NATIONAL QUALITY FORUM

Measure Submission and Evaluation Worksheet 5.0

This form contains the information submitted by measure developers/stewards, organized according to NQF's measure evaluation criteria and process. The evaluation criteria, evaluation guidance documents, and a blank online submission form are available on the submitting standards web page.

NQF #: 0148   **NQF Project:** Pulmonary Project

(for Endorsement Maintenance Review)
Original Endorsement Date: Mar 09, 2007 **Most Recent Endorsement Date:** Mar 09, 2007

BRIEF MEASURE INFORMATION
De.1 Measure Title: Blood cultures performed in the emergency department prior to initial antibiotic received in hospital
Co.1.1 Measure Steward: Centers for Medicare & Medicaid Services
De.2 Brief Description of Measure: Percentage of pneumonia patients 18 years of age and older who have had blood cultures performed in the emergency department prior to initial antibiotic received in hospital
2a1.1 Numerator Statement: Number of pneumonia patients whose initial emergency room blood culture was performed prior to the administration of the first hospital dose of antibiotics
2a1.4 Denominator Statement: Pneumonia patients 18 years of age and older who have an initial blood culture collected in the emergency department
2a1.8 Denominator Exclusions: •Received in transfer from another acute care or critical access hospital, including another emergency department •No working diagnosis of pneumonia at the time of admission •Receiving comfort measures only4 •<18 years of age •Do not receive antibiotics or a blood culture •No chest x-ray or CT scan that indicated positive infiltrate within 24 hours prior to hospital arrival or anytime during this hospitalization
1.1 Measure Type: Process **2a1. 25-26 Data Source:** Administrative claims, Paper Records **2a1.33 Level of Analysis:** Facility **1.2-1.4 Is this measure paired with another measure?** No **De.3 If included in a composite, please identify the composite measure** (*title and NQF number if endorsed*): N/A

STAFF NOTES (*issues or questions regarding any criteria*)
Comments on Conditions for Consideration:
Is the measure untested? Yes ☐ No ☐   If untested, explain how it meets criteria for consideration for time-limited endorsement:
1a. Specific national health goal/priority identified by DHHS or NPP addressed by the measure (*check De.5*): 5. Similar/related endorsed or submitted measures (*check 5.1*): Other Criteria:
Staff Reviewer Name(s):

1. IMPACT, OPPORTUNITY, EVIDENCE - IMPORTANCE TO MEASURE AND REPORT

Importance to Measure and Report is a threshold criterion that must be met in order to recommend a measure for endorsement. All three subcriteria must be met to pass this criterion. See guidance on evidence.
Measures must be judged to be important to measure and report in order to be evaluated against the remaining criteria. (evaluation criteria)

1a. High Impact: H ☐ M ☐ L ☐ I ☐
(*The measure directly addresses a specific national health goal/priority identified by DHHS or NPP, or some other high impact aspect of healthcare.*)

De.4 Subject/Topic Areas *(Check all the areas that apply)*:   Pulmonary/Critical Care, Pulmonary/Critical Care : Pneumonia
De.5 Cross Cutting Areas (*Check all the areas that apply*):   Population Health

1a.1 Demonstrated High Impact Aspect of Healthcare: Affects large numbers, A leading cause of morbidity/mortality

1a.2 If "Other," please describe:

1a.3 Summary of Evidence of High Impact *(Provide epidemiologic or resource use data)*:
Streptococcus pneumonia (SP) remains a major cause of serious invasive illness such as pneumonia, meningitis, and bacteremia, with an estimated 44,000 cases and 5,000 deaths in 2009 among people of all ages in the US (ref #5). The same bacteria is also among the leading causes of relatively less serious and non-invasive illness such as acute otitis media and sinusitis (ref #5). Using various data sources in 2004-2005 and experts' opinion, and based on an analytic model, Huang et al. estimated that approximately 3.9 million cases of SP disease (invasive or non-invasive) occur annually, resulting in 4.9 million outpatient visits, 760,000 emergency department visits, and 2.4 million hospital days, for a total cost of $4.9 billion a year (ref #11). Severe forms of SP disease usually occur in the elderly (>65 years), who also account for a disproportionately higher share of the cost. People with chronic pulmonary disease such as COPD and emphysema, asthma, sickle cell disease, diabetes mellitus, functional or anatomic asplenia, HIV infection or immunocompromising disease, chronic heart disease, and cigarette smokers, are at a higher risk of invasive SP infections.

Huang, S A, Johnson K M, Ray G T, Wroe P, Lieu T, Moore M, Zell E, Linder J, Grijalva C, Metlay J, Finkelstein J A. Burden and cost of US pneumococcal disease 2004 [abstract]. In: IDSA 47th Annual Meeting; 2009 Oct 29- Nov 1; Philadelphia, PA: Session 105-Community Acquired Bacterial Infections including STD's and Mycobacteria on October 31, 2009.

1a.4 Citations for Evidence of High Impact cited in 1a.3: Huang, S A, Johnson K M, Ray G T, Wroe P, Lieu T, Moore M, Zell E, Linder J, Grijalva C, Metlay J, Finkelstein J A. Burden and cost of US pneumococcal disease 2004 [abstract]. In: IDSA 47th Annual Meeting; 2009 Oct 29- Nov 1; Philadelphia, PA: Session 105-Community Acquired Bacterial Infections including STD's and Mycobacteria on October 31, 2009.

Centers for Disease Control [Internet]. Active Bacterial Core Surveillance (ABCs) Report emerging infectious program network Streptococcus pneumonia, 2009; [updated October 2010; cited 2010 Feb 8]. Available from http://www.cdc.gov/abcs/repots-findings/survreports/spneu09.pdf

Pilishvili T, Lexau C, Farley M, et al. Sustained Reductions in Invasive Pneumococcal Disease in the Era of Conjugate Vaccine. Clin Infect Dis 2010;201:32-41.

1b. Opportunity for Improvement: H ☐ M ☐ L ☐ I ☐
(*There is a demonstrated performance gap - variability or overall less than optimal performance*)

1b.1 Briefly explain the benefits (improvements in quality) envisioned by use of this measure:
Although recommendations for blood cultures are controversial due to the overall low yield, they can have a significant impact on the care of an individual patient and are important for epidemiologic reasons, such as antibiotic susceptibility patterns used to develop treatment guidelines. The Joint IDSA/ATS Guidelines on the Management of Community-Acquired Pneumonia (CAP) in Adults recommend that certain patients with pneumonia should be investigated for specific pathogens that would significantly alter decisions regarding empirical therapy, when the presence of these pathogens is suspected (Mandell, 2007). The guidelines recommend that if blood cultures are performed, they would be performed prior to antibiotic administration, i.e., pretreatment blood samples(Mandell, 2007). Pretreatment cultures are recommended because the yield of clinically useful information is greater if the

culture is collected before antibiotics are administered.

Keep in mind, this measure does NOT require a blood culture to be performed on all ED patients. That decision is left up to the physician. This measure, ONLY includes cases in which a physician DID perform a blood culture. This measure focuses on treatment provided in the Emergency Department where the largest number and variety of pneumonia patients receive treatment prior to admission orders. A review of performance measure data from the pneumonia national hospital quality measures over the past few years indicates that 68 to 70% of patients admitted to the hospital for pneumonia receive care and services in the ED prior to admission. Emergency Departments serve patients with a variety of co-morbidities such as those indicated above and varying levels of severity related to their clinical condition. The ED also serves as a triage point for the next level of care; intensive care, or general unit. In concordance with the guideline recommendations, the performance measure does not require blood cultures for all ED patients, but if a culture is done, it must be done prior to administration of the first dose of antibiotics received in the hospital in order to meet the intent of this measure.

Therefore, if blood cultures are performed in the ED AND they are performed prior to the antibiotic, the blood culture yield of clinically useful information is greater. Thus, treatment can be pathogen specific and patients should have a better outcome. There is room for improvement for patients included in this measure. According to the latest data from the CMS Clinical Data Warehouse, the national rate (96%) is 4% less than the clinically achievable benchmark of 99.9%. The performance rates of 18% of hospitals (nearly 1 out of 5) are still below 90%.

1b.2 Summary of Data Demonstrating Performance Gap *(Variation or overall less than optimal performance across providers)*:
[*For Maintenance – Descriptive statistics for performance results for this measure - distribution of scores for measured entities by quartile/decile, mean, median, SD, min, max, etc.*]
As shown on data posted on CMS Hospital Compare website, there is still a number of providers who perform blood cultures in the ED AFTER an antibiotic has already been administered. The most recent national CMS rate of patients who had a blood culture performed in the ED prior to their initial hospital antibiotic is 96.2% (4Q2010). The numerator consisted of 127,137 patients, the denominator consisted of 132,147 patients from 3,986 hospitals across the nation.
There is performance gap across hospitals. According to the latest data from the CMS Clinical Data Warehouse, the national rate (96%) is 4% less than the clinically achievable benchmark of 99.9%. The performance rates of 18% of hospitals (nearly 1 out of 5) are still below 90%.

1b.3 Citations for Data on Performance Gap: [*For Maintenance – Description of the data or sample for measure results reported in 1b.2 including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*]
CMS Clinical Data Warehouse and the CMS Hospital Compare website.

1b.4 Summary of Data on Disparities by Population Group: [*For Maintenance –Descriptive statistics for performance results for this measure by population group*]
We observed variations in disparities across demographic groups such as age group, gender, location (regions and urban vs rural) and race/ethnicity.
Regarding race/ethnicity, compared to Caucasian (95.2%), the rate of ED patients who had blood cultures performed prior to their initial hospital antibiotic is lower among all minorities, African-Americans (93.6%), Asian/Pacific Islanders (94.9%), Hispanics (92.0%) and Native Americans (89.9%)
Regarding gender, males (94.8%) have a slightly higher rate for PN-3b compared to women (94.6%).
Regarding age, compared to the under 65 years (93.7%) the rates were higher among all other age ranges, 65-74 years (95.0%), 75-84 years (95.4%) and 85 or older (95.5%).

Regarding region, most regions are very similar with the exception of the US Territories (71.2%), US Virgin Islands and Puerto Rico. Puerto Rico has consistently had low rates and make up 90% of the patients contained in the rate for the US Territories. The other regions are very similar, South (94.9%), Midwest (95.4%), Northeast (94.7%) and West (94.1%).
Lastly, urban versus rural show a slightly higher difference in rates by approximately .8%, with urban (94.9%) and rural (94.1%).
Most of these differences were statistically significant (p-value <0.05) but they should still be confirmed in multi-variate analysis which would take into account competing effects of other factors that may affect PN-3b.

1b.5 Citations for Data on Disparities Cited in 1b.4: [*For Maintenance – Description of the data or sample for measure results reported in 1b.4 including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities*]

included]
2009 CMS Clinical Data Warehouse

1c. Evidence (*Measure focus is a health outcome OR meets the criteria for quantity, quality, consistency of the body of evidence.*)
Is the measure focus a health outcome? Yes☐ No☐   **If not a health outcome**, rate the body of evidence.

Quantity: H☐ M☐ L☐ I☐   Quality: H☐ M☐ L☐ I☐   Consistency: H☐ M☐ L☐ I☐

Quantity	Quality	Consistency	Does the measure pass subcriterion1c?
M-H	M-H	M-H	Yes☐
L	M-H	M	Yes☐ IF additional research unlikely to change conclusion that benefits to patients outweigh harms: otherwise **No**☐
M-H	L	M-H	Yes☐ IF potential benefits to patients clearly outweigh potential harms: otherwise **No**☐
L-M-H	L-M-H	L	No ☐

Health outcome – rationale supports relationship to at least one healthcare structure, process, intervention, or service	Does the measure pass subcriterion1c? Yes☐ IF rationale supports relationship

1c.1 Structure-Process-Outcome Relationship (*Briefly state the measure focus, e.g., health outcome, intermediate clinical outcome, process, structure; then identify the appropriate links, e.g., structure-process-health outcome; process- health outcome; intermediate clinical outcome-health outcome*):
We understand that the intent of this measure is to reduce the likelihood of unreliable negative results if antibiotic is administered prior to drawing the blood sample for the blood culture. However, the 2009 analysis showed that patients who passed this measure have better clinical outcomes, such as in-hospital mortality, 30-day mortality and 30-readission. After linking the 2009 calendar year data in the clinical data warehouse, the CMS inpatient claims database and the CMS enrollment database, the in-hospital death rate was 6.6% (12,677/191,101) for those who passed the measure and 7.5% (641/8,526) for those who failed the measure, p-value 0.001. The 30-day mortality was 13.9% (26,654/191,191) for those who passed the measure and 14.7% (1,255/8,526) for those who failed the measure, p-value 0.044. The readmission rate was 20.3% (36,291/178,424) for those who passed the measure and 21.5% (1,697/7885) for those who failed the measure, p-value 0.010. This analysis was conducted on fee-for-service Medicare patients age 65 and older. Patients who died in the hospital were excluded from the readmission calculation.

1c.2-3 Type of Evidence (*Check all that apply*):
Clinical Practice Guideline

1c.4 Directness of Evidence to the Specified Measure (*State the central topic, population, and outcomes addressed in the body of evidence and identify any differences from the measure focus and measure target population*):
The goal of this measure is to provide the highest yield for a blood culture if a physician chooses to perform a blood culture. In a large retrospective study of blood cultures in pneumonia patients, Metersky et al demonstrated that when patients are selected appropriately, for example, those who are sicker or have comorbid conditions like liver disease, etc., the yield of blood culture pathogens was doubled when performed prior to antibiotics for each risk factor.

1c.5 Quantity of Studies in the Body of Evidence (*Total number of studies, not articles*): A quick review the literature since 2000 resulted in at least a half dozen studies as evidenced by published guidelines and peer-reviewed publications that support the recommendation of this measure.

1c.6 Quality of Body of Evidence (*Summarize the certainty or confidence in the estimates of benefits and harms to patients across studies in the body of evidence resulting from study factors. Please address: a) study design/flaws; b) directness/indirectness of the evidence to this measure (e.g., interventions, comparisons, outcomes assessed, population included in the evidence); and c) imprecision/wide confidence intervals due to few patients or events*): At least 1 prospective randomized study was conducted to compare pathogen-directed antibiotic treatment and empirical broad-spectrum antibiotic treatment in patients with community-acquired pneumonia (van der Eerden MM et al., Thorax 2005;60:672-8).
At least 3 scientific societies have published guidelines that recommend this practice (American Thoracic Society/Infectious Diseases Society of America, British Thoracic Society and the Canadian Infectious Disease Society/Canadian Thoracic Society).

1c.7 Consistency of Results across Studies *(Summarize the consistency of the magnitude and direction of the effect):* While performing blood cultures remains controversial, most studies, guidelines and meta-analysis consistently recommend performing them prior to antibiotics for the best yield IF the decision is made to perform them at all.

1c.8 Net Benefit *(Provide estimates of effect for benefit/outcome; identify harms addressed and estimates of effect; and net benefit - benefit over harms)*:
The overall low yield, cost and infrequent positive impact on clinical care argue against the routine use of blood cultures. However, should a physician choose to perform a blood culture, all guidelines agree that performing it prior to the initial antibiotic yields the best possible result.
In a large retrospective study of blood cultures in pneumonia patients, Metersky et al demonstrated that when patients are selected appropriately, for example, those who are sicker or have comorbid conditions like liver disease, etc., the yield of blood culture pathogens was doubled for each risk factor.

1c.9 Grading of Strength/Quality of the Body of Evidence. Has the body of evidence been graded? No

1c.10 If body of evidence graded, identify the entity that graded the evidence including balance of representation and any disclosures regarding bias: We did not grade the body of evidence. However, effort was made by scientific societies to grade the body of evidence and their own recommendations.

1c.11 System Used for Grading the Body of Evidence: Other

1c.12 If other, identify and describe the grading scale with definitions: N/A

1c.13 Grade Assigned to the Body of Evidence: N/A

1c.14 Summary of Controversy/Contradictory Evidence: The overall low yield, cost and infrequent positive impact on clinical care argue against the routine use of blood cultures.

1c.15 Citations for Evidence other than Guidelines*(Guidelines addressed below)*:
Heffelfinger JD, Dowell SF, Jorgensen JH, Klugman KP, et al. Management of community-acquired pneumonia in the era of pneumococcal resistance: a report from the Drug-Resistant Streptococcus Pneumoniae Therapeutic Working Group. Archives of Internal Medicine. 2000, 160:1399-1408.

King MD, Whitney CG, Parekh F, Farley MM. Recurrent invasive pneumococcal disease: a population-based assessment. Clin Infect Dis 2003; 37:1029-36.

Metersky ML, Ma A, Bratzler DW, et al. Predicting bacteremia in patients with community-acquired pneumonia. Am J Respir Crit Care Med 2004; 169: 342-347.

van der Eerden MM, Vlaspolder F, de Graaf CS, Groot T, Bronsveld W, Jansen HM. Comparison between pathogen directed antibiotic treatment and empirical broad spectrum antibiotic treatment in patients with community acquired pneumonia : a prospective randomized study. Thorax 2005; 60:672-8.

1c.16 Quote verbatim, <u>the specific guideline recommendation</u> *(Including guideline # and/or page #)*:
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12. 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 (see below) but are optimal for patients without these conditions. For patients without the clinical indications listed in table 5, diagnostic testing is optional but should not be considered wrong.

Table 5. Clinical indications for more extensive diagnostic testing.
Indication
Blood

culture
Sputum
culture
Legionella
UAT
Pneumococcal
UAT Other
Intensive care unit admission X X X X Xa
Failure of outpatient antibiotic therapy X X X
Cavitary infiltrates X X Xb
Leukopenia X X
Active alcohol abuse X X X X
Chronic severe liver disease X X
Severe obstructive/structural lung disease X
Asplenia (anatomic or functional) X X
Recent travel (within past 2 weeks) X Xc
Positive Legionella UAT result Xd NA
Positive pneumococcal UAT result X X NA
Pleural effusion X X X X Xe
NOTE. NA, not applicable; UAT, urinary antigen test.
a Endotracheal aspirate if intubated, possibly bronchoscopy or nonbronchoscopic bronchoalveolar lavage.
b Fungal and tuberculosis cultures.
c See table 8 for details.
d Special media for Legionella.
e Thoracentesis and pleural fluid cultures.

1c.17 Clinical Practice Guideline Citation: Mandell LA, Wunderink RG, Anzueta A, Bartlett JG, Infectious Diseases Society of America; American Thoracic Society. Infectious Diseases Society of America/American Thoracic Society consensus guidelines on the management of community-acquired pneumonia in adults. Clin Infect Dis. 2007 March 1;44 Suppl 2:S27-72.

1c.18 National Guideline Clearinghouse or other URL: http://www-archive.thoracic.org/sections/publications/statements/pages/mtpi/idsaats-cap.html

1c.19 Grading of Strength of Guideline Recommendation. Has the recommendation been graded? Yes

1c.20 If guideline recommendation graded, identify the entity that graded the evidence including balance of representation and any disclosures regarding bias: The committee that graded these guideline recommendations consisted of infectious diseases, pulmonary and critical care physicians with interest and expertise in pulmonary infections. The committee chairs were selected by the presidents of the IDSA and the ATS in consultation with other leaders in the respective societies. The committee co-chairs were charged with selection of the rest of the committee. One acknowledged weakness of this document is the lack of representation by primary care, hospitalist and emergency medicine physicians.

1c.21 System Used for Grading the Strength of Guideline Recommendation: GRADE

1c.22 If other, identify and describe the grading scale with definitions:

1c.23 Grade Assigned to the Recommendation: Moderate recommendation; Level 1 evidence

1c.24 Rationale for Using this Guideline Over Others: The British Thoracic Society and the Canadian Infectious Diseases Society/Canadian Thoracic Society are the only other guidelines that address CAP in adults. Both of these guidelines recommend blood cultures be performed prior to antibiotics IF they are performed. We use the IDSA/ATS Guidelines because they best address pneumonia disease and its epidemiology in the United States.

Based on the NQF descriptions for rating the evidence, what was the developer's assessment of the quantity, quality, and

consistency of the body of evidence?
1c.25 Quantity: High   1c.26 Quality: High1c.27 Consistency: High

Was the threshold criterion, *Importance to Measure and Report*, met?
(*1a & 1b must be rated moderate or high and 1c yes*)   Yes☐ No☐
Provide rationale based on specific subcriteria:

For a new measure if the Committee votes NO, then STOP.
For a measure undergoing endorsement maintenance, if the Committee votes NO because of 1b. (no opportunity for improvement), it may be considered for continued endorsement and all criteria need to be evaluated.

2. RELIABILITY & VALIDITY - SCIENTIFIC ACCEPTABILITY OF MEASURE PROPERTIES

Extent to which the measure, <u>as specified</u>, produces consistent (reliable) and credible (valid) results about the quality of care when implemented. (<u>evaluation criteria</u>)
Measure testing must demonstrate adequate reliability and validity in order to be recommended for endorsement. Testing may be conducted for data elements and/or the computed measure score. Testing information and results should be entered in the appropriate field. Supplemental materials may be referenced or attached in item 2.1. See <u>guidance on measure testing</u>.

S.1 **Measure Web Page** *(In the future, NQF will require measure stewards to provide a URL link to a web page where current detailed specifications can be obtained)*. Do you have a web page where current detailed specifications for <u>this</u> measure can be obtained? Yes

S.2 **If yes, provide web page URL:**
http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228767363466

2a. **RELIABILITY. Precise Specifications and Reliability Testing:** H☐ M☐ L☐ I☐

2a1. **Precise Measure Specifications**. (*The measure specifications precise and unambiguous.*)

2a1.1 **Numerator Statement** *(Brief, narrative description of the measure focus or what is being measured about the target population, e.g., cases from the target population with the target process, condition, event, or outcome)*:
Number of pneumonia patients whose initial emergency room blood culture was performed prior to the administration of the first hospital dose of antibiotics

2a1.2 **Numerator Time Window** *(The time period in which the target process, condition, event, or outcome is eligible for inclusion)*:
From arrival to the hospital through 24 hours after hospital arrival.

2a1.3 **Numerator Details** *(All information required to identify and calculate the cases from the target population with the target process, condition, event, or outcome such as definitions, codes with descriptors, and/or specific data collection items/responses)*:
Pneumonia patients who come through the Emergency Department (ED) AND have their initial blood culture performed while still in the ED prior to their initial antibiotic administered in the hospital. The following data elements are used to calculate the numerator;
Antibiotic Administration Date
Antibiotic Administration Time
Antibiotic Name
Arrival Date
Arrival Time
Blood Culture Collected
Initial Blood Culture Collection Date
Initial Blood Culture Collection Time

2a1.4 **Denominator Statement** *(Brief, narrative description of the target population being measured)*:
Pneumonia patients 18 years of age and older who have an initial blood culture collected in the emergency department

2a1.5 **Target Population Category** *(Check all the populations for which the measure is specified and tested if any)*: Adult/Elderly Care

2a1.6 Denominator Time Window *(The time period in which cases are eligible for inclusion)*:
From arrival to the hospital through 24 hours after hospital arrival.

2a1.7 Denominator Details (*All information required to identify and calculate the target population/denominator such as definitions, codes with descriptors, and/or specific data collection items/responses)*:
The following data elements are used to determine the denominator;
Admission Time
Antibiotic Received
Birthdate
Chest X-Ray
Clinical Trial
Comfort Measures Only
Discharge Date
Discharge Disposition
ICD-9-CM Other Diagnosis Codes
ICD-9-CM Principal Diagnosis Code
Pneumonia Diagnosis: ED/Direct Admit

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
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
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

2a1.8 Denominator Exclusions *(Brief narrative description of exclusions from the target population)*:
•Received in transfer from another acute care or critical access hospital, including another emergency department
•No working diagnosis of pneumonia at the time of admission
•Receiving comfort measures only4
•<18 years of age
•Do not receive antibiotics or a blood culture
•No chest x-ray or CT scan that indicated positive infiltrate within 24 hours prior to hospital arrival or anytime during this hospitalization

2a1.9 Denominator Exclusion Details *(All information required to identify and calculate exclusions from the denominator such as definitions, codes with descriptors, and/or specific data collection items/responses)*:
All exclusions listed above in 2a1.8.

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

2a1.10 Stratification Details/Variables *(All information required to stratify the measure results including the stratification variables,*

codes with descriptors, definitions, and/or specific data collection items/responses):
N/A

2a1.11 Risk Adjustment Type *(Select type. Provide specifications for risk stratification in 2a1.10 and for statistical model in 2a1.13)*: No risk adjustment or risk stratification   **2a1.12 If "Other," please describe:**

2a1.13 Statistical Risk Model and Variables *(Name the statistical method - e.g., logistic regression and list all the risk factor variables. Note - risk model development should be addressed in 2b4.)*:
N/A

2a1.14-16 Detailed Risk Model Available at Web page URL (or attachment). Include coefficients, equations, codes with descriptors, definitions, and/or specific data collection items/responses. Attach documents only if they are not available on a webpage and keep attached file to 5 MB or less. NQF strongly prefers you make documents available at a Web page URL. Please supply login/password if needed**:**

2a1.17-18. Type of Score: Rate/proportion

2a1.19 Interpretation of Score *(Classifies interpretation of score according to whether better quality is associated with a higher score, a lower score, a score falling within a defined interval, or a passing score)*: Better quality = Higher score

2a1.20 Calculation Algorithm/Measure Logic *(Describe the calculation of the measure score as an ordered sequence of steps including identifying the target population; exclusions; cases meeting the target process, condition, event, or outcome; aggregating data; risk adjustment; etc.)*:
Numerator: Number of pneumonia patients whose initial Emergency Department (ED) blood culture was performed prior to the administration of the first hospital dose of antibiotics.

Denominator: Pneumonia patients 18 years of age and older who have initial blood culture collected in the ED.

Variable Key: Antibiotic Timing, Blood Culture Timing, Blood Culture Collection Day, Duration of Stay, Initial Antibiotic Date, and Initial Antibiotic Time.

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
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.
coif 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.
coif 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.
coif Clinical Trial equals No, continue processing and proceed to Pneumonia Diagnosis: ED/Direct Admit.

5.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 Antibiotic Received.
6.Check Antibiotic Received
a. If Antibiotic Received is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
b. If Antibiotic Received equals 1 or 4, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
c. If Antibiotic Received equals 2 or 3, continue processing and proceed to Blood Culture Collected.

7.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.
b. If Blood Culture Collected equals 2, 3, or 4, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
c. If Blood Culture Collected equals 1, continue processing and proceed to Arrival Date.
8.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.
9.Calculate Duration of Stay. Duration of Stay, in days, is equal to the Discharge Date minus the Arrival Date.

10.Check Duration of Stay
a. If the Duration of Stay is greater than 1, continue processing and proceed to step 12 to check Arrival Time. Do not check Discharge Disposition.
b. If the Duration of Stay is less than or equal to 1, continue processing and proceed to Discharge Disposition.
11.Check Discharge Disposition only if Duration of Stay was less than or equal to 1
a. If the Discharge Disposition equals 4, 6, or 7 the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
b. If Discharge Disposition equals 1, 2, 3, 5, or 8, continue processing and proceed to Arrival Time.
12.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 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 Antibiotic Name.
13.Check Antibiotic Name
a. If the Antibiotic Name is on Table 2.1, continue processing and proceed to Antibiotic Administration Date.
b. If the Antibiotic Grid is not populated, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
Note: The front-end edits reject cases containing invalid data and/or an incomplete Antibiotic Grid. A complete Antibiotic Grid requires all data elements in the row to contain either a valid value and/or Unable to Determine.
14.Check Antibiotic Administration Date
a. If the Antibiotic Administration Date equals Unable to Determine for all antibiotic doses, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
b. If the Antibiotic Administration Date equals a Non Unable to Determine Value for at least one antibiotic dose, continue processing and proceed to the Initial Antibiotic Date determination. Note: Proceed only with Antibiotics that have an associated Non Unable to Determine Antibiotic Administration Date.

15. Determine the Initial Antibiotic Date. The Initial Antibiotic Date equals the Antibiotic Administration Date that corresponds to the initial antibiotic dose.
Note: The initial antibiotic dose is the earliest antibiotic dose administered that is on Table 2.1. If there is more than one antibiotic on the earliest date, select the one having the earliest non Unable to Determine Antibiotic Administration Time. If there is only one antibiotic on the earliest date, retain that earliest antibiotic as the Initial Antibiotic Dose.

16. 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 Blood Culture Collection Day calculation.
17. Calculate Blood Culture Collection Day. Blood Culture Collection Day, in days, is equal to the Initial Antibiotic Date minus the Initial Blood Culture Collection Date.

18. Check Blood Culture Collection Day
a. If the Blood Culture Collection Day is less than zero days, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
b. If the Blood Culture Collection Day is greater than zero days, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
c. If the Blood Culture Collection Day is equal to zero days, continue processing and proceed to Antibiotic Administration Time.
19. Check Antibiotic Administration Time
a. If the Antibiotic Administration Time is equal to Unable to Determine for the antibiotic that is considered the Initial Antibiotic Date, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population.
b. If the Antibiotic Administration Time is a Non Unable to Determine time for the antibiotic that is considered the Initial Antibiotic Date, continue processing and proceed to determine the Initial Antibiotic Time.
20. Determine the Initial Antibiotic Time. The Initial Antibiotic Time is equal to the Antibiotic Administration Time that corresponds to the Initial Antibiotic Dose.

21. 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 proceed to the Antibiotic Timing calculation.
22. Calculate Antibiotic Timing. Antibiotic Timing, in minutes, is equal to the Initial Antibiotic Date and Initial Antibiotic Time minus the Arrival Date and Arrival Time.

23. Check Antibiotic Timing
a. If the Antibiotic Timing is less than zero minutes, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
b. If the Antibiotic Timing is greater than or equal to zero minutes, continue processing and proceed to the Blood Culture Timing calculation.
24. Calculate Blood Culture Timing. Blood Culture Timing, in minutes, is equal to the Initial Antibiotic Date and Initial Antibiotic Time minus the Initial Blood Culture Collection Date and initial Blood Culture Collection Time.

25. Check Blood Culture Timing
a. If the Blood Culture Timing is less than zero minutes, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
b. If the Blood Culture Timing is greater than or equal to zero minutes, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.

2a1.21-23 Calculation Algorithm/Measure Logic Diagram URL or attachment:
URL
http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228767363466
N/A

2a1.24 Sampling (Survey) Methodology. If measure is based on a sample (or survey), provide instructions for obtaining the sample, conducting the survey and guidance on minimum sample size (response rate):
The population of the PN measure set is identified using 5 data elements:
ICD-9-CM Principal Diagnosis Code
ICD-9-CM Other Diagnosis Codes
Admission Date
Birthdate
Discharge Date
Patients admitted to the hospital for inpatient acute care are included in the PN Initial Patient Population and are eligible to be sampled if they have:

An ICD-9-CM Principal Diagnosis Code for PN as defined in Appendix A, Table 3.1, NO ICD-9-CM Other Diagnosis Code of Cystic Fibrosis as defined in Appendix A, Table 3.4, a Patient Age (Admission Date minus Birthdate) greater than or equal to 18 years, and a Length of Stay (Discharge Date minus Admission Date) less than or equal to 120 days
OR

An ICD-9-CM Principal Diagnosis Code of Septicemia or Respiratory Failure as defined in Appendix A, Table 3.2 and Table 3.3 accompanied by an ICD-9-CM Other Diagnosis Code of PN as defined in Appendix A, Table 3.1, NO ICD-9-CM Other Diagnosis Code of Cystic Fibrosis as defined in Appendix A, Table 3.4, a Patient Age (Admission Date minus Birthdate) greater than or equal to 18 years, and a Length of Stay (Discharge Date minus Admission Date) less than or equal to 120 days

First, identify the Initial Patient Population for the measure set. An Initial Patient Population is defined for each measure set, stratum, and sub-population and the count is collected in the Initial Patient Population Size data elements. This data pull utilizes administrative data such as ICD-9-CM diagnosis and procedure codes, admission date, and birthdate.
All ICD-9-CM diagnosis and procedure codes included in the appropriate Initial Patient Population definition must be applied. This identification process must be completed prior to the application of data integrity filter, measure exclusions, and the application of sampling methodology.
For specific measure set, strata, and sub-population definitions, refer to the appropriate Initial Patient Population discussion in the Measure Information section of this manual.
?
Second, if the hospital is sampling, use the Initial Patient Population identified above and pull the sample of medical records for each measure set, stratum, or sub-population using the Sample Size Requirements defined in the appropriate Measure Information section of this manual.
?
Third, collect or abstract from the identified medical records the general and measure specific data elements that are needed for the measure set. The count of the number of cases used in this step is collected in the Sample Size data elements.
oIf the hospital is not sampling, use the medical records identified in the first data pull.
oIf the hospital is sampling, use the medical records from the cases in the identified sample.

Hospitals are NOT required to sample their data. If sampling offers minimal benefit (i.e., a hospital has 80 cases for the quarter and must select a sample of 76 cases) the hospital may choose to use all cases.

2a1.25 Data Source *(Check all the sources for which the measure is specified and tested)*. If other, please describe:
 Administrative claims, Paper Records

2a1.26 Data Source/Data Collection Instrument (*Identify the specific data source/data collection instrument, e.g. name of database, clinical registry, collection instrument, etc.*): Patient medical record can be collected using the CMS Abstraction and Reporting Tool (CART).

2a1.27-29 Data Source/data Collection Instrument Reference Web Page URL or Attachment: URL

http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier3&cid=1135267770141
N/A

2a1.30-32 Data Dictionary/Code Table Web Page URL or Attachment:
URL
http://www.qualitynet.org/dcs/ContentServer?c=Page&pagename=QnetPublic%2FPage%2FQnetTier4&cid=1228767363466
N/A

2a1.33 Level of Analysis (*Check the levels of analysis for which the measure is specified and tested*):   Facility

2a1.34-35 Care Setting *(Check all the settings for which the measure is specified and tested)*:   Hospital/Acute Care Facility

2a2. Reliability Testing. (*Reliability testing was conducted with appropriate method, scope, and adequate demonstration of reliability.*)

2a2.1 Data/Sample *(Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included)*:
Since 2005, CMS has conducted on a regular basis through its contractor " the Clinical Data Abstraction Center (CDAC)" various reliability tests of data elements involved in the assessment of several performance, including blood cultures performed in the emergency department prior to initial antibiotic received in the hospital. Each month, CDAC randomly selects a national sample of 80 cases that had been previously abstracted by hospitals and submitted to the Clinical Data Warehouse. The medical charts for these 80 cases are re-abstracted by CDAC abstractors and compared to the data submitted by the hospitals. The annual sample amounts to 960 cases (12 * 80 per month).

2a2.2 Analytic Method *(Describe method of reliability testing & rationale)*:
The CDAC creates a monthly Project Level Accuracy Report. The report examined agreement between assessors (reliability). Accuracy is calculated as the raw agreement rate of both the original abstractor and the reabstractor with the adjudicated gold standard data. The overall accuracy is the aggregate agreement rate (adjusted for computer mismatches) across all data elements in all cases in the sample.

2a2.3 Testing Results *(Reliability statistics, assessment of adequacy in the context of norms for the test conducted)*:
The most current accuracy result (October, 2011) showed a high agreement rate for all data elements for Blood cultures performed in the emergency department prior to initial antibiotic received in hospital for inpatient discharges. For example, the agreement rates for three major data elements, pneumonia diagnosis, blood culture collected and initial blood culture collection date, were 100%, 98.86% and 98.65%, respectively.

2b. VALIDITY. Validity, Testing, <u>including all Threats to Validity</u>:   H☐ M☐ L☐ I☐

2b1.1 Describe how the measure specifications *(measure focus, target population, and exclusions)* are consistent with the evidence cited in support of the measure focus (*criterion 1c)* and identify any differences from the evidence:
The measure corresponds directly with the 2007 IDSA/ATS Consensus Guidelines for immunocompetent patients with CAP. All exclusions are also consistent with the guidelines. This measure only looks at cases in which the physician makes the decision to perform a blood culture in the ED, they are not required.

2b2. Validity Testing. (*Validity testing was conducted with appropriate method, scope, and adequate demonstration of validity.*)

2b2.1 Data/Sample *(Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included)*:
This measure was implemented on a national level as a CMS national project in 1998. The existing database for hospitalized patients in the last six years comprises almost the universe of patients hospitalized for pneumonia in the United States, approximately one million claims a year since 2005. Potential underrepresentation due to sampling has not been an issue.

2b2.2 Analytic Method *(Describe method of validity testing and rationale; if face validity, describe systematic assessment)*:
This measure has face validity. A group of national experts reviewed the measure and evidence and all agreed that high measure scores will relate to higher quality.
Regarding the individual data elements, the abstractors have direct access to the medical record, which is the most authoritative source to extract the required information. The definitions of individual data elements have been constantly revised and clarified to

avoid ambiguity. They are compiled in a "Manual Specification" document that is posted to various internet websites (CMS, Joint Commission, etc.). After ten years of clarification the likelihood of systematic error when assessing individual data elements should be minimal.

Regarding the overall assessment of the measure using a series of exclusion and inclusion criteria to estimate the denominator (eligible patients) and the numerator (those who received the recommended care), an elaborate analytic algorithm has been developed and repeatedly tested over the past five or six years. On a quarterly basis, the national database is analyzed by two independent teams of statisticians/programmers who compare their results against each other.

2b2.3 Testing Results *(Statistical results, assessment of adequacy in the context of norms for the test conducted; if face validity, describe results of systematic assessment)*:
As indicated earlier, the national database of the existing similar measure is analyzed by two independent teams of statisticians/programmers (located at two different sites) and their results are validated against each other. The matching rate has been 100% over the last five years. A very tiny number of mismatches that were observed on occasion were due to accidental programming glitches not as a result of the measure algorithm itself; and they were always promptly corrected to reach the perfect 100% matching rate between the two independent teams of analysts.
For each quarter, a dedicated contractor with CMS randomly selects five submitted cases from each hospital for re-abstraction. This process was started in 2003. For the last 6 years, the validation score for the data elements were consistently over 90. The validation score for 2010 was 94.3.

POTENTIAL THREATS TO VALIDITY. (*All potential threats to validity were appropriately tested with adequate results.*)

2b3. Measure Exclusions. (*Exclusions were supported by the clinical evidence in 1c or appropriately tested with results demonstrating the need to specify them.*)

2b3.1 Data/Sample for analysis of exclusions *(Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included)*:
Over 4,000 acute care hospitals in the US are submitting their data to the CMS clinical data warehouse, regardless of their Medicare status. Although hospitals are allowed to sample, the vast majority of hospitals submit 100% of their pneumonia cases. Only very large hospitals perform random sampling of their cases. The data set is over 90% of the universe of patients 18 years and older who are discharged with a diagnosis of pneumonia. The annual data set is above 1 million pneumonia hospitalizations. CMS has been collecting this data for over 10 years.

2b3.2 Analytic Method (*Describe type of analysis and rationale for examining exclusions, including exclusion related to patient preference)*:
This quality performance measure is calculated as the proportion of pneumonia patients whose initial ED blood culture was performed prior to the administration of the first hospital dose of antibiotics. All pneumonia patients 18 years of age who have a blood culture performed in the ED are included in this measure. A series of exclusions is applied as detailed in the Specifications section of this report. No risk adjustment is performed for this measure. On a quarterly basis we conduct benchmark analysis to estimate the clinically achievable performance rate as a goal for hospitals.

2b3.3 Results *(Provide statistical results for analysis of exclusions, e.g., frequency, variability, sensitivity analyses)*:
Since these are well established measures for over a decade, we no longer analyze every exclusion on a regular basis. However, at the request of the expert panel we do examine the impact of certain exclusions. Most recently we examined the impact of the exclusion of patients undergoing a clinical trial. The frequency of this exclusion turned out to be very small and did not impact the national rate of the measure. However, individual hospitals could be negatively affected, especially those that involved in clinical trials or those with a small denominator. CMS opinion was to keep these specific exclusion since this measure is used for pay-for-performance.
We are currently examining the impact of the ´comfort measures only´ exclusion.

2b4. Risk Adjustment Strategy. (*For outcome measures, adjustment for differences in case mix (severity) across measured entities was appropriately tested with adequate results.*)

2b4.1 Data/Sample *(Description of the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included)*:
This measure does not require any risk adjustment.

2b4.2 Analytic Method (*Describe methods and rationale for development and testing of risk model or risk stratification including selection of factors/variables*):
N/A

2b4.3 Testing Results (*Statistical risk model: Provide quantitative assessment of relative contribution of model risk factors; risk model performance metrics including cross-validation discrimination and calibration statistics, calibration curve and risk decile plot, and assessment of adequacy in the context of norms for risk models. Risk stratification: Provide quantitative assessment of relationship of risk factors to the outcome and differences in outcomes among the strata*):
N/A

2b4.4 If outcome or resource use measure is not risk adjusted, provide rationale and analyses to justify lack of adjustment: N/A

2b5. Identification of Meaningful Differences in Performance. (*The performance measure scores were appropriately analyzed and discriminated meaningful differences in quality.*)

2b5.1 Data/Sample (*Describe the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*):
When we examine the meaningful differences in performance, we use the entire data set as described in Importance section of this report. We do not sample the original data set since we have electronic access to the entire data set: over 4,000 acute care hospitals and over 1 million records per year, for the last 10 years.

2b5.2 Analytic Method (*Describe methods and rationale to identify statistically significant and practically/meaningfully differences in performance*):
From past experience we usually use our professional/clinical judgment to determine meaningful differences in performance. Once measure results are obtained, analysts will review any variations in performance quarterly. Variations are discussed with subject matter experts and medical director to review the differences in performance across hospitals.
Each quarter we analyze the CMS data to determine the realistic achievable national benchmark/target rate. Those providers whose rates are below the national achievable benchmark would be considered to have less than optimal performance. The national benchmark will be determined using the ABC methodology developed by the University of Alabama.
We also examine the variations in performance across hospitals by describing the frequency distribution and histogram of individual hospital rates. In this analysis we provide the frequency count of hospitals by 10% increments and value of selected percentiles. The goal for this analysis is see all the hospitals moving toward the benchmark.

2b5.3 Results (*Provide measure performance results/scores, e.g., distribution by quartile, mean, median, SD, etc.; identification of statistically significant and meaningfully differences in performance*):
 According to the latest data from the CMS Clinical Data Warehouse, the national rate (96%) is 4% less than the clinically achievable benchmark of 99.9%. The performance rates of 18% of hospitals (nearly 1 out of 5) are still below 90%.

2b6. Comparability of Multiple Data Sources/Methods. (*If specified for more than one data source, the various approaches result in comparable scores.*)

2b6.1 Data/Sample (*Describe the data or sample including number of measured entities; number of patients; dates of data; if a sample, characteristics of the entities included*):
We use only one data source: the direct abstraction of medical records.

2b6.2 Analytic Method (*Describe methods and rationale for testing comparability of scores produced by the different data sources specified in the measure*):
N/A

2b6.3 Testing Results (*Provide statistical results, e.g., correlation statistics, comparison of rankings; assessment of adequacy in the context of norms for the test conducted*):
N/A

2c. Disparities in Care: H☐ M☐ L☐ I ☐ NA☐ (*If applicable, the measure specifications allow identification of disparities.*)

2c.1 **If measure is stratified for disparities, provide stratified results** *(Scores by stratified categories/cohorts)*: N/A

2c.2 **If disparities have been reported/identified (e.g., in 1b), but measure is not specified to detect disparities, please explain:**
We have looked at disparities in PN-3b. We used SAS procedure Glimmix to account for the correlation/clustering effect of patients within hospitals. Random intercepts were used for each hospital. The model included only race-related dummy variables. The between-hospital effects were estimated by including hospital proportion of patients for each minority group in the model. For details of the methodology see Hausmann et al. "Between-hospital and within-hospital racial and ethnic disparities in community-acquired pneumonia treatment and mortality." Medical Care 2009; 47(9): 1009-1017. We excluded patients whose race/ethnicity was missing or "unable to determine" in the the dataset.

2.1-2.3 **Supplemental Testing Methodology Information:**

Steering Committee: Overall, was the criterion, *Scientific Acceptability of Measure Properties*, met?
(*Reliability and Validity must be rated moderate or high*) Yes☐ No☐
Provide rationale based on specific subcriteria:

If the Committee votes No, STOP

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3. USABILITY

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

C.1 **Intended Purpose/ Use** *(Check all the purposes and/or uses for which the measure is intended)*: Payment Program, Public Reporting, Quality Improvement (Internal to the specific organization), Quality Improvement with Benchmarking (external benchmarking to multiple organizations), Regulatory and Accreditation Programs

3.1 **Current Use** *(Check all that apply; for any that are checked, provide the specific program information in the following questions)*: Public Reporting, Payment Program, Regulatory and Accreditation Programs, Quality Improvement with Benchmarking (external benchmarking to multiple organizations)

3a. Usefulness for Public Reporting: H☐ M☐ L☐ I☐
(*The measure is meaningful, understandable and useful for public reporting.*)

3a.1. **Use in Public Reporting - disclosure of performance results to the public at large** *(If used in a public reporting program, provide name of program(s), locations, Web page URL(s)).* If not publicly reported in a national or community program, state the reason AND plans to achieve public reporting, potential reporting programs or commitments, and timeline, e.g., within 3 years of endorsement: [*For Maintenance – If not publicly reported, describe progress made toward achieving disclosure of performance results to the public at large and expected date for public reporting; provide rationale why continued endorsement should be considered.*]
Currently, PN-3b is included among the publicly reported performance in Centers for Medicare and Medicaid (CMS) Hospital Compare (since 2004) and also included in the CMS Hospital Value-based Purchasing Program which is a nation-wide program that will take effect in 2013.
In order for hospitals to receive their Annual Payment Update from CMS, they agree to report their data and have their measure rates reported on Hospital Compare. Details regarding this program can be found at the following URL, https://www.cms.gov/HospitalQualityInits/08_HospitalRHQDAPU.asp.

3a.2. **Provide a rationale for why the measure performance results are meaningful, understandable, and useful for public reporting.** If usefulness was demonstrated (e.g., focus group, cognitive testing), describe the data, method, and results: PN-3b has been reported publicly on Hospital Compare since fourth quarter 2003. CMS conducts annual consumer testing of the language on Hospital Compare to ensure clarity and ease of interpretation of the information posted publicly.

3.2 Use for other Accountability Functions (payment, certification, accreditation). If used in a public accountability program, provide name of program(s), locations, Web page URL(s): Currently, PN-3b is included in the Centers for Medicare and Medicaid (CMS) Hospital Value-based Purchasing Program which is a nation-wide program. In order for hospitals to receive their Annual Payment Update from CMS, they agree to report their data and have their measure rates reported on Hospital Compare. Details regarding this program can be found at the following URL, https://www.cms.gov/HospitalQualityInits/08_HospitalRHQDAPU.asp. This measure is also currently used in the accreditation process for The Joint Commission.

3b. Usefulness for Quality Improvement: H☐ M☐ L☐ I☐
(*The measure is meaningful, understandable and useful for quality improvement.*)

3b.1. Use in QI. If used in quality improvement program, provide name of program(s), locations, Web page URL(s):
[*For Maintenance – If not used for QI, indicate the reasons and describe progress toward using performance results for improvement*].
Currently, PN-3b is included in the Centers for Medicare and Medicaid (CMS) Hospital Value-based Purchasing Program which is a nation-wide quality improvement program. In order for hospitals to receive their Annual Payment Update from CMS, they agree to report their data and have their measure rates reported on Hospital Compare. In order for hospitals to receive their Annual Payment Update from CMS, they agree to report their data and have their measure rates reported on Hospital Compare. Details regarding this program can be found at the following URL, https://www.cms.gov/HospitalQualityInits/08_HospitalRHQDAPU.asp.

3b.2. Provide rationale for why the measure performance results are meaningful, understandable, and useful for quality improvement. If usefulness was demonstrated *(e.g., QI initiative),* describe the data, method and results:
PN-3b has been reported publicly on Hospital Compare since fourth quarter 2003. CMS conducts annual consumer testing of the language on Hospital Compare to ensure clarity and ease of interpretation of the information posted publicly. The higher the score the better a facility is doing. If a facility is not scoring as high as they would like to score, they can see where they have failures, thus knowing where improvement is needed.

Overall, to what extent was the criterion, *Usability,* **met?** H☐ M☐ L☐ I☐
Provide rationale based on specific subcriteria:

4. FEASIBILITY

Extent to which the required data are readily available, retrievable without undue burden, and can be implemented for performance measurement. (**evaluation criteria**)

4a. Data Generated as a Byproduct of Care Processes: H☐ M☐ L☐ I☐

4a.1-2 How are the data elements needed to compute measure scores generated? *(Check all that apply).*
Data used in the measure are:
Coded by someone other than person obtaining original information (e.g., DRG, ICD-9 codes on claims), Abstracted from a record by someone other than person obtaining original information (e.g., chart abstraction for quality measure or registry)

4b. Electronic Sources: H☐ M☐ L☐ I☐

4b.1 Are the data elements needed for the measure as specified available electronically *(Elements that are needed to compute measure scores are in defined, computer-readable fields)*: Some data elements are in electronic sources

4b.2 If ALL data elements are not from electronic sources, specify a credible, near-term path to electronic capture, OR provide a rationale for using other than electronic sources: N/A

4c. Susceptibility to Inaccuracies, Errors, or Unintended Consequences: H☐ M☐ L☐ I☐

4c.1 Identify susceptibility to inaccuracies, errors, or unintended consequences of the measurement identified during testing and/or operational use and strategies to prevent, minimize, or detect. If audited, provide results:
Since the instructions for obtaining the data are written by the measure developers, interpretation of data elements will always be a factor, as they are interpreted by over 4,000 hospitals across the nation. However, since basically the same data elements have been used by PN-3b since 1998, we feel the data elements at this point in time are in very good shape.
No unintended consequences have been identified for PN-3b.

4d. Data Collection Strategy/Implementation: H☐ M☐ L☐ I☐

A.2 Please check if either of the following apply (*regarding proprietary measures*):
4d.1 Describe what you have learned/modified as a result of testing and/or operational use of the measure regarding data collection, availability of data, missing data, timing and frequency of data collection, sampling, patient confidentiality, time and cost of data collection, other feasibility/implementation issues *(e.g., fees for use of proprietary measures)*:
Specifications (including codes and data elements) are modified every 6 months according to feedback received from clinicians and hospital staff collecting data for PN-3b. Data is available in the medical record and there are no feasibility or implementation issues identified.
In the past we learned that missing data was an issue regarding the integrity of our data results. The algorithms were altered to address this issue. If a case is submitted to the CMS Clinical Data Warehouse that has any data elements missing, they are rejected, i.e., sent back to the submitter to give them the opportunity to complete the missing element.

Overall, to what extent was the criterion, *Feasibility*, met? H☐ M☐ L☐ I☐
Provide rationale based on specific subcriteria:

OVERALL SUITABILITY FOR ENDORSEMENT

Does the measure meet all the NQF criteria for endorsement? Yes☐ No☐
Rationale:

If the Committee votes No, STOP.
If the Committee votes Yes, the final recommendation is contingent on comparison to related and competing measures.

5. COMPARISON TO RELATED AND COMPETING MEASURES

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

5.1 If there are related measures *(either same measure focus or target population)* or competing measures *(both the same measure focus and same target population)*, list the NQF # and title of all related and/or competing measures:

5a. Harmonization

5a.1 If this measure has EITHER the same measure focus OR the same target population as NQF-endorsed measure(s):
Are the measure specifications completely harmonized?

5a.2 If the measure specifications are not completely harmonized, identify the differences, rationale, and impact on interpretability and data collection burden:

5b. Competing Measure(s)

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

CONTACT INFORMATION

Co.1 Measure Steward (Intellectual Property Owner): Centers for Medicare & Medicaid Services, 7500 Security Boulevard , Mail Stop S3-01-02, Baltimore, Maryland, 21244-1850

Co.2 Point of Contact: Kristie, Baus, MS, RN, kristie.baus@cms.hhs.gov, 410-786-8161-

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Co.6 Additional organizations that sponsored/participated in measure development:
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 School, McMaster University, Winthrop-University Hospital, SUNY at Stony Brook, American College of Emergency Physicians, Denver Health Medical Center, University of Connecticut School of Medicine, Georgetown University Medical Center, Beth Israel Medical Center,

Co.7 Public Contact: Kristie, Baus, MS, RN, kristie.baus@cms.hhs.gov, 410-786-8161-, Centers for Medicare & Medicaid Services

ADDITIONAL INFORMATION

Workgroup/Expert Panel involved in measure development
Ad.1 Provide a list of sponsoring organizations and workgroup/panel members' names and organizations. Describe the members' role in measure development.
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Ad.2 If adapted, provide title of original measure, NQF # if endorsed, and measure steward. Briefly describe the reasons for adapting the original measure and any work with the original measure steward: N/A

Measure Developer/Steward Updates and Ongoing Maintenance
Ad.3 Year the measure was first released: 1998

Ad.4 Month and Year of most recent revision: 12, 2011
Ad.5 What is your frequency for review/update of this measure? Every 6 months. Even though the answer is 12/2011 above the most recent goes into effect 7/2012
Ad.6 When is the next scheduled review/update for this measure? 12, 2013

Ad.7 Copyright statement: Public Measure

Ad.8 Disclaimers: N/A

Ad.9 Additional Information/Comments: N/A

Date of Submission (*MM/DD/YY*): 10/18/2011