NEW JERSEY 2007 HOSPITAL PERFORMANCE REPORT

TECHNICAL REPORT: METHODOLOGY

New Jersey Department of Health and Senior Services
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A. Sources of Hospital Quality Measures and Data

The **New Jersey 2007 Hospital Performance Report** used data based on the measures developed by The Joint Commission and the Centers for Medicare and Medicaid Services (CMS) for reporting on hospital quality. The New Jersey Department of Health and Senior Services (Department) followed the specifications developed by The Joint Commission and CMS, as defined in Section D of this technical report. The **New Jersey 2007 Hospital Performance Report** included information on hospital discharges for the period of January 1, 2006 through December 31, 2006.

The report contains two major changes from previous years. First, in addition to acute myocardial infarction (AMI or heart attack), pneumonia, and congestive heart failure (CHF) measures, the Department has added information on surgical infection prevention (SIP). Second, we are publishing all rates, including those with fewer than 25 cases. In previous reports, we omitted rates with less than 25 cases.

The report and its methodology have been developed with the guidance of the Department's Quality Improvement Advisory Committee (QIAC). Table 1 lists the measures collected by the Department and an indication as to its inclusion in the report.

Table 1: Joint Commission Core Performance Measures and Inclusion in Report

Joint Commission Core Performance Measures	Included in Report
Acute Myocardial Infarction (AMI)	
Aspirin at arrival	Included
Aspirin prescribed at discharge	Included
Beta blocker at arrival	Included
Beta blocker prescribed at discharge	Included
ACEI/ARB for LVSD	Included
Smoking cessation advice	Included
Inpatient mortality	Not Included
Time to fibrinolysis	Not Included
Fibrinolytic agent received within 30 minutes of hospital arrival	Not Included
Time to PCI	Not Included
PCI received within 90 minutes of hospital arrival*	Included
Pneumonia	
Oxygenation assessment	Included
Pneumococcal vaccination	Included
Antibiotic timing	Not Included
Initial antibiotic received within 8 hours of arrival	Not Included
Initial antibiotic received within 4 hours of arrival	Included
Initial antibiotic selection for PN immunocompetent ICU patient **	Included
Initial antibiotic selection for PN immunocompetent non-ICU patient **	Included
Blood cultures in emergency department***	Included
Blood cultures within 24 hours	Not Included
Smoking cessation advice	Included
Influenza vaccination	Not Included
Congestive Heart Failure	
LVS assessment	Included
ACEI/ARB for LVSD	Included
Discharge instructions	Included
Smoking cessation advice	Included
Surgical Infection Prevention	
Preventive antibiotic started	Included
Preventive antibiotic selected	Not Included
Preventive antibiotic stopped	Included

* Measure reported for July 1, 2006 through December 31, 2006 discharges.
** Because of small sample sizes for ICU patients, these two measures were combined into one measure following the CMS methodology.
*** Measure reported beginning with January 1, 2006 discharges.

All New Jersey general acute care hospitals and one specialized heart hospital were required to submit the information for AMI, pneumonia, CHF, and SIP measures to the Department through their Joint Commission vendors on a quarterly basis. Hospitals collected the basic information for each record by abstracting data from patient medical records and administrative databases. The data were transmitted to Joint Commission vendors, who processed the data according to algorithms established by The Joint Commission to produce scores for each measure. Joint Commission vendors then transmitted both the

individual patient files and the hospital level information to the Department. The Department summarized the quarterly data and provided a summary report to each hospital for review. The Department also provided each hospital with a summary report for the full twelve months for review.

B. Calculation of Hospital Performance Rates

Calculation of individual rates:
Each rate was calculated following the Joint Commission methodology outlined in Section D. The rate for each measure was the proportion of times that the hospital provided the appropriate care. Each measure included only those patients who were eligible for that treatment or test. For example, patients with contraindications for aspirin were excluded from the aspirin at arrival and aspirin prescribed at discharge measures.

Calculation of overall scores:
The overall AMI, pneumonia, CHF, and SIP scores for each hospital are summary measures of how frequently the hospital provided recommended care based on the seven AMI measures, the six pneumonia measures, the four CHF measures, and the two SIP measures, respectively. In deciding to calculate the summary measures, the Department followed the general approach to reporting hospital performance developed by Rhode Island and Kansas. This method was also used for CMS's Premier Hospital Quality Demonstration Project. It has the advantage of evaluating a hospital by the number of opportunities it had to provide quality care for a specific condition. The overall scores were calculated using the following steps:

- The numerator was the sum of patients who received care and the denominator was the sum of patients who were eligible for care for the condition measures. The results for all measures were included for each hospital.
- The overall score was calculated as a percentage by dividing the numerator by the denominator.
- Overall scores (as well as individual rates) were reported as whole numbers. When hospitals were presented from high to low overall scores, a more detailed calculation using six decimal places was used.
- Because of the inclusion of new measures or changes in measure definitions, overall scores are not necessarily comparable to the overall scores from previous years.

C. Data Validation

Hospitals have internal processes to check the accuracy of their data collection. The Joint Commission has reviewed the accuracy of the vendors' systems for

processing the data and calculating the rates as well as conducted a limited study of the accuracy of the abstraction process in a small sample of hospitals. CMS reviews the accuracy of the data submitted by hospitals to the federal government for its quality assessment initiatives. Their data validation process examines the abstracted elements of five records per hospital per quarter selected at random from the cases submitted to CMS for AMI, pneumonia, CHF and SIP conditions[1]. With assistance from the Healthcare Quality Strategies, Inc. (formerly PRONJ, the Healthcare Quality Improvement Organization of New Jersey), the Department adapted this process to assess the data it received. Validation reports from the last quarter of 2005 and first two quarters of 2006 were examined to determine the validity of the data submitted by New Jersey hospitals. The department followed the CMS methodology in calculating 95% confidence intervals for this period, first with all cases and conditions (including SIP) and then, if a hospital failed to meet a certain threshold, another confidence interval was calculated based on a reduced set of measures referred to as starter set measures[2]. The confidence interval had to include or exceed a threshold of 80%, meaning that a hospital was likely to be correct in its reporting of data elements at least 80% of the time. All New Jersey hospitals met this criterion.

D. Measure Definitions

The definitions for the measures included in this report follow the Joint Commission/CMS definitions that were in effect for the reporting period (Specifications Manual for National Hospital Quality Measures versions 1.04 to 2.1).

During the 12-month reporting period, the Joint Commission/CMS implemented changes to the definitions of several measures. In the body of this technical report, we provide the specifications that were in effect for fourth quarter 2006 discharges; relevant definitional changes implemented by the Joint Commission/CMS at other times during the reporting period are described in footnotes.

For the complete specification manuals and detailed information on definitional changes, we refer the interested reader to the Joint Commission (www.jointcommission.org) and CMS QualityNet (www.qualitynet.org) websites.

[1] More information on the CMS validation process is available at www.qualitynet.org

[2] These measures (AMI – aspirin at arrival, aspirin at discharge, beta blocker at arrival, beta blocker at discharge, ACEI/ARB at discharge; Pneumonia – oxygenation assessment, pneumococcal vaccination, antibiotics within 4 hours; CHF – LVS assessment, ACEI/ARB at discharge) represent the original set of measures that hospitals were required to submit to the CMS.

Acute Myocardial Infarction (Heart Attack)

1. **Aspirin at Arrival** – The percentage of AMI patients age 18 or older without contraindications who received aspirin within 24 hours before or after hospital arrival.
    - **Numerator:** The number of AMI patients who received aspirin within 24 hours before or after hospital arrival.
    - **Denominator:** All AMI patients, defined as discharges with an ICD-9 CM Principal Diagnosis Code for AMI, without aspirin contraindications.
    - **Excluded Populations**:
        - Patients less than 18 years of age.
        - Patients transferred to another acute care hospital or federal hospital on day of or day after arrival.
        - Patients received in transfer from another acute care hospital, including another emergency department.
        - Patients discharged on day of arrival.
        - Patients who expired on day of or day after arrival.
        - Patients who left against medical advice on day of or day after arrival.
        - Patients receiving comfort measures only (i.e., support for the dying patient) documented by physician, nurse practitioner, or physician assistant[3].
        - Patients with one or more of the following aspirin contraindications/reasons for not prescribing aspirin documented in the medical record:
            - Active bleeding on arrival or within 24 hours after arrival;
            - Aspirin allergy;
            - Warfarin/Coumadin as pre-arrival medication; or
            - Other reasons documented by physician, nurse practitioner, or physician assistant for not giving aspirin within 24 hours before or after hospital arrival.

2. **Aspirin Prescribed at Discharge** – The percentage of AMI patients 18 years and older without aspirin contraindications who are prescribed aspirin at hospital discharge.
    - **Numerator:** The number of AMI patients who are prescribed aspirin at hospital discharge.
    - **Denominator:** All AMI patients, defined as discharges with an ICD-9 CM Principal Diagnosis Code for AMI, without aspirin contraindications.
    - **Excluded Populations**:
        - Patients less than 18 years of age.
        - Patients transferred to another acute care hospital or federal hospital.

[3] Exclusion effective beginning with July 1, 2006 discharges.

- Patients who expired.
- Patients who left against medical advice.
- Patients discharged to hospice.
- Patients receiving comfort measures only documented by physician, nurse practitioner, or physician assistant[4].
- Patients with one or more of the following aspirin contraindications/reasons for not prescribing aspirin documented in the medical record:
  - Aspirin allergy;
  - Active bleeding on arrival or during hospital stay;
  - Warfarin/Coumadin prescribed at discharge; or
  - Other reasons documented by physician, nurse practitioner, or physician assistant for not prescribing aspirin at discharge.

3. **Beta Blocker at Arrival** – The percentage of AMI patients 18 years and older without beta blocker contraindications who received a beta blocker within 24 hours after hospital arrival.
   - **Numerator:** The number of AMI patients who received a beta blocker within 24 hours after hospital arrival.
   - **Denominator:** All AMI patients, defined as discharges with an ICD-9-CM Principal Diagnosis Code for AMI, without beta blocker contraindications.
   - **Excluded Populations:**
     - Patients less than 18 years of age.
     - Patients transferred to another acute care hospital or federal hospital on day of or day after arrival.
     - Patients received in transfer from another acute care hospital, including another emergency department.
     - Patients discharged on day of arrival.
     - Patients who expired on day of or day after arrival.
     - Patients who left against medical advice on day of or day after arrival.
     - Patients receiving comfort measures only documented by physician, nurse practitioner, or physician assistant[5].
     - Patients with one or more of the following beta blocker contraindications/reasons for not prescribing a beta blocker documented in the medical record:
       - Beta blocker allergy;
       - Bradycardia (heart rate less than 60 bpm) on arrival or within 24 hours after arrival while not on a beta blocker;
       - Heart failure on arrival or within 24 hours after arrival;

[4] Exclusion effective beginning with July 1, 2006 discharges.
[5] Exclusion effective beginning with July 1, 2006 discharges.

        - Second or third degree heart block on ECG on arrival or within 24 hours after arrival and does not have a pacemaker;
        - Shock on arrival or within 24 hours after arrival; or
        - Other reasons documented by a physician, nurse practitioner, or physician assistant for not giving a beta blocker within 24 hours after hospital arrival.

4. **Beta Blocker Prescribed at Discharge** – The percentage of AMI patients 18 years and older without beta blocker contraindications who are prescribed a beta blocker at hospital discharge.
    - **Numerator:** The number of AMI patients who are prescribed a beta blocker at hospital discharge.
    - **Denominator:** All AMI patients, defined as discharges with an ICD-9-CM Principal Diagnosis Code for AMI, without beta blocker contraindications.
    - **Excluded Populations:**
        - Patients less than 18 years of age.
        - Patients transferred to another acute care hospital or federal hospital.
        - Patients who expired.
        - Patients who left against medical advice.
        - Patients discharged to hospice.
        - Patients receiving comfort measures only documented by physician, nurse practitioner, or physician assistant[6].
        - Patients with one or more of the following beta blocker contraindications/reasons for not prescribing a beta blocker documented in the medical record:
            - Beta blocker allergy;
            - Bradycardia (heart rate less than 60 bpm) on day of discharge or day prior to discharge while not on a beta blocker;
            - Second or third degree heart block on ECG on arrival or during hospital stay and does not have a pacemaker; or
            - Other reasons documented by a physician, nurse practitioner, or physician assistant for not prescribing a beta blocker at discharge.

5. **ACEI/ARB for LVSD** – The percentage of AMI patients 18 years and older with left ventricular systolic dysfunction (LVSD) and without both angiotensin converting enzyme inhibitor (ACEI) and angiotensin receptor blocker (ARB) contraindications with documented evidence of a prescription for an ACEI or ARB at hospital discharge. For purposes of this measure, LVSD is defined as chart documentation of a left ventricular ejection fraction (LVEF) less

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[6] Exclusion effective beginning with July 1, 2006 discharges.

than 40% or a narrative description of left ventricular systolic (LVS) function consistent with moderate or severe systolic dysfunction.

- **Numerator:** The number of AMI patients who are prescribed an ACEI or ARB at hospital discharge.
- **Denominator:** All AMI patients, defined as discharges with an ICD-9-CM Principal Diagnosis Code for AMI, and either chart documentation of a LVEF less than 40% or a narrative description of LVS function consistent with moderate or severe systolic dysfunction, without both ACEI and ARB contraindications.
- **Excluded Populations:**
  - Patients less than 18 years of age.
  - Patients transferred to another acute care hospital or federal hospital.
  - Patients who expired.
  - Patients who left against medical advice.
  - Patients discharged to hospice.
  - Patients receiving comfort measures only documented by physician, nurse practitioner, or physician assistant[7].
  - Patients with BOTH a potential contraindications/reason for not prescribing an ACEI at discharge AND a potential contraindications/reason for not prescribing an ARB at discharge, as evidence by one or more of the following:
    - ACEI allergy AND ARB allergy;
    - Moderate or severe aortic stenosis;
    - Physician, nurse practitioner, or physician assistant documentation of BOTH a reason for not prescribing an ACEI at discharge AND a reason for not prescribing an ARB at discharge.
    - Reason documented by physician, nurse practitioner, or physician assistant for not prescribing an ARB at discharge AND an ACEI allergy.
    - Reason documented by physician, nurse practitioner, or physician assistant for not prescribing an ACEI at discharge AND an ARB allergy.

6. **Smoking Cessation Advice** – The percentage of AMI patients 18 years and older with a history of smoking cigarettes who are given smoking cessation advice or counseling during the hospital stay. For purposes of this measure, a smoker is defined as someone who has smoked cigarettes anytime during the year prior to hospital arrival.
   - **Numerator:** The number of AMI patients who were cigarette smokers who received smoking cessation advice or counseling during the hospital stay.

[7] Exclusion effective beginning with July 1, 2006 discharges.

- **Denominator:** All AMI patients, defined as discharges with an ICD-9-CM Principal Diagnosis Code for AMI, with a history of smoking cigarettes anytime during the year prior to hospital arrival.
- **Excluded Populations:**
  - Patients less than 18 years of age.
  - Patients transferred to another acute care hospital or federal hospital.
  - Patients who expired.
  - Patients who left against medical advice.
  - Patients discharged to hospice.
  - Patients receiving comfort measures only documented by physician, nurse practitioner, or physician assistant[8].

7. **PCI within 90 Minutes of Arrival**[9] – The percentage of AMI patients 18 years and older receiving percutaneous coronary intervention (PCI) during the hospital stay with a time from hospital arrival to PCI of 90 minutes or less.
   - **Numerator:** The number of AMI patients whose time from hospital arrival to PCI is 90 minutes or less.
   - **Denominator:** All AMI patients, defined as discharges with an ICD-9-CM Principal Diagnosis Code for AMI, and with ST-segment elevation or left bundle branch block on the electrocardiogram performed closest to hospital arrival, who received PCI within 24 hours after hospital arrival.
   - **Excluded Populations:**
     - Patients less than 18 years of age.
     - Patients received in transfer from another acute care hospital, including another emergency department.
     - Patients receiving comfort measures only documented by physician, nurse practitioner, or physician assistant[10].
     - Patients administered fibrinolytic agents.
     - PCI described as non-primary by physician, nurse practitioner, or physician assistant[11].
     - Patients who did not receive PCI within 90 minutes or had a reason for delay documented by a physician, nurse practitioner, or physician assistant[12].

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[8] Exclusion effective beginning with July 1, 2006 discharges.
[9] Measure reported for July 1, 2006 through December 31, 2006 discharges. This measure replaces an older measure, “PCI within 120 minutes of hospital arrival”.
[10] Exclusion effective beginning with July 1, 2006 discharges.
[11] Exclusion effective beginning with July 1, 2006 discharges.
[12] Exclusion effective beginning with July 1, 2006 discharges.

Pneumonia

1. **Oxygenation Assessment –** The percentage of pneumonia patients 18 years and older who had an assessment of arterial oxygenation by arterial blood gas (ABG) or pulse oximetry within 24 hours prior to or after hospital arrival.
   - **Numerator:** The number of patients whose arterial oxygenation was assessed by ABG or pulse oximetry within 24 hours prior to or after hospital arrival.
   - **Denominator:** All inpatients 18 years and older with an:
     - ICD-9-CM Principal Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of septicemia and ICD-9-CM Other Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of respiratory failure and ICD-9-CM Other Diagnosis Code of pneumonia
   - **Excluded Populations:**
     - Patients received in transfer from another acute care or critical access hospital, including another emergency department.
     - Patients who had no working diagnosis of pneumonia at the time of admission.
     - Patients receiving comfort measures only.
     - Patients less than 18 years of age.
     - Patients who had no chest x-ray or CT scan that indicated positive infiltrate within 24 hours prior to hospital arrival or anytime during this hospitalization[13].

2. **Pneumococcal Vaccination** – The percentage of pneumonia patients 65 years of age and older who were screened for pneumococcal vaccine status and were administered the vaccine prior to discharge, if indicated.
   - **Numerator:** The number of pneumonia patients 65 years of age and older who were screened for pneumococcal vaccine status and were vaccinated prior to discharge, if indicated.
   - **Denominator:** All pneumonia patients 65 years of age and older with an:
     - ICD-9-CM Principal Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of septicemia and ICD-9-CM Other Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of respiratory failure and ICD-9-CM Other Diagnosis Code of pneumonia.

[13] Exclusion effective beginning with July 1, 2006 discharges.

- **Excluded Populations[14]:**
  - Patients receiving comfort measures only
  - Patient who expired in the hospital.
  - Patients who left against medical advice.
  - Patients who were discharged to hospice care.
  - Patients who were transferred to another short-term general hospital for inpatient care.
  - Patients who were discharged to a federal hospital.
  - Patients less than 65 years of age.
  - Patients who had no chest x-ray or CT scan that indicated positive infiltrate within 24 hours prior to hospital arrival or anytime during this hospitalization[15].

3. **Initial Antibiotic Received Within 4 Hours of Hospital Arrival –** The percentage of pneumonia patients 18 years and older who received their first dose of antibiotics within four hours of arrival at the hospital.
   - **Numerator:** The number of pneumonia inpatients whose initial antibiotic dose is administered within four hours of hospital arrival.
   - **Denominator:** All pneumonia inpatients 18 years of age an older with an:
     - ICD-9-CM Principal Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of septicemia and ICD-9-CM Other Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of respiratory failure and ICD-9-CM Other Diagnosis Code of pneumonia.
   - **Excluded Populations:**
     - Patients received in transfer from another acute care or critical access hospital, including another emergency department.
     - Patients who had no working diagnosis of pneumonia at the time of admission.
     - Patients receiving comfort measures only
     - Patients who do not receive antibiotics during hospitalization or within 36 hours (2160 minutes) from the time of hospital arrival.
     - Patients who have received antibiotics within 24 hours prior to hospital arrival.
     - Patients less than 18 years of age.
     - Patients involved in protocols or clinical trials.
     - Patients who had no chest x-ray or CT scan that indicated positive infiltrate within 24 hours prior to hospital arrival or anytime during this hospitalization[16].

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[14] Exclusion criteria dropped during the reporting period included the following: patients received in transfer from another acute care or critical access hospital, including another emergency department (effective beginning with July 1, 2006 discharges); patients who had no working diagnosis of pneumonia at the time of admission (effective beginning with October 1, 2006 discharges).

[15] Exclusion effective beginning with July 1, 2006 discharges.

[16] Exclusion effective beginning with July 1, 2006 discharges.

4. **Blood Cultures Performed in Emergency Department Before First Antibiotic Received in Hospital[17] –** The percentage of pneumonia patients 18 years and older whose initial emergency room blood culture specimen was collected prior to first hospital dose of antibiotics.
   - **Numerator:** The number of pneumonia inpatients whose initial emergency room blood culture was performed prior to the administration of the first hospital dose of antibiotics.
   - **Denominator:** All pneumonia inpatients 18 years and older who have an initial blood culture collected in the emergency department with an:
     - ICD-9-CM Principal Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of septicemia and ICD-9-CM Other Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of respiratory failure and ICD-9-CM Other Diagnosis Code of pneumonia.
   - **Excluded Populations:**
     - Patients received in transfer from another acute care or critical access hospital, including another emergency department.
     - Patients who had no working diagnosis of pneumonia at the time of admission.
     - Patients receiving comfort measures only.
     - Patients less than 18 years of age.
     - Patients who do not receive antibiotics or a blood culture.
     - Patients who had no chest x-ray or CT scan that indicated positive infiltrate within 24 hours prior to hospital arrival or anytime during this hospitalization[18].

5. **Smoking Cessation Advice** – The percentage of pneumonia patients 18 years and older with a history of smoking cigarettes who are given smoking cessation advice or counseling during the hospital stay. For purposes of this measure, a smoker is defined as someone who has smoked cigarettes anytime during the year prior to hospital arrival.
   - **Numerator:** The number of pneumonia patients who received smoking cessation advice or counseling during the hospital stay.
   - **Denominator:** All pneumonia inpatients 18 years and older with a history of smoking cigarettes anytime prior to hospital arrival with an:
     - ICD-9-CM Principal Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of septicemia and ICD-9-CM Other Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of respiratory failure and ICD-9-CM Other Diagnosis Code of pneumonia.
   - **Excluded Populations[19]:**

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[17] Measure reported beginning with January 1, 2006 discharges. This measure replaces an older measure, "Blood cultures performed before initial antibiotic", that applied to all patients (i.e., not only those in the emergency department).
[18] Exclusion effective beginning with July 1, 2006 discharges.

- Patients receiving comfort measures only.
- Patients who expired in the hospital.
- Patients who left against medical advice.
- Patients discharged to hospice.
- Patients transferred to a federal hospital.
- Patients transferred to another short-term general hospital for inpatient care.
- Patients less than 18 years of age.
- Patients who had no chest x-ray or CT scan that indicated positive infiltrate within 24 hours prior to hospital arrival or anytime during this hospitalization[20].

6. **Initial Antibiotic Selection for Community-Acquired Pneumonia in Immunocompetent Patients –** The percentage of immunocompetent pneumonia patients 18 years and older who receive an initial antibiotic regimen during the first 24 hours that is consistent with current guidelines.
   - **Numerator:** The number of pneumonia inpatients who received antibiotics consistent with current guidelines during the first 24 hours of their hospitalization.
   - **Denominator:** All pneumonia inpatients 18 years of age and older with an:
     - ICD-9-CM Principal Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of septicemia and ICD-9-CM Other Diagnosis Code of pneumonia; or
     - ICD-9-CM Principal Diagnosis Code of respiratory failure and ICD-9-CM Other Diagnosis Code of pneumonia.
   - **Excluded Populations:**
     - Patients received in transfer from another acute care or critical access hospital, including another emergency department.
     - Patients who have no working diagnosis of pneumonia at the time of admission.
     - Patients receiving comfort measures only.
     - Patients who do not receive antibiotics during hospitalization or within 36 hours (2160 minutes) from the time of hospital arrival.
     - Patients who are Compromised (i.e., the patient has a clinical condition that could cause an impaired immune system or put the patient at higher risk for infection OR had a prior hospitalization within the past 14 days).
     - Patients involved in protocols or clinical trials.
     - Patients with Healthcare Associated Pneumonia (i.e., patient had a risk for healthcare associated pneumonia prior to hospital

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[19] Exclusion criteria dropped during the reporting period included the following: patients received in transfer from another hospital's emergency department (effective beginning with January 1, 2006 discharges); patients who had no working diagnosis of pneumonia at the time of admission (effective beginning with October 1, 2006 discharges).
[20] Exclusion effective beginning with July 1, 2006 discharges.

admission as determined by the presence of at least one of the following: hospitalization for two days within the last 90 days; residence in nursing home or extended care facility for any amount of time within the last 90 days; chronic dialysis within the last 30 days; home wound care within the last 30 days).

- Patients who had no chest x-ray or CT scan that indicated positive infiltrate within 24 hours prior to hospital arrival or anytime during this hospitalization[21].
- Pneumonia patients with another suspected source of infection who did not receive an antibiotic regimen recommended for pneumonia, but did receive antibiotics within the first 24 hours of hospitalization[22].

Congestive Heart Failure

1. **LVS Assessment –** The percentage of congestive heart failure patients 18 years and older with documentation in the hospital record that left ventricular systolic (LVS) function was assessed before arrival, during hospitalization, or is planned for after discharge.
   - **Numerator:** The number of congestive heart failure patients with documentation that LVS function was assessed before arrival, during hospitalization, or is planned for after discharge.
   - **Denominator:** All inpatients with an ICD-9-CM Principal Diagnosis Code of heart failure.
   - **Excluded Populations:**
     - Patients less than 18 years of age.
     - Patients transferred to another acute care hospital or federal hospital.
     - Patients who expired.
     - Patients who left against medical advice.
     - Patients discharged to hospice.
     - Patients receiving comfort measures only (i.e., support for the dying patient), documented by a physician, nurse practitioner, or physician assistant[23].
     - Patients with reasons documented by a physician, nurse practitioner, or physician assistant for no LVS function assessment.
     - Patients who had a left ventricular assistive device (LVAD) or heart transplant procedure during hospital stay.

2. **ACEI/ARB for LVSD**– The percentage of congestive heart failure patients 18 years and older with left ventricular systolic dysfunction (LVSD) and without both angiotensin converting enzyme inhibitor (ACEI) and

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[21] Exclusion effective beginning with July 1, 2006 discharges.
[22] Exclusion effective beginning with October 1, 2006 discharges.
[23] Exclusion effective beginning with July 1, 2006 discharges.

angiotensin receptor blocker (ARB) contraindications who are prescribed an ACEI or ARB at hospital discharge. For purposes of this measure, LVSD is defined as chart documentation of a left ventricular ejection fraction (LVEF) less than 40% or a narrative description of left ventricular systolic (LVS) function consistent with moderate or severe systolic dysfunction.

- **Numerator:** The number of CHF patients who are prescribed an ACEI or ARB at hospital discharge.
- **Denominator:** All inpatients with documentation of a LVEF less than 40% or a narrative description of LVS function consistent with moderate or severe systolic dysfunction and an ICD-9-CM Principal Diagnosis Code of heart failure.
- **Excluded Populations:**
  - Patients less than 18 years of age.
  - Patients transferred to another acute care hospital or federal hospital.
  - Patients who expired.
  - Patients who left against medical advice.
  - Patients discharged to hospice.
  - Patients receiving comfort measures only (i.e., support for the dying patient) documented by a physician, nurse practitioner, or physician assistant[24].
  - Patients with BOTH a potential contraindications/reason for not prescribing an ACEI at discharge AND a potential contraindications/reason for not prescribing an ARB at discharge, as evidence by one or more of the following:
    - ACEI allergy AND ARB allergy;
    - Moderate or severe aortic stenosis;
    - Physician, nurse practitioner, or physician assistant documentation of BOTH a reason for not prescribing an ACEI at discharge AND a reason for not prescribing an ARB at discharge.
    - Reason documented by physician, nurse practitioner, or physician assistant for not prescribing an ARB at discharge AND an ACEI allergy.
    - Reason documented by physician, nurse practitioner, or physician assistant for not prescribing an ACEI at discharge AND an ARB allergy.
  - Patients who had a left ventricular assistive device (LVAD) or heart transplant procedure during hospital stay.

3. **Discharge Instructions –** The percentage of congestive heart failure patients 18 years and older discharged home with written instructions or educational material to patient or caregiver at discharge or during the hospital stay addressing all of the following: activity level, diet, discharge

[24] Exclusion effective beginning with July 1, 2006 discharges.

medications, follow-up appointment, weight monitoring, and what to do if symptoms worsen.

- **Numerator:** The number of congestive heart failure patients with documentation that they or their caregivers were given written discharge instructions or other educational material addressing all of the following: activity level, diet, discharge medications, follow-up appointment, weight monitoring, and what to do if symptoms worsen.
- **Denominator:** All inpatients who were discharged to home or home care with an ICD-9-CM Principal Diagnosis Code of heart failure.
- **Excluded Populations:**
  - Patients less than 18 years of age.
  - Patients receiving comfort measures only (i.e., support for the dying patient), documented by a physician, nurse practitioner, or physician assistant[25].
  - Patients who had a left ventricular assistive device (LVAD) or heart transplant procedure during hospital stay.

4. **Smoking Cessation Advice** – The percentage of congestive heart failure patients 18 years and older with a history of smoking cigarettes who are given smoking cessation advice or counseling during the hospital stay. For purposes of this measure, a smoker is defined as someone who has smoked cigarettes anytime during the year prior to hospital arrival.
   - **Numerator:** The number of CHF patients who receive smoking cessation advice or counseling during the hospital stay.
   - **Denominator:** All CHF patients, defined as discharges with an ICD-9-CM Principal Diagnosis Code for CHF, with a history of smoking cigarettes anytime during the year prior to hospital arrival.
   - **Excluded Populations:**
     - Patients less than 18 years of age.
     - Patients transferred to another acute care hospital or federal hospital.
     - Patients who expired.
     - Patients who left against medical advice.
     - Patients discharged to hospice.
     - Patients receiving comfort measures only (i.e., support for the dying patient), documented by a physician, nurse practitioner, or physician assistant[26].
     - Patients who had a left ventricular assistive device (LVAD) or heart transplant procedure during hospital stay.

<u>Surgical Infection Prevention</u>

1. **Preventive Antibiotic Started–** The percentage of surgical patients who receive preventative antibiotics within one hour prior to surgical incision.

[25] Exclusion effective beginning with July 1, 2006 discharges.
[26] Exclusion effective beginning with July 1, 2006 discharges.

(Patients who received vancomycin or a fluoroquinolone for prophylactic antibiotics should have the antibiotics administered within two hours prior to surgical incision.) Procedures could include CABG, other cardiac surgery, hip arthoplasty, knee arthoplasty, colon surgery, hysterectomy, and/or vascular surgery.

- **Numerator:** The number of surgery patients who received prophylactic antibiotics within one hour of surgical incision (two hours if receiving vancomycin or a fluoroquinolone).
- **Denominator:** All selected surgical patients with no evidence of prior infection, with an ICD-9-CM Principal Procedure Code of selected major surgeries and an ICD-9-CM Principal Procedure Code of selected surgeries[27].
- **Excluded Populations:**
    - Patients who had a principal diagnosis suggestive of preoperative infectious diseases[28].
    - Patients who were receiving antibiotics within 24 hours prior to arrival (except colon surgery patients taking oral prophylactic antibiotics).
    - Patients who were receiving antibiotics more than 24 hours prior to surgery (except colon surgery patients taking oral prophylactic antibiotics).
    - Colon surgery patients who received oral prophylactic antibiotics only, and who received no antibiotics during stay.
    - Patients less than 18 years of age.
    - Patients with physician documented infection prior to surgical procedure of interest.
    - Patients who had other procedures requiring general or spinal anesthesia that occurred within 3 days (4 days for CABG and Other Cardiac Surgery)[29] prior to or after the procedure of interest (during separate surgical episodes) during this hospital stay.
    - Patients whose ICD-9-CM principal procedure occurred prior to the date of admission[30].

2. **Preventive Antibiotic Stopped–** The percentage of surgical patients whose preventative antibiotics were discontinued within 24 hours after surgery end time (48 hours for CABG and other cardiac patients).

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[27] Beginning with October 1, 2006 discharges, the condition "or ICD-9-CM Other Procedure Codes for selected surgeries" was removed from the inclusion criteria.

[28] Exclusion criteria were modified beginning with October 1, 2006 discharges. This exclusion was previously stated as "patients who had a principal or admission diagnosis suggestive of preoperative infectious diseases".

[29] Beginning with July 1, 2006 discharges, exclusion criteria were changed from "24 hours" to "3 days (4 days for CABG and Other Cardiac Surgery)".

[30] Exclusion effective beginning with July 1, 2006 discharges.

Procedures could include CABG, other cardiac surgery, hip arthoplasty, knee arthoplasty, colon surgery, hysterectomy, and/or vascular surgery.

- **Numerator:** The number of surgery patients whose prophylactic antibiotics were discontinued within 24 hours after surgery end time (48 hours for CABG and other cardiac surgery patients).
- **Denominator:** All selected inpatients with no evidence of prior infection, and with an ICD-9-CM Principal Procedure Code of selected major surgeries and an ICD-9-CM Principal Procedure Code of selected surgeries.
- **Excluded Populations[31]:**
    - Patients who had a principal diagnosis suggestive of preoperative infectious diseases.
    - Patients who were receiving antibiotics within 24 hours prior to arrival (except colon surgery patients taking oral prophylactic antibiotics).
    - Patients who were receiving antibiotics more than 24 hours prior to surgery (except colon surgery patients taking oral prophylactic antibiotics).
    - Patients who were diagnosed with and treated for infections within two days (three days for CABG and Other Cardiac Surgery)[32] after surgery end date.
    - Patients who did not receive any antibiotics during hospitalization.
    - Patients less than 18 years of age.
    - Patients with physician documented infection prior to surgical procedure of interest.
    - Patients who had other procedures requiring general or spinal anesthesia that occurred within 3 days (4 days for CABG and Other Cardiac Surgery)[33] prior to or after the procedure of interest (during separate surgical episodes) during this hospital stay.
    - Patients whose ICD-9-CM principal procedure occurred prior to the date of admission[34].

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[31] Exclusions dropped during the reporting period included the following: patients who did not receive any antibiotics before or during surgery or within 24 hours after surgery end time (effective beginning with July 1, 2006 discharges).

[32] Beginning with July 1, 2006 discharges, exclusion criteria were modified to include "(three days for CABG and Other Cardiac Surgery)".

[33] Beginning with July 1, 2006 discharges, exclusion criteria were changed from "24 hours" to "3 days (4 days for CABG and Other Cardiac Surgery)".

[34] Exclusion effective beginning with July 1, 2006 discharges.

E. **Calculation of Top 10% and 50% Scores**

For each quality measure, including the overall score, we identified the hospital score that was at the 50th percentile ("median"), and the 90th percentile ("top 10th percentile"). These statistics included all hospitals, including those with fewer than 25 cases for a measure. Scores for PBI Regional Medical Center, which closed during 2006, were not included in these calculations.