define the measure cohort. The denominator includes patients 18 and over hospitalized for COPD. The measure was developed in a cohort of patients 65 years and older who were enrolled in Medicare FFS and admitted to non-federal hospitals. To be included in the Medicare FFS cohort the inclusion criteria required that the patient be continuously enrolled in Medicare FFS Parts A and B for the 12 months prior to the index hospitalization. Primary COPD and respiratory failure with a secondary diagnosis of acute exacerbation of COPD are defined by the following ICD-9-CM and ICD-10-CM codes: ICD-9-CM codes used to define COPD: 491.21 Obstructive chronic bronchitis; with (acute) exacerbation; acute exacerbation of COPD, decompensated COPD, decompensated COPD with exacerbation. 491.22 Obstructive chronic bronchitis; with acute bronchitis 491.8 Other chronic bronchitis. Chronic: tracheitis, tracheobronchitis. 491.9 Unspecified chronic bronchitis 492.8 Other emphysema; emphysema (lung or pulmonary): Not otherwise specified, centriacinar, centrilobular, obstructive, panacinar, panlobular, unilateral, vesicular. MacLeod's syndrome; Swyer-James syndrome; unilateral hyperlucent lung 493.20 Chronic obstructive asthma; asthma with COPD, chronic asthmatic bronchitis, unspecified 493.21 Chronic obstructive asthma; asthma with COPD, chronic asthmatic bronchitis, with status asthmaticus 493.22 Chronic obstructive asthma; asthma with COPD, chronic asthmatic bronchitis, with (acute) exacerbation 496 Chronic: nonspecific lung disease, obstructive lung disease, obstructive pulmonary disease (COPD) NOS. ICD-10-CM codes used to define COPD: J441 Chronic obstructive pulmonary disease with (acute) exacerbation J418 Mixed simple and mucopurulent chronic bronchitis J42 Unspecified chronic bronchitis J439 Emphysema, unspecified J449 Chronic obstructive pulmonary disease, unspecified J440 Chronic obstructive pulmonary disease with acute lower respiratory infection ICD-9-CM codes used to define respiratory failure: 518.81 Other diseases of lung; acute respiratory failure; respiratory failure NOS 518.82 Other diseases of lung; acute respiratory failure; other pulmonary insufficiency, acute

	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	respiratory distress 518.84 Other diseases of lung; acute respiratory failure; acute and chronic respiratory failure 799.1 Other ill-defined and unknown causes of morbidity and mortality; respiratory arrest, cardiorespiratory failure ICD-9-CM codes used to define acute exacerbation of COPD: 491.21 Obstructive chronic bronchitis; with (acute) exacerbation; acute exacerbation of COPD, decompensated COPD, decompensated COPD with exacerbation. 491.22 Obstructive chronic bronchitis; with acute bronchitis 493.21 Chronic obstructive asthma; asthma with COPD, chronic asthmatic bronchitis, with status asthmaticus 493.22 Chronic obstructive asthma; asthma with COPD, chronic asthmatic bronchitis, with (acute) exacerbation ICD-10-CM codes used to define respiratory failure: J9600 Respiratory failure, unspecified, unspecified whether with hypoxia or hypercapnia J9690 Respiratory failure, unspecified, unspecified whether with hypoxia or hypercapnia J80 Acute Respiratory distress syndrome J9620 Acute and chronic respiratory failure, unspecified whether with hypoxia or hypercapnia R092 Respiratory arrest ICD-10-CM codes used to define acute exacerbation of COPD: J441 Chronic obstructive pulmonary disease with (acute) exacerbation J440 Chronic obstructive pulmonary disease with acute low respiratory infection
Exclusions	An index admission is any eligible admission to an acute care hospital assessed in the measure for the outcome (readmitted within 30 days of the date of discharge from the initial admission). The measure excludes admissions for patients: • with an in hospital death (because they are not eligible for readmission). • transferred to another acute care facility (We assign the outcome for the acute episode of care to the hospital that discharges the patient to the non-acute care setting because the discharging hospital initiates the discharge and the transition to the outpatient setting. Therefore, the last admission in the acute care setting for the episode of care is eligible to be an index admission in the measure. The prior admissions in the same acute episode are excluded from the measure.) • who were discharged alive and against medical advice (AMA) (because providers did not have the opportunity to deliver full care and prepare the patient for discharge). • without at least 30 days post-discharge claims data (because the 30-day readmission outcome cannot be assessed in this group). Additionally, admissions that occur within 30 days of the discharge date of an earlier index admission are not themselves considered to be index admissions. Any COPD admission can only be an index admission or a readmission, but not both. Of note, a patient may satisfy multiple exclusion criteria.
Exclusion Details	We provide denominator exclusions details for the Medicare data. The specific fields used in "all-payer" data will vary. In-hospital deaths are identified using the discharge disposition vital status indicator. Transfers to other acute care facilities are defined when a patient with an inpatient hospital admission (with at least one qualifying COPD admission) is discharged from an acute care hospital and admitted to another acute care hospital on the same day or next day. Discharges Against Medical Advice (AMA) are identified using the discharge disposition indicator. Lack of claims data for 30 days post-discharge is identified by patient enrollment status in the

	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	CMS' Enrollment Database (EDB) (for Medicare FFS patients only).
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"1. The measure employs a hierarchical logistic regression model to create a hospital-level 30-day RSRR. This approach to modeling appropriately accounts for the structure of the data (patients clustered within hospitals), the underlying risk due to patients' comorbidities, and sample size at a given hospital when estimating hospital readmission rates. In brief, the approach simultaneously models two levels (patient and hospital) to account for the variance in patient outcomes within and between hospitals.2 At the patient level, the model adjusts the log-odds of readmission within 30 days of discharge for age and selected clinical covariates. The second level models hospital-specific intercepts as arising from a normal distribution. The hospital-specific intercepts represent the hospital contribution to the risk of readmission, after accounting for patient risk and sample size, and can be inferred as a measure of quality. The hospital-specific intercepts are given a distribution in order to account for the clustering (non-independence) of patients within the same hospital. If there were no differences among hospitals, then after adjusting for patient risk, the hospital intercepts should be identical across all hospitals. The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case-mix to an average hospital's performance with the same case-mix. Thus, a lower ratio indicates lower-than-expected readmission or better quality and a higher ratio indicates higher-than-expected readmission or worse quality. The predicted hospital outcome (the numerator) is the sum of predicted probabilities of readmission for all patients at a particular hospital. The predicted probability of each patient in that hospital is calculated using the hospital-specific intercept and patient risk factors. The expected number of readmissions (the denominator) is the sum of expected probabilities of readmission for all patients at a hospital. The expected probability of each patient in a hospital is calculated using a common intercept and patient risk factors. Candidate and Final Risk-adjustment Variables: The measure was developed using Medicare FFS claims data. Candidate variables were patient-level risk-adjustors that were expected to be predictive of readmission, based on empirical analysis, prior literature, and clinical judgment, including age and indicators of comorbidity and disease severity. For each patient, covariates are obtained from Medicare claims extending 12 months prior to and including the index admission. The model adjusts for case mix differences based on the clinical status of patients at the time of admission. We used condition categories (CCs), which are clinically meaningful groupings of more than 15,000 ICD-9-CM diagnosis codes, and combinations of CCs as candidate variables. A file which contains a list of the ICD-9-CM codes and their groupings into CCs is available on www.qualitynet.org (http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier3&cid=1182785083979). We did not risk-adjust for CCs that were possible adverse events of care and that were only recorded in the index admission. Only comorbidities that conveyed information about the patient at that time or in the 12 months prior, and not complications that arose during the course of the hospitalization were included in the risk-adjustment.

	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	References: 1. 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. 2. Normand S-LT, Shahian DM. 2007. Statistical and Clinical Aspects of Hospital Outcomes Profiling. Stat Sci 22 (2): 206-226. Frequencies and odds ratios for the model development sample (2008 Medicare FFS patients aged 65 and older; n=170,480 admissions) are presented below. Table 1: Final set of risk-adjustment variables: Variable//Frequency (%)//Odds Ratio (95% confidence interval) Demographic • Age-65 (years above 65, continuous) for 65 and over cohorts/Frequency = -/OR (95% CI)=1.00 (1.00-1.00); (this variable is Age (years, continuous) for 18 and over cohorts) Cardiovascular/Respiratory • Sleep Apnea (ICD-9 CM diagnosis codes: 327.20, 327.21, 327.23, 327.27, 327.29, 780.51, 780.53, 780.57) / Frequency=10.46% / OR (95% CI)=1.00 (0.96-1.03) • History of mechanical ventilation (ICD-9 procedure codes: 93.90, 96.70, 96.71, 96.72)/ Frequency=7.33/ OR (95% CI)=1.13 (1.08-1.18) • Respirator dependence/respiratory failure (CC 77-78)/ Frequency=1.38/ OR (95% CI)=1.12 (1.03-1.23) • Cardio-respiratory failure and shock (CC 79)/ Frequency=29.84/ OR (95% CI)=1.21 (1.18-1.24) • Congestive heart failure (CC 80)/ Frequency=43.86/ OR (95% CI)=1.21 (1.18-1.24) • Chronic atherosclerosis (CC 83-84)/ Frequency=51.57/ OR (95% CI)=1.11 (1.08-1.13) • Arrhythmias (CC 92-93)/ Frequency=37.2/ OR (95% CI)=1.17 (1.12-1.22) • Vascular or circulatory disease (CC 104-106)/ Frequency=38.2/ OR (95% CI)=1.09 (1.05-1.14) • Arrhythmias (CC 92-93)/ Frequency=38.48/ OR (95% CI)=1.14 (1.11-1.17) • Other and Unspecified Heart Disease (CC 94)/ Frequency=19.45/ OR (95% CI)=1.08 (1.05-1.11) • Vascular or Circulatory Disease (CC 104-106)/ Frequency=39.42/ OR (95% CI)=1.09 (1.06-1.11) • Fibrosis of lung and other chronic lung disorder (CC 109)/ Frequency=18.12/ OR (95% CI)=1.09 (1.06-1.12) • Pneumonia (CC 111-113)/ Frequency=51.51/ OR (95% CI)=1.10 (1.07-1.13) Other Comorbid Conditions • History of Infection (CC 1, 3-6)/ Frequency=32.16/ OR (95% CI)=1.08 (1.05-1.11) • Metastatic cancer and acute leukemia (CC 7)/ Frequency=2.64/ OR (95% CI)=1.24 (1.15-1.33) • Lung, upper digestive tract, and other severe cancers (CC 8)/ Frequency=5.91/ OR (95% CI)=1.19 (1.13-1.25) • Lymphatic, head and neck, brain, and other major cancers; breast, prostate, colorectal and other cancers and tumors; other respiratory and heart neoplasms (CC 9-11)/ Frequency=13.88/ OR (95% CI)=1.04 (1.01-1.08) • Other digestive and urinary neoplasms (CC 12)/ Frequency=7.06/ OR (95% CI)=0.96 (0.92-1.01) • Diabetes and DM complications (CC 15-20, 119-120)/ Frequency=39.15/ OR (95% CI)=1.08 (1.05-1.11)

	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	• Protein-calorie malnutrition (CC 21)/ Frequency=7.57/ OR (95% CI)=1.14 (1.09-1.19) • Disorders of Fluid/Electrolyte/Acid-Base (CC 22-23)/ Frequency=34.57/ OR (95% CI)=1.17 (1.14-1.20) • Other Endocrine/Metabolic/Nutritional Disorders (CC 24)/ Frequency=68.61/ OR (95% CI)=0.91 (0.89-0.94) • Pancreatic Disease (CC 32)/ Frequency=4.85/ OR (95% CI)=1.12 (1.06-1.17) • Peptic Ulcer, Hemorrhage, Other Specified Gastrointestinal Disorders (CC 34)/ Frequency=12.58/ OR (95% CI)=1.07 (1.03-1.11) • Other Gastrointestinal Disorders (CC 36)/ Frequency=58.29/ OR (95% CI)=1.04 (1.02-1.07) • Severe Hematological Disorders (CC44)/ Frequency=2.07 /OR (95% CI)=1.12 (1.04-1.20) • Iron Deficiency and Other/Unspecified Anemias and Blood Disease (CC 47)/ Frequency=42.09/ OR (95% CI)=1.13 (1.10-1.16) • Dementia and senility (CC 49-50)/ Frequency=17.07 /OR (95% CI)=1.00 (0.97-1.04) • Drug/Alcohol Induced Dependence/Psychosis (CC 51-52)/ Frequency=3.67/ OR (95% CI)=1.15 (1.09-1.22) • Major Psych Disorders (CC 54-56)/ Frequency=10.79/ OR (95% CI)=1.08 (1.04-1.12) • Depression (CC 58)/ Frequency=19.63/ OR (95% CI)=1.06 (1.03-1.09) • Anxiety Disorders (CC 59)/ Frequency=3.27/ OR (95% CI)=1.15 (1.08-1.22) • Other Psychiatric Disorders (CC 60)/ Frequency=18.37/ OR (95% CI)=1.11 (1.08-1.15) • Quadriplegia, paraplegia, functional disability (CC 67-69, 100-102, 177-178)/ Frequency=5.02/ OR (95% CI)=1.08 (1.02-1.13) • Polyneuropathy (CC 71)/ Frequency=7.91/ OR (95% CI)=1.11 (1.06-1.16) • Acute Coronary Syndrome (CC 81-82)/ Frequency=9.54/ OR (95% CI)=1.08 (1.04-1.12) • Hypertensive Heart and Renal Disease or Encephalopathy (CC 89)/ Frequency=13.20/ OR (95% CI)=1.13 (1.09-1.17) • Stroke (CC 95-96)/ Frequency=6.84/ OR (95% CI)=1.04 (1.00-1.09) • Renal Failure (CC 131)/ Frequency=18.61/ OR (95% CI)=1.10 (1.06-1.14) • Decubitus ulcer or chronic skin ulcer (CC 148-149)/ Frequency=7.43/ OR (95% CI)=1.03 (0.99-1.08) • Cellulitis, Local Skin Infection (CC 152)/ Frequency=12.50/ OR (95% CI)=1.07 (1.03-1.11) • Vertebral Fractures (CC 157)/ Frequency=5.24/ OR (95% CI)=1.14 (1.08 -1.19) ICD-10-CM codes for model variables (for those variables defined by ICD-9 CM codes rather than CCs) Mechanical Ventilation • 5A09357 Assistance with Respiratory Ventilation, Less than 24 Consecutive Hours, Continuous Positive Airway Pressure • 5A09457 Assistance with Respiratory Ventilation, 24-96 Consecutive Hours, Continuous Positive Airway Pressure • 5A09557 Assistance with Respiratory Ventilation, Greater than 96 Consecutive Hours, Continuous Positive Airway Pressure • 5A1935Z Respiratory Ventilation, Less than 24 Consecutive Hours • 5A1945Z Respiratory Ventilation, 24-96 Consecutive Hours •5A1955Z Respiratory Ventilation, Greater than 96 Consecutive Hours Sleep Apnea • G4730 Sleep apnea, unspecified

	1891 Hospital 30-day, all-cause, risk-standardized readmission rate (RSRR) following chronic obstructive pulmonary disease (COPD) hospitalization
	• G4731 Primary central sleep apnea • G4733 Obstructive sleep apnea (adult) (pediatric) • G4737 Central sleep apnea in conditions classified elsewhere • G4739 Other sleep apnea Attachment Delv49b_COPD_ReadmissionMethodologyReport-9-29-11.pdf
Stratification	Results of this measure will not be stratified.
Type Score	Rate/proportion better quality = lower score
Algorithm	The RSRR is calculated as the ratio of the number of "predicted" to the number of "expected" readmissions, multiplied by the national unadjusted readmission rate. For each hospital, the numerator of the ratio ("predicted") is the number of readmissions within 30 days predicted on the basis of the hospital's performance with its observed case mix, and the denominator ("expected") is the number of readmissions expected on the basis of the nation's performance with that hospital's case mix. This approach is analogous to a ratio of "observed" to "expected" used in other types of statistical analyses. It conceptually allows for a comparison of a particular hospital's performance given its case-mix to an average hospital's performance with the same case-mix. Thus, a lower ratio indicates lower-than-expected readmission or better quality and a higher ratio indicates higher-than-expected readmission or worse quality. The predicted hospital outcome (the numerator) is the sum of predicted probabilities of readmission for all patients at a particular hospital. The predicted probability of each patient in that hospital is calculated using the hospital-specific intercept and patient risk factors. The expected number of readmissions (the denominator) is the sum of expected probabilities of readmission for all patients at a hospital. The expected probability of each patient in a hospital is calculated using a common intercept and patient risk factors. Please see attachment for more details on the calculation algorithm. Attachment COPD Readmission Calculation Algorithm.pdf
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	0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
Status	Maintenance, Original Endorsement: May 15, 2008, Most Recent Endorsement: Jan 31, 2012
Steward	Centers for Medicare and Medicaid Services Other organizations: The Joint Commission, Centers for Disease Control and Prevention, Infectious Diseases Society of America, American Thoracic Society, Johns Hopkins University, Northeastern Ohio Univ. College of Medicine, Pneumonia Patient Outcomes Team, New Jersey Medical
Description	Percent of pneumonia patients, age 18 years or older, transferred or admitted to the ICU within 24 hours of hospital arrival who had blood cultures performed within 24 hours prior to or 24 hours after arrival at the hospital.
Type	Process
Data Source	Administrative claims, Paper Records Patient medical record can be collected using the CMS Abstraction and Reporting Tool (CART). URL http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier3

	0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
	&cid=1135267770141 N/A URL http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228767363466 N/A
Level	Facility, Population : National, Population : Regional, Population : State
Setting	Hospital/Acute Care Facility
Numerator Statement	Number of pneumonia patients transferred or admitted to the ICU within 24 hours of hospital arrival who had blood cultures performed within 24 hours prior to or 24 hours after arrival at the hospital
Numerator Details	Time Window: The time period included in this measure is from arrival to the hospital through 24 hours after arrival to the hospital. The following patients are included in the numerator; pneumonia patients transferred or admitted to the ICU within 24 hours of hospital arrival who had blood cultures performed within 24 hours prior to or 24 hours after arrival at the hospital The data elements needed for the numerator are: Arrival Date Arrival Time Blood Culture Collected Initial Blood Culture Collection Date Initial Blood Culture Collection Time
Denominator Statement	Patients, age 18 years or older, discharged with: ICD-9-CM principal diagnosis code of pneumonia OR ICD-9-CM principal diagnosis code of septicemia or respiratory failure (acute or chronic) AND an ICD-9-CM Other diagnosis code of pneumonia Table 3.1 Pneumonia (PN) ICD-9 Code Shortened Description 481 PNEUMOCOCCAL PNEUMONIA 482.0 K. PNEUMONIAE PNEUMONIA 482.1 PSEUDOMONAL PNEUMONIA 482.2 H.INFLUENZAE PNEUMONIA 482.30 STREPTOCOCCAL PNEUMN NOS 482.31 PNEUMONIA STRPTOCOCCUS A 482.32 PNEUMONIA STRPTOCOCCUS B 482.39 PNEUMONIA OTH STREP 482.40 STAPHYLOCOCCAL PNEU NOS 482.41 METH SUS PNEUM D/T STAPH 482.42 METH RES PNEU D/T STAPH 482.49 STAPH PNEUMONIA NEC 482.82 PNEUMONIA E COLI 482.83 PNEUMO OTH GRM-NEG BACT 482.84 LEGIONNAIRES´ DISEASE 482.89 PNEUMONIA OTH SPCF BACT 482.9 BACTERIAL PNEUMONIA NOS 483.0 PNEU MYCPLSM PNEUMONIAE

	0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
	483.1 PNEUMONIA D/T CHLAMYDIA 483.8 PNEUMON OTH SPEC ORGNSM 485 BRONCHOPNEUMONIA ORG NOS 486 PNEUMONIA, ORGANISM NOS Table 3.2 Septicemia ICD-9 Code Shortened Description 038.0 STREPTOCOCCAL SEPTICEMIA 038.10 STAPHYLCOCC SEPTICEM NOS 038.11 METH SUSC STAPH AUR SEPT 038.12 MRSA SEPTICEMIA 038.19 STAPHYLCOCC SEPTICEM NEC 038.2 PNEUMOCOCCAL SEPTICEMIA 038.3 ANAEROBIC SEPTICEMIA 038.40 GRAM-NEG SEPTICEMIA NOS 038.41 H. INFLUENAE SEPTICEMIA 038.42 E COLI SEPTICEMIA 038.43 PSEUDOMONAS SEPTICEMIA 038.44 SERRATIA SEPTICEMIA 038.49 GRAM-NEG SEPTICEMIA NEC 038.8 SEPTICEMIA NEC 038.9 SEPTICEMIA NOS 995.91 SEPSIS 995.92 SEVERE SEPSIS Table 3.3 Respiratory Failure ICD-9 Code Shortened Description 518.81 ACUTE RESPIRATRY FAILURE 518.84 ACUTE & CHRONC RESP FAIL Table 3.1 Pneumonia (PN) ICD-10 Code Shortened Description J 13 Pneumonia due to Streptococcus pneumoniae J 18.1 Lobar pneumonia, unspecified organism J 15.0 Pneumonia due to Klebsiella pneumoniae J 15.1 Pneumonia due to Pseudomonas J 14 Pneumonia due to Hemophilus influenzae J 15.4 Pneumonia due to other streptococci J 15.3 Pneumonia due to streptococcus, group B J 15.20 Pneumonia due to staphylococcus, unspecified J 15.21 Pneumonia due to staphylococcus aureus Z 16 Infection and drug resistant microorganisms J 15.29 Pneumonia due to other staphylococcus J 15.5 Pneumonia due to Escherichia coli J 15.6 Pneumonia due to other aerobic Gram-negative bacteria A 48.1 Legionnaires' disease

	0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
	J 15.8 Pneumonia due to other specified bacteria J 15.9 Unspecified bacterial pneumonia J 15.7 Pneumonia due to Mycoplasma pneumoniae J 16.0 Chlamydial pneumonia J 16.8 Pneumonia due to other specified infectious organisms J 18.0 Bronchopneumonia, unspecified organism J 18.8 Other pneumonia, unspecified organism J 18.9 Pneumonia, unspecified organism J 17 Pneumonia in diseases classified elsewhere J 18.2 Hypostatic pneumonia, unspecified organism J 85.1 Abscess of lung with pneumonia Table 3.2 Septicemia ICD-10 Code Shortened Description A 40.0 Sepsis due to streptococcus, group A A 40.1 Sepsis due to streptococcus, group B A 40.3 Sepsis due to Streptococcus pneumoniae A 40.8 Other streptococcal sepsis A 40.9 Streptococcal sepsis, unspecified A 41.9 Sepsis unspecified A 41.2 Sepsis due to other unspecified specified staphylococcus A 41.0 Sepsis due to Staphylococcus aureus A 41.0 AND U80.1 Sepsis due to Staphylococcus aureus AND Methicillin-resistant staph aureus infection A 41.1 Sepsis due to other specified staphylococcus A 41.89 Other specified sepsis A 41.4 Sepsis due to anaerobes A 41.50 Gram-negative sepsis, unspecified A 41.3 Sepsis due to Hemophilus influenzae A 41.51 Sepsis due to Escherichia coli (E coli) A 41.52 Sepsis due to pseudomonas A 41.53 Sepsis due to Serratia A 41.59 Other Gram-negative sepsis A 41.81 Sepsis due to Enterococcus A 42.7 Actinomycotic sepsis A 41.9 Sepsis, unspecified R65.20 Severe sepsis without septic shock R65.21 Severe sepsis with septic shock Table 3.3 Respiratory Failure ICD-10 Code Shortened Description J 96.0 Acute respiratory failure J 96.9 Respiratory failure, unspecified J 96.2 Acute and chronic respiratory failure J 96.1 Chronic respiratory failure

	0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
	J 80 Acute respiratory syndrome J 22 Unspecified acute lower respiratory infection J 98.8 Other specified respiratory disorders
Denominator Details	Time Window: The time period included in this measure is from arrival to the hospital through 24 hours after arrival to the hospital. Patients, age 18 years or older, discharged with: ICD-9-CM principal diagnosis code of pneumonia OR ICD-9-CM principal diagnosis code of septicemia or respiratory failure (acute or chronic) AND an ICD-9-CM Other diagnosis code of pneumonia Table 3.1 Pneumonia (PN) ICD-9 Code Shortened Description 481 PNEUMOCOCCAL PNEUMONIA 482.0 K. PNEUMONIAE PNEUMONIA 482.1 PSEUDOMONAL PNEUMONIA 482.2 H.INFLUENZAE PNEUMONIA 482.30 STREPTOCOCCAL PNEUMN NOS 482.31 PNEUMONIA STRPTOCOCCUS A 482.32 PNEUMONIA STRPTOCOCCUS B 482.39 PNEUMONIA OTH STREP 482.40 STAPHYLOCOCCAL PNEU NOS 482.41 METH SUS PNEUM D/T STAPH 482.42 METH RES PNEU D/T STAPH 482.49 STAPH PNEUMONIA NEC 482.82 PNEUMONIA E COLI 482.83 PNEUMO OTH GRM-NEG BACT 482.84 LEGIONNAIRES´ DISEASE 482.89 PNEUMONIA OTH SPCF BACT 482.9 BACTERIAL PNEUMONIA NOS 483.0 PNEU MYCPLSM PNEUMONIAE 483.1 PNEUMONIA D/T CHLAMYDIA 483.8 PNEUMON OTH SPEC ORGNSM 485 BRONCHOPNEUMONIA ORG NOS 486 PNEUMONIA, ORGANISM NOS Table 3.2 Septicemia ICD-9 Code Shortened Description 038.0 STREPTOCOCCAL SEPTICEMIA 038.10 STAPHYLCOCC SEPTICEM NOS 038.11 METH SUSC STAPH AUR SEPT 038.12 MRSA SEPTICEMIA 038.19 STAPHYLCOCC SEPTICEM NEC 038.2 PNEUMOCOCCAL SEPTICEMIA 038.3 ANAEROBIC SEPTICEMIA 038.40 GRAM-NEG SEPTICEMIA NOS

	0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
	038.41 H. INFLUENAE SEPTICEMIA 038.42 E COLI SEPTICEMIA 038.43 PSEUDOMONAS SEPTICEMIA 038.44 SERRATIA SEPTICEMIA 038.49 GRAM-NEG SEPTICEMIA NEC 038.8 SEPTICEMIA NEC 038.9 SEPTICEMIA NOS 995.91 SEPSIS 995.92 SEVERE SEPSIS Table 3.3 Respiratory Failure ICD-9 Code Shortened Description 518.81 ACUTE RESPIRATRY FAILURE 518.84 ACUTE & CHRONC RESP FAIL Table 3.1 Pneumonia (PN) ICD-10 Code Shortened Description J 13 Pneumonia due to Streptococcus pneumoniae J 18.1 Lobar pneumonia, unspecified organism J 15.0 Pneumonia due to Klebsiella pneumoniae J 15.1 Pneumonia due to Pseudomonas J 14 Pneumonia due to Hemophilus influenzae J 15.4 Pneumonia due to other streptococci J 15.3 Pneumonia due to streptococcus, group B J 15.20 Pneumonia due to staphylococcus, unspecified J 15.21 Pneumonia due to staphylococcus aureus Z 16 Infection and drug resistant microorganisms J 15.29 Pneumonia due to other staphylococcus J 15.5 Pneumonia due to Escherichia coli J 15.6 Pneumonia due to other aerobic Gram-negative bacteria A 48.1 Legionnaires' disease J 15.8 Pneumonia due to other specified bacteria J 15.9 Unspecified bacterial pneumonia J 15.7 Pneumonia due to Mycoplasma pneumoniae J 16.0 Chlamydial pneumonia J 16.8 Pneumonia due to other specified infectious organisms J 18.0 Bronchopneumonia, unspecified organism J 18.8 Other pneumonia, unspecified organism J 18.9 Pneumonia, unspecified organism J 17 Pneumonia in diseases classified elsewhere J 18.2 Hypostatic pneumonia, unspecified organism J 85.1 Abscess of lung with pneumonia Table 3.2 Septicemia ICD-10 Code Shortened Description A 40.0 Sepsis due to streptococcus, group A

	0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
	A 40.1 Sepsis due to streptococcus, group B A 40.3 Sepsis due to Streptococcus pneumoniae A 40.8 Other streptococcal sepsis A 40.9 Streptococcal sepsis, unspecified A 41.9 Sepsis unspecified A 41.2 Sepsis due to other unspecified specified staphylococcus A 41.0 Sepsis due to Staphylococcus aureus A 41.0 AND U80.1 Sepsis due to Staphylococcus aureus AND Methicillin-resistant staph aureus infection A 41.1 Sepsis due to other specified staphylococcus A 41.89 Other specified sepsis A 41.4 Sepsis due to anaerobes A 41.50 Gram-negative sepsis, unspecified A 41.3 Sepsis due to Hemophilus influenzae A 41.51 Sepsis due to Escherichia coli (E coli) A 41.52 Sepsis due to pseudomonas A 41.53 Sepsis due to Serratia A 41.59 Other Gram-negative sepsis A 41.81 Sepsis due to Enterococcus A 42.7 Actinomycotic sepsis A 41.9 Sepsis, unspecified R65.20 Severe sepsis without septic shock R65.21 Severe sepsis with septic shock Table 3.3 Respiratory Failure ICD-10 Code Shortened Description J 96.0 Acute respiratory failure J 96.9 Respiratory failure, unspecified J 96.2 Acute and chronic respiratory failure J 96.1 Chronic respiratory failure J 80 Acute respiratory syndrome J 22 Unspecified acute lower respiratory infection J 98.8 Other specified respiratory disorders The data elements needed for the denominator are: Admission Date Birthdate Chest X-Ray Clinical Trial Comfort Measures Only Discharge Date ICD-9-CM Other Diagnosis Codes ICD-9-CM Principal Diagnosis Codes ICU Admission or Transfer Pneumonia Diagnosis: ED/Direct Admit

	0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
	Transfer from Another Hospital or ASC
Exclusions	Patients less than 18 years of age, Patients with a length of stay greater than 120 days, Patients with Cystic Fibrosis, Patients who had not chest x-ray or CT scan that indicated abnormal findings within 24 hours prior to hospital arrival or anytime during this hospitalization, Patients with Comfort Measures Only, Patients enrolled in clinical trial, Patients received as a transfer from emergency/observation department of another hospital, Patients received as a transfer from an inpatient or outpatient department of another hospital, Patients received as a transfer from an ambulatory surgery center, Patients who had no diagnosis of pneumonia either as an ED final diagnosis/impression or direct admission diagnosis/impression and Patients who have a duration of stay less than or equal to one day
Exclusion Details	All exclusions listed above. Table 3.4 Cystic Fibrosis ICD-9 Code Shortened Description 277.00 CYSTIC FIBROSIS W/O ILEUS 277.01 CYSTIC FIBROSIS W ILEUS 277.02 CYSTIC FIBROSIS W PUL MAN 277.03 CYSTIC FIBROSIS W GI MAN 277.09 CYSTIC FIBROSIS NEC Table 3.4 Cystic Fibrosis ICD-10 Code Shortened Description E 84.9 Cystic fibrosis, unspecified E 84.11 Meconium ileus in Cystic Fibrosis E 84.0 Cystic fibrosis with pulmonary manifestations E 84.19 Cystic fibrosis with other intestinal manifestations E 84.8 Cystic fibrosis with other manifestations
Risk Adjustment	No risk adjustment or risk stratification N/A
Stratification	This measure is not stratified.
Type Score	Rate/proportion better quality = higher score
Algorithm	Numerator: Number of pneumonia patients transferred or admitted to the ICU within 24 hours of hospital arrival who had blood cultures performed within 24 hours prior to or 24 hours after arrival at the hospital. Denominator: Pneumonia ICU patients 18 years of age and older. Variable Key: Duration of Stay, Arrival Date Time, Initial Blood Culture Date Time, Initial Blood Day, and Initial Blood Minutes 1. Start processing. Run cases that are included in the Pneumonia (PN) Initial Patient Population and pass the edits defined in the Transmission Data Processing Flow: Clinical through this measure. 2. Check Chest X-Ray

	0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
	a. If Chest X-Ray is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. b. If Chest X-Ray equals 2 or 3, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing. c. If Chest X-Ray equals 1, continue processing and proceed to Comfort Measures Only. 3. Check Comfort Measures Only a. If Comfort Measures Only is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. b. If Comfort Measures Only equals 1, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing. c. If Comfort Measures Only equals 2, 3, or 4, continue processing and proceed to Clinical Trial. 4. Check Clinical Trial a. If Clinical Trial is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. b. If Clinical Trial equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing. c. If Clinical Trial equals No, continue processing and proceed to Transfer From Another Hospital or ASC. 5. Check Transfer From Another Hospital or ASC a. If Transfer From Another Hospital or ASC is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. b. If Transfer From Another Hospital or ASC equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing. c. If Transfer From Another Hospital or ASC equals No, continue processing and proceed to Pneumonia Diagnosis: ED/Direct Admit. 6. Check Pneumonia Diagnosis: ED/Direct Admit a. If Pneumonia Diagnosis: ED/Direct Admit is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. b. If Pneumonia Diagnosis: ED/Direct Admit equals 2, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing. c. If Pneumonia Diagnosis: ED/Direct Admit equals 3, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing. d. If Pneumonia Diagnosis: ED/Direct Admit equals 1, continue processing and proceed to ICU Admission or Transfer. 7. Check ICU Admission or Transfer a. If ICU Admission or Transfer is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. b. If ICU Admission or Transfer equals 2 or 3, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing. c. If ICU Admission or Transfer equals 1, continue processing and proceed to Blood Culture Collected. 8. Check Blood Culture Collected a. If Blood Culture Collected is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.

	0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
	b. If Blood Culture Collected equals 3, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing. c. If Blood Culture Collected equals 1, 2, or 4, continue processing and proceed to Arrival Date. 9. Check Arrival Date a. If the Arrival Date is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. b. If the Arrival Date equals Unable to Determine, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing. c. If the Arrival Date equals a Non Unable to Determine Value, continue processing and proceed to the Duration of Stay calculation. 10. Calculate Duration of Stay. Duration of Stay, in days, is equal to the Discharge Date minus the Arrival Date. 11. Check Duration of Stay a. If the Duration of Stay is less than or equal to 1, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing. b. If the Duration of Stay is greater than 1, continue processing and proceed to recheck Blood Culture Collected. 12. Recheck Blood Culture Collected a. If Blood Culture Collected equals 4, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing. b. If Blood Cultures Collected equals 1 or 2, continue processing and proceed to Initial Blood Culture Collection Date. 13. Check Initial Blood Culture Collection Date a. If the Initial Blood Culture Collection Date is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. b. If the Initial Blood Culture Collection Date equals Unable to Determine, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing. c. If the Initial Blood Culture Collection Date equals a Non Unable to Determine Value, continue processing and proceed to the Initial Blood Day calculation. 14. Calculate Initial Blood Day. The Initial Blood Day is equal to the Initial Blood Culture Collection Date minus the Arrival Date. 15. Check Initial Blood Day a. If the Initial Blood Day is less than zero, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. If the Initial Blood Day is equal to zero, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Note: Initial Blood Day equals zero means blood culture date same day as arrival date. So it is within 24 hours, no need for exact time. Stop processing. b. If the Initial Blood Day is greater than zero, continue processing and proceed to Arrival Time. 16. Check Arrival Time a. If the Arrival Time is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. b. If the Arrival Time equals Unable to Determine, the case will proceed to a Measure Category

	0356 PN3a--Blood cultures performed within 24 hours prior to or 24 hours after hospital arrival for patients who were transferred or admitted to the ICU within 24 hours of hospital arrival
	Assignment of D and will be in the Measure Population. Stop processing. c. If the Arrival Time equals a Non Unable to Determine Value, continue processing and proceed to Initial Blood Culture Collection Time. 17. Check Initial Blood Culture Collection Time a. If the Initial Blood Culture Collection Time is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. b. If the Initial Blood Culture Collection Time equals Unable to Determine, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing. c. If the Initial Blood Culture Collection Time equals a Non Unable to Determine Value, continue processing and continue to concatenate the variables Arrival Date Time and Initial Blood Culture Date Time. 18. Concatenate arrival date and arrival time to create the variable Arrival Date Time. Concatenate initial blood culture collection date and initial blood culture collection time to create the variable Initial Blood Culture Date Time. Continue processing and proceed to the Initial Blood Minutes calculation. 19. Calculate Initial Blood Minutes. Initial Blood Minutes is equal to the Initial Blood Culture Date Time minus the Arrival Date Time. 20. Check Initial Blood Minutes a. If the Initial Blood Minutes is less than zero, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing. b. If the Initial Blood Minutes is greater than or equal to zero and less than or equal to 1440 (24 hours), the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing. c. If the Initial Blood Minutes is greater than 1440 (24 hours), the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing. URL http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228767363466
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