Measure Information Form

**Measure Set:** Pneumonia (PN)

**Performance Measure Identifier:**

<table>
<thead>
<tr>
<th>Organization</th>
<th>Set Measure ID#</th>
<th>Measure Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMS</td>
<td>PN-6</td>
<td>ICU &amp; Non-ICU Patients</td>
</tr>
<tr>
<td>The Joint Commission</td>
<td>PN-6a</td>
<td>ICU Patients</td>
</tr>
<tr>
<td>The Joint Commission</td>
<td>PN-6b</td>
<td>Non-ICU Patients</td>
</tr>
</tbody>
</table>

Note: CMS data is transmitted as patient level data while the Joint Commission’s data is transmitted as aggregate level data. Therefore, in order for The Joint Commission to distinguish between ICU and non-ICU patients, two separate measures are required for data transmission.

**Performance Measure Name:**

(PN-6) Initial Antibiotic Selection for Community-Acquired Pneumonia (CAP) in Immunocompetent Patients

(PN-6a) Initial Antibiotic Selection for Community-Acquired Pneumonia (CAP) in Immunocompetent Patients – Intensive Care Unit (ICU) Patients

(PN-6b) Initial Antibiotic Selection for Community-Acquired Pneumonia (CAP) in Immunocompetent Patients – Non ICU Patients

**Description:**

(PN-6) Immunocompetent patients with Community-Acquired Pneumonia who receive an initial antibiotic regimen during the first 24 hours that is consistent with current guidelines

(PN-6a) Immunocompetent ICU patients with Community-Acquired Pneumonia who receive an initial antibiotic regimen during the first 24 hours that is consistent with current guidelines

(PN-6b) Immunocompetent non-Intensive Care Unit (ICU) patients with Community-Acquired Pneumonia who receive an initial antibiotic regimen during the first 24 hours that is consistent with current guidelines

**Rationale:** The current North American antibiotic guidelines for Community-Acquired Pneumonia in immunocompetent patients are from the Centers for Disease Control and Prevention (CDC), the Infectious Diseases Society of America (IDSA), the Canadian Infectious Disease Society / Canadian Thoracic Society (CIDS/CTS), and the American Thoracic Society (ATS). All four reflect that Streptococcus pneumoniae is the most common cause of CAP, that treatment that covers “atypical” pathogens (e.g., Legionella species, Chlamydia pneumoniae, Mycoplasma pneumoniae) can be associated with
improved survival, and that the prevalence of antibiotic resistant \textit{S. pneumoniae} is increasing.

The CMS convened a conference of guideline authors, including Julie Gerberding, MD (CDC), John Bartlett, MD (IDSA), Ronald Grossman, MD (CIDS/CTS), and Michael Niederman, MD (ATS), to reach consensus on the antibiotic regimens that could be considered consistent with all four organizations’ guidelines. These regimens are reflected in this measure, and in the Pneumonia Antibiotic Consensus Recommendation located directly behind the measure information form.

**Type of Measure:** Process

**Improvement Noted As:** An increase in the rate/score/number of occurrences

**Numerator Statement:** Pneumonia patients who received an initial antibiotic regimen (as specified under the Set Measure Identifier and description above) consistent with current guidelines during the first 24 hours of their hospitalization

<table>
<thead>
<tr>
<th>Included populations</th>
<th>PN-6</th>
<th>PN-6a</th>
<th>PN-6b</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia patients who received antibiotics consistent with current guidelines</td>
<td>ICU pneumonia patients who received antibiotics consistent with current guidelines</td>
<td>Non-ICU pneumonia patients who received antibiotics consistent with current guidelines</td>
<td></td>
</tr>
</tbody>
</table>

| Excluded Populations | None | None | None |

<table>
<thead>
<tr>
<th>Data Elements</th>
<th>PN-6</th>
<th>PN-6a</th>
<th>PN-6b</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{Antibiotic Administration Date}</td>
<td>\textit{Antibiotic Administration Date}</td>
<td>\textit{Antibiotic Administration Date}</td>
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</tr>
<tr>
<td>\textit{Antibiotic Administration Route}</td>
<td>\textit{Antibiotic Administration Route}</td>
<td>\textit{Antibiotic Administration Route}</td>
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<tr>
<td>\textit{Antibiotic Administration Time}</td>
<td>\textit{Antibiotic Administration Time}</td>
<td>\textit{Antibiotic Administration Time}</td>
<td></td>
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<tr>
<td>\textit{Antibiotic Allergy}</td>
<td>\textit{Antibiotic Allergy}</td>
<td>\textit{Antibiotic Allergy}</td>
<td></td>
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<tr>
<td>\textit{Antibiotic Name}</td>
<td>\textit{Antibiotic Name}</td>
<td>\textit{Antibiotic Name}</td>
<td></td>
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<tr>
<td>\textit{Arrival Date}</td>
<td>\textit{Arrival Date}</td>
<td>\textit{Arrival Date}</td>
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<tr>
<td>\textit{Arrival Time}</td>
<td>\textit{Arrival Time}</td>
<td>\textit{Arrival Time}</td>
<td></td>
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<tr>
<td>\textit{Pseudomonas Risk}</td>
<td>\textit{Risk Factors for Drug-Resistant Pneumococcus}</td>
<td>\textit{Risk Factors for Drug-Resistant Pneumococcus}</td>
<td></td>
</tr>
</tbody>
</table>

**Denominator Statement:** Pneumonia patients (as specified under the Set Measure Identifier and description above) 18 years of age and older

Specifications Manual for National Hospital Inpatient Quality Measures
Discharges 10-01-10 (4Q10) through 03-31-11 (1Q11) PN-6, 6ab-2
Included Populations: Discharges with:
- An *ICD-9-CM Principal Diagnosis Code* of pneumonia as defined in Appendix A, Table 3.1 OR *ICD-9-CM Principal Diagnosis Code* of septicemia or respiratory failure (acute or chronic) as defined in Appendix A, Tables 3.2, or 3.3
  AND
- An *ICD-9-CM Other Diagnosis Code* of pneumonia (Appendix A, Table 3.1)

Excluded Populations:
- Patients less than 18 years of age
- Patients who have a Length of Stay greater than 120 days
- Patients with Cystic Fibrosis (Appendix A, Table 3.4)
- Patients who had no chest x-ray or CT scan that indicated abnormal findings within 24 hours prior to hospital arrival or anytime during this hospitalization
- Patients with *Comfort Measures Only* documented on day of or day after arrival
- Patients enrolled in clinical trials
- Patients received as a transfer from the emergency/observation department of another hospital
- Patients received as a transfer from an inpatient or outpatient department of another hospital
- Patients received as a transfer from an ambulatory surgery center
- Patients who have no diagnosis of pneumonia either as the ED final diagnosis/impression or direct admission diagnosis/impression
- PN patients not in the ICU (PN-6a only)
- PN patients in ICU (PN-6b only)
- Patients with *Healthcare Associated PN* as defined in the Data Dictionary
- Patients who are *Compromised* as defined in the Data Dictionary
- Patients transferred/admitted to the ICU within 24 hours after arrival to this hospital, with a beta-lactam allergy
- Patients who have duration of stay less than or equal to one day
- Pneumonia patients with *Another Source of Infection* who did not receive an antibiotic regimen recommended for pneumonia, but did receive antibiotics within the first 24 hours of hospitalization

Data Elements:
- *Admission Date*
- *Another Source of Infection*
- *Antibiotic Administration Date*
- *Antibiotic Administration Time*
- *Antibiotic Name*
- *Antibiotic Received*
- *Birthdate*
Risk Adjustment: No

Data Collection Approach: Retrospective, data sources for required data elements include administrative data and medical record documents. Some hospitals may prefer to gather data concurrently by identifying patients in the population of interest. This approach provides opportunity for improvement at the point of care/service. However, complete documentation includes the final ICD-9-CM diagnosis and procedure codes, which require retrospective data entry.

Data Accuracy: Variation may exist in the assignment of ICD-9-CM codes; therefore, coding practices may require evaluation to ensure consistency.

Measure Analysis Suggestions: The time of antibiotic administration is critical to this measure. For quality improvement purposes, the ORYX® Vendor may want to create reports to identify patients who received their antibiotic consistent with guidelines but greater than 24 hours from the time of arrival, and patients who did not receive an antibiotic consistent with guidelines. This will allow healthcare organizations to direct education effort in the appropriate direction (e.g., appropriate antibiotic selection or timing of administration).

Sampling: Yes, please refer to the measure set specific sampling requirements and for additional information see the Population and Sampling Specifications section.

Data Reported As: Aggregate rate generated from count data reported as a proportion

Selected References:


<table>
<thead>
<tr>
<th>Patient Type</th>
<th>Antibiotic Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non – ICU Patient</td>
<td>β-lactam (IV or IM) Table 2.3 + Macrolide (IV or PO) Table 2.5</td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
<tr>
<td></td>
<td><strong>Antipneumococcal Quinolone monotherapy (IV or PO) Table 2.9</strong></td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
<tr>
<td></td>
<td>β-lactam (IV or IM) Table 2.3 + Doxycycline (IV or PO) Table 2.10</td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
<tr>
<td></td>
<td>If less than 65 with no <em>Risk Factors for Drug-Resistant Pneumococcus</em> (see data element)</td>
</tr>
<tr>
<td></td>
<td><strong>Macrolide monotherapy (IV or PO) Table 2.5</strong></td>
</tr>
<tr>
<td></td>
<td>β-lactam = Ceftriaxone, Cefotaxime, Ampicillin/Sulbactam, Ertapenem</td>
</tr>
<tr>
<td></td>
<td>Macrolide = Erythromycin, Clarithromycin, Azithromycin</td>
</tr>
<tr>
<td></td>
<td>Antipneumococcal Quinolones = Levofloxacin¹, Moxifloxacin, Gemifloxacin</td>
</tr>
<tr>
<td>Patient Type</td>
<td>Antibiotic Recommendation</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>ICU Patient</td>
<td><strong>Macrolide (IV) Table 2.6</strong> + either β-lactam (IV) Table 2.16 <strong>OR</strong> Antipneumococcal/Antipseudomonal β-lactam (IV) Table 2.4</td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
<tr>
<td></td>
<td><strong>Antipneumococcal Quinolone (IV) Table 2.14 OR Antipseudomonal Quinolone (IV) Table 2.8 + either β-lactam (IV) Table 2.16 OR Antipneumococcal/Antipseudomonal β-lactam (IV) Table 2.4</strong></td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
<tr>
<td></td>
<td><strong>Antipneumococcal/ Antipseudomonal β-lactam (IV) Table 2.4 + Aminoglycoside (IV) Table 2.11 + either Antipneumococcal Quinolone (IV) Table 2.14 OR Macrolide (IV) Table 2.6</strong></td>
</tr>
<tr>
<td></td>
<td>β-lactam = Ceftriaxone, Cefotaxime, Ampicillin/Sulbactam,</td>
</tr>
<tr>
<td></td>
<td>Antipneumococcal/ Antipseudomonal β-lactam = Cefepime, Imipenem, Meropenem, Piperacillin/Tazobactam, Doripenem</td>
</tr>
<tr>
<td></td>
<td>Macrolide = Erythromycin, Azithromycin</td>
</tr>
<tr>
<td></td>
<td>Antipneumococcal Quinolones = Levofloxacin¹, Moxifloxacin</td>
</tr>
<tr>
<td></td>
<td>Antipseudomonal Quinolone = Ciprofloxacin, Levofloxacin¹</td>
</tr>
<tr>
<td></td>
<td>Aminoglycoside = Gentamicin, Tobramycin, Amikacin</td>
</tr>
<tr>
<td>Non-ICU patient with Pseudomonal Risk</td>
<td>These antibiotics are acceptable for Non-ICU patients with Pseudomonal Risk <strong>ONLY</strong>:</td>
</tr>
<tr>
<td></td>
<td><strong>Antipneumococcal/Antipseudomonal β-lactam (IV) Table 2.4 + Antipseudomonal Quinolone (IV or PO) Table 2.8</strong></td>
</tr>
<tr>
<td></td>
<td>Or</td>
</tr>
<tr>
<td>Patient Type</td>
<td>Antibiotic Recommendation</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Antipseudomonal β-lactam (IV)</td>
<td>Table 2.4 + Antipseudomonal β-lactam (IV) Table 2.11 + either Antipseudomonal Quinolone (IV or PO) Table 2.9 Or Macrolide (IV or PO) Table 2.5</td>
</tr>
</tbody>
</table>

These antibiotics are ONLY acceptable for Non-ICU patients with β-lactam allergy and Pseudomonal Risk: **Aztreonam (IV or IM)** Table 2.7 + **Antipseudomococcal Quinolone (IV or PO)** Table 2.9 + **Aminoglycoside (IV)** Table 2.11

Or

**Aztreonam**\(^2\) (IV or IM) Table 2.7 + **Levofloxacin**\(^1\) (IV or PO) Table 2.17

Antipseudomonal Quinolone = Ciprofloxacin, Levofloxacin\(^1\)

Antipseudomonal β-lactam = Cefepime, Imipenem, Meropenem, Piperacillin/Tazobactam, Doripenem

Aminoglycoside = Gentamicin, Tobramycin, Amikacin

Antipseudomococcal Quinolone = Levofloxacin\(^1\), Moxifloxacin, **Gemifloxacin**

Macrolide = Erythromycin, **Clarithromycin**, Azithromycin

Data collected by the CMS National Pneumonia Project indicate that 78% of Medicare pneumonia patients who were hospitalized during 1998-99 received antibiotics that were consistent with guidelines published at that time. Among the states and territories this ranged from 55% to 87%. Compliance was lower among ICU patients, largely because atypical pathogen coverage was generally not common, but was only recommended for ICU patients. Subsequent revisions have made such coverage recommended for all inpatients.

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\(^1\) Levofloxacin should be used in 750mg dosage when used in the management of patients with pneumonia.

\(^2\) For patients with renal insufficiency.

Note: The dosage listed is specified to reflect clinical expert recommendations. We do not collect dosage information for the purposes of the Pneumonia Project.
PN-6: Initial Antibiotic Selection for Community-Acquired Pneumonia (CAP) in Immunocompetent Patients

Numerator: Pneumonia patients who received an initial antibiotic regimen consistent with current guidelines during the first 24 hours of their hospitalization

Denominator: Pneumonia patients 18 years of age and older.

Variable Key:
- Patient Age
- Duration of Stay
- Antibiotic Days
- Abxday Flag
- ANTMINUTES
- Regimen1a
- Regimen2a
- Regimen3a
- Regimen4a
- Regimen5a
- Regimen6a
- Regimen7a
For each case, include for further processing only those antibiotic doses that are on Table 2.1 and whose associated route = 1, 2, or 3.
Antibiotic Administration

Antibiotic Days = Antibiotic Administration Date – Arrival Date (in days)

Calculate Antibiotic Days for each antibiotic dose that has a non-UTD date.
Proceed only with antibiotic doses that have non-UTD Antibiotic Administration Dates.

Antibiotic Days < 0 for ANY antibiotic dose

Antibiotic Days ≥ 0 for ALL antibiotic doses

Antibiotic Days > 0 for ANY antibiotic dose

Initialize Abxday flag = No for each antibiotic doses.
Set Abxday flag = Yes for each antibiotic dose where Antibiotic Days = 0.

ANTIMINUTES = Antibiotic Administration Date and Antibiotic Administration Time - Arrival Date and Arrival Time (in minutes)

Calculate ANTIMINUTES for each antibiotic dose that has a non-UTD date and time combination.
Proceed with antibiotic doses that have ANTIMINUTES calculated, OR Abxday flag = Yes.

ANTIMINUTES < 0 for ANY antibiotic dose

ANTIMINUTES ≥ 0 and ≤ 1440 minutes for at least one antibiotic dose.

For each case, proceed ONLY with those antibiotic doses that satisfy at least one of the following conditions:
Abxday flag = Yes
ANTIMINUTES ≥ 0 and ≤ 1440

ICU Admission or Transfer

Antibiotic Allergy

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Discharges 10-01-10 (4Q10) through 03-31-11 (1Q11)
The Patient Age is calculated from Admission Date – Birthdate as part of the Initial Patient Population logic.

Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example: if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.

Specifications Manual for National Hospital Inpatient Quality Measures
Discharges 10-01-10 (4Q10) through 03-31-11 (1Q11)
Specifications Manual for National Hospital Inpatient Quality Measures
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Regimen 4a: non-ICU patients with Pseudomonas Risk
Regimen 5a: non-ICU patients with Pseudomonas Risk
Regimen 6a: non-ICU patients with Pseudomonas Risk and Beta lactam allergy
Regimen 7a: non-ICU patients with Pseudomonas Risk and Beta lactam allergy

Note: Regimen 5a cannot be reached if Regimen 4a is met due to the regimens overlap.
Note: Regimen 6a cannot be reached if Regimen 1a is met due to the regimens overlap.
Note: Regimen 7a cannot be reached if Regimen 6a is met due to the regimens overlap.
Pneumonia (PN) - 6: Initial Antibiotic Selection for Community-Acquired Pneumonia (CAP) in Immunocompetent Patients

Numerator: Pneumonia patients who received an initial antibiotic regimen consistent with current guidelines during the first 24 hours of their hospitalization.

Denominator: Pneumonia patients 18 years of age and older.

Variable Key: Patient Age, Duration of Stay, Antibiotic Days, Antibiotic Day (Abxday) Flag, ANTIMINUTES, Regimen 1a, Regimen 2a, Regimen 3a, Regimen 4a, Regimen 5a, Regimen 6a, Regimen 7a.

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.
   c. If Chest X-Ray equals 1, continue processing and proceed to Comfort Measures Only.

3. Check Comfort Measures Only
   a. If Comfort Measures Only is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Comfort Measures Only equals 1, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If Comfort Measures Only equals 2, 3, or 4, continue processing and proceed to Clinical Trial.

4. Check Clinical Trial
   a. If Clinical Trial is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Clinical Trial equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the measure population. Stop processing.
c. If Clinical Trial equals No, continue processing and proceed to Initialize Variables.

5. Initialize Variables. Initialize Variables as follows: Regimen 1a equal to false. Regimen 2a equal to false. Regimen 3a equal to false. Regimen 4a equal to false. Regimen 5a equal to false. Regimen 6a equal to false. Regimen 7a equal to false. Proceed to Transfer From Another Hospital or ASC.

6. Check Transfer From Another Hospital or ASC
   a. If Transfer From Another Hospital or ASC is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Transfer From Another Hospital or ASC equals 1, 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 Transfer From Another Hospital or ASC equals 5, continue processing and proceed to Pneumonia Diagnosis: ED/Direct Admit.

7. 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 3, 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 1, 2, or 4, continue processing and proceed to ICU Admission or Transfer.

8. Check ICU Admission or Transfer
   a. If ICU Admission or Transfer is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If ICU Admission or Transfer equals 3, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If ICU Admission or Transfer equals 1 or 2, continue processing and proceed to recheck Pneumonia Diagnosis: ED/Direct Admit.

9. Recheck Pneumonia Diagnosis: ED/Direct Admit
   a. If Pneumonia Diagnosis: ED/Direct Admit equals 4, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
b. If Pneumonia Diagnosis: ED/Direct Admit equals 1 or 2, continue processing and proceed to Arrival Date.

10. 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.

11. Calculate Duration of Stay. Duration of Stay, in days, is equal to the Discharge Date minus the Arrival Date.

12. Check Duration of Stay
   a. If the Duration of Stay is less than or equal to 1, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   b. If the Duration of Stay is greater than 1, continue processing and proceed to Health Care Associated Pneumonia (PN).

13. Check Health Care Associated PN
   a. If Health Care Associated PN is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Health Care Associated PN equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If Health Care Associated PN equals No, continue processing and proceed to Compromised.
14. Check Compromised
   a. If Compromised is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Compromised equals 1, 2, or 3, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If Compromised equals 4, continue processing and proceed to Antibiotic Received.

15. 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 D and will be in the Measure Population. Stop processing.
   c. If Antibiotic Received equals 2 or 3, continue processing and proceed to Antibiotic Name.

16. Check Antibiotic Name
   a. If the Antibiotic Grid is not populated, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If the Antibiotic Name is on Table 2.1, continue processing and proceed to Antibiotic Administration Route. 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.

17. Check Antibiotic Administration Route
   a. If the Antibiotic Administration Route is equal to 10 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 Route is equal to 1, 2 or 3 for any antibiotic dose, continue processing. For each case, include for further processing only those antibiotic doses that are on Table 2.1 and whose associated route equals 1, 2 or 3. Proceed to Antibiotic Administration Date.

18. 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 Antibiotic Days calculation.

19. Calculate the Antibiotic Days. The Antibiotic Days, in days, equals the Antibiotic Administration Date minus the Arrival Date. Calculate the Antibiotic Days for each antibiotic dose that has a non Unable to Determine date. Proceed only with antibiotic doses that have non Unable to Determine Antibiotic Administration Dates.

20. Check Antibiotic Days
   a. If the Antibiotic Days is less than zero for ANY antibiotic dose, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If none of the Antibiotic Days is less than zero for ANY antibiotic dose, continue processing and recheck Antibiotic Days.

21. Recheck Antibiotic Days
   a. If the Antibiotic Days is equal to zero for ALL antibiotic doses, continue processing and proceed to step 29 and recheck ICU Admission or Transfer. Do not check Arrival Time, Antibiotic Administration Time, and ANTIMINUTES.
   b. If the Antibiotic Days is greater than zero for ANY antibiotic dose, continue processing and proceed to Initialize Abxday Flag

22. Initialize Abxday Flag only if Antibiotic Days was greater than zero for any antibiotic dose. Initialize Abxday Flag to equal No for each antibiotic doses. Set Abxday flag to equal Yes for each antibiotic dose where Antibiotic Days is equal to zero.

23. 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, continue processing and check the Abxday flag.
      1. If the Abxday flag equals No for all doses, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
      2. If the Abxday flag equals Yes for Any dose, continue processing. Proceed only with those doses where the Abxday flag equals Yes. Proceed to step 29 and recheck ICU Admission or Transfer. Do not check Antibiotic Administration Time or ANTIMINUTES.
c. If the Arrival Time equals a Non Unable To Determine Value, continue processing and proceed to Antibiotic Administration Time.

24. Check Antibiotic Administration Time only if the Arrival Time is a Non Unable to Determine Value
   a. If the Antibiotic Administration Time is equal to Unable to Determine for all antibiotic doses, continue processing and check the Abxday flag.
      1. If the Abxday flag is equal to No for all doses, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
      2. If the Abxday flag is equal to Yes for ANY dose, continue processing. Proceed only with doses where the Abxday flag is equal to Yes. Proceed to step 29 and recheck ICU Admission or Transfer. Do not check ANTIMINUTES.
   b. If the Antibiotic Administration Time is a Non Unable to Determine value for at least one antibiotic dose, continue processing and proceed to the ANTIMINUTES calculation.

25. Calculate ANTIMINUTES only if the Antibiotic Administration Time is a Non Unable to Determine Value. ANTIMINUTES, in minutes, is equal to the Antibiotic Administration Date and Antibiotic Administration Time minus the Arrival Date and the Arrival Time. Calculate the ANITMINUTES for each antibiotic dose that has a non Unable to Determine date and time combination. Proceed with antibiotic doses that have ANTIMINUTES calculated OR Abxflag equal to Yes.

26. Check ANTIMINUTES
   a. If the ANTIMINUTES are less than zero for ANY antibiotic dose, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If none of the ANTIMINUTES is less than zero for ANY antibiotic dose, continue processing and recheck ANTIMINUTES.

27. Recheck ANTIMINUTES
   a. If the ANTIMINUTES are greater than 1440 minutes or 24 hours for all antibiotic doses with a Non Unable To Determine date and time, continue processing. Proceed with antibiotic doses that have ANTIMINUTES calculated or Abxflag equal to Yes. Proceed to the Abxday flag.
      1. If the Abxday flag is equal to No for all doses, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
2. If the Abxday flag is equal to Yes for ANY dose, continue processing. Proceed only with doses where the Abxday flag is equal to Yes. Proceed to recheck ICU Admission or Transfer.

b. If the ANTIMINUTES are greater than or equal to zero and less than or equal to 1440 minutes for at least one antibiotic dose, continue processing. Proceed only with antibiotic doses that have ANTIMINUTES calculated or Abxday Flag equal to Yes. Proceed to recheck ICU Admission or Transfer.

28. For each case, proceed ONLY with those antibiotic doses that satisfy at least one of the following conditions: Abxday flag is equal to Yes or ANTIMINUTES is greater or equal to zero and less than or equal to 1440. Proceed to recheck ICU Admission or Transfer.

29. Recheck ICU Admission or Transfer
a. If ICU Admission or Transfer equals 1, continue processing and check Antibiotic Allergy. Check Antibiotic Allergy.
   1. If Antibiotic Allergy is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   2. If Antibiotic Allergy equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   3. If Antibiotic Allergy equals No, continue processing and proceed to step 77 and check Antibiotic Administration Route. Do not check Regimen 1a, 2a, 3a, 4a, 5a, 6a, or 7a.

b. If ICU Admission or Transfer equals 2, continue processing and proceed to check Regimen 1a.

30. Non ICU Regimens

31. Check Regimen 1a: All non ICU patients

32. Check Antibiotic Name
a. If None of the Antibiotic Names are on Table 2.9, continue processing and proceed to step 34 and check Regimen 2a.

b. If the Antibiotic Name is on Table 2.9, continue processing and proceed to Antibiotic Administration Route.

33. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to Regimen 2a.
b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, set Regimen 1a to equal True. Continue processing and proceed to step 85 and check the Regimens. Do not check Regimen 2a, 3a, 4a, 5a, 6a, 7a.

34. Check Regimen 2a: Non ICU patients without Drug Resistant Pneumococcus Risk

35. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.5, continue processing and proceed to step 39 and check Regimen 3a.
   b. If the Antibiotic Name is on Table 2.5, continue processing and proceed to Antibiotic Administration Route.

36. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 39 and check Regimen 3a.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to Patient Age.

37. Check Patient Age. The Patient Age is calculated from Admission Date minus Birthdate as part of the Initial Patient Population logic.
   a. If the Patient Age is greater than or equal to 65, continue processing and proceed to step 39 and check Regimen 3a.
   b. If the Patient Age is less than 65, continue processing and proceed to Risk Factors for Drug Resistant Pneumococcus.

38. Check Risk Factors for Drug Resistant Pneumococcus
   a. If Risk Factors for Drug Resistant Pneumococcus are missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Risk Factors for Drug Resistant Pneumococcus equal Yes, continue processing and proceed to step 39 and check Regimen 3a.
   c. If Risk Factors for Drug Resistant Pneumococcus equal No, set Regimen 2a to equal True. Continue processing and proceed to step 85 and check the Regimens. Do not check Regimen 3a, 4a, 5a, 6a, 7a.

39. Check Regimen 3a: All non ICU patients
40. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.3, continue processing and proceed to step 44 and check Regimen 4a.
   b. If the Antibiotic Name is on Table 2.3, continue processing and proceed to Antibiotic Administration Route.

41. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 1, continue processing and proceed to step 44 and check Regimen 4a.
   b. If ANY of the Antibiotic Administration Routes are equal to 2 or 3, continue processing and proceed to recheck Antibiotic Name.

42. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.5 or Table 2.10, continue processing and proceed to step 44 and check Regimen 4a.
   b. If the Antibiotic Name is on Table 2.5 or Table 2.10, continue processing and proceed to recheck Antibiotic Administration Route.

43. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 44 and recheck Regimen 4a.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, set Regimen 3a to equal True. Continue processing and proceed to step 85 and check the Regimens. Do not check Regimen 4a, 5a, 6a, 7a.

44. Check Regimen 4a: non ICU patients with Pseudomonas Risk

45. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.4, continue processing and proceed to step 50 and check Regimen 5a.
   b. If the Antibiotic Name is on Table 2.4, continue processing and proceed to Antibiotic Administration Route.

46. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 50 and check Regimen 5a.
b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to recheck Antibiotic Name.

47. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.8, continue processing and proceed to step 50 and check Regimen 5a.
   b. If the Antibiotic Name is on Table 2.8, continue processing and proceed to recheck Antibiotic Administration Route.

48. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 50 and check Regimen 5a.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to Pseudomonas Risk.

49. Check Pseudomonas Risk
   a. If Pseudomonas Risk is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Pseudomonas Risk equals No, continue processing and proceed to step 50 and check Regimen 5a.
   c. If Pseudomonas Risk equals Yes, set Regimen 4a to equal True. Continue processing and proceed to step 85 and check the Regimens. Do not check Regimen 5a, 6a, 7a.

50. Check Regimen 5a: non ICU patients with Pseudomonas Risk

51. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.4, continue processing and proceed to step 60 and check Regimen 6a.
   b. If the Antibiotic Name is on Table 2.4, continue processing and proceed to Antibiotic Administration Route.

52. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 60 and check Regimen 6a.
   b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to recheck Antibiotic Name.

53. Recheck Antibiotic Name
a. If None of the Antibiotic Names are on Table 2.11, continue processing and proceed to step 60 and check Regimen 6a.
b. If the Antibiotic Name is on Table 2.11, continue processing and proceed to recheck Antibiotic Administration Route.

54. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 60 and check Regimen 6a.
   b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to recheck Antibiotic Name.

55. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.5, continue processing and proceed to step 57 and recheck Antibiotic Name. Do not recheck Antibiotic Administration Route.
   b. If the Antibiotic Name is on Table 2.5, continue processing and proceed to recheck Antibiotic Administration Route.

56. Recheck Antibiotic Administration Route.
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to recheck Antibiotic Name.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to step 59 and check Pseudomonas Risk. Do not recheck Antibiotic Name and Antibiotic Administration Route.

57. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.9, continue processing and proceed to step 60 and check Regimen 6a.
   b. If the Antibiotic Name is on Table 2.9, continue processing and proceed to recheck Antibiotic Administration Route.

58. Recheck Antibiotic Administration Route.
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 60 and check Regimen 6a.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to Pseudomonas Risk.

59. Check Pseudomonas Risk
   a. If Pseudomonas Risk is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Pseudomonas Risk equals No, continue processing and proceed to Regimen 6a.
c. If Pseudomonas Risk equals Yes, set Regimen 5a to equal True. Continue processing and proceed to step 85 and check the Regimens. Do not check Regimen 6a, 7a. Note: Regimen 5a cannot be reached if Regimen 4a is met due to the regimens overlap.

60. Check Regimen 6a: non ICU patients with Pseudomonas Risk and Beta lactam allergy

61. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.7, continue processing and proceed to step 69 and check Regimen 7a.
   b. If the Antibiotic Name is on Table 2.7, continue processing and proceed to Antibiotic Administration Route.

62. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 1, continue processing and proceed to step 69 and check Regimen 7a.
   b. If ANY of the Antibiotic Administration Routes are equal to 2 or 3, continue processing and proceed to recheck Antibiotic Name.

63. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.9, continue processing and proceed to step 69 and check Regimen 7a.
   b. If the Antibiotic Name is on Table 2.9, continue processing and proceed to recheck Antibiotic Administration Route.

64. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 69 and check Regimen 7a.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to recheck Antibiotic Name.

65. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.11, continue processing and proceed to step 69 and check Regimen 7a.
   b. If the Antibiotic Name is on Table 2.11, continue processing and proceed to recheck Antibiotic Administration Route.

66. Recheck Antibiotic Administration Route
a. If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 69 and check Regimen 7a.
b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to Pseudomonas Risk.

67. Check Pseudomonas Risk
   a. If Pseudomonas Risk is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Pseudomonas Risk equals No, continue processing and proceed to step 69 and check Regimen 7a. Do not check Antibiotic Allergy.
   c. If Pseudomonas Risk equals Yes, continue processing and proceed to Antibiotic Allergy.

68. Check Antibiotic Allergy
   a. If Antibiotic Allergy is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Antibiotic Allergy equals No, continue processing and proceed to Regimen 7a.
   c. If Antibiotic Allergy equals Yes, set Regimen 6a to equal True. Continue processing and proceed to step 85 and check the Regimens. Do not check Regimen 7a. Note: Regimen 6a cannot be reached if Regimen 1a is met due to the regimens overlap.

69. Check Regimen 7a: non ICU patients with Pseudomonas Risk and Beta lactam allergy

70. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.7, continue processing and proceed to step 84 and check Another Source of Infection.
   b. If the Antibiotic Name is on Table 2.7, continue processing and proceed to Antibiotic Administration Route.

71. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 1, continue processing and proceed to step 84 and check Another Source of Infection.
   b. If ANY of the Antibiotic Administration Routes are equal to 2 or 3, continue processing and proceed to recheck Antibiotic Name.
72. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.17, continue processing and proceed to step 84 and check Another Source of Infection.
   b. If the Antibiotic Name is on Table 2.17, continue processing and proceed to recheck Antibiotic Administration Route.

73. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 84 and check Another Source of Infection.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to Pseudomonas Risk.

74. Check Pseudomonas Risk
   a. If Pseudomonas Risk is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Pseudomonas Risk equals No, continue processing and proceed to step 84 and check Another Source of Infection.
   c. If Pseudomonas Risk equals Yes, continue processing and proceed to Antibiotic Allergy.

75. Check Antibiotic Allergy
   a. If Antibiotic Allergy is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Antibiotic Allergy equals No, continue processing and proceed to step 84 and check Another Source of Infection.
   c. If Antibiotic Allergy equals Yes, set Regimen 7a to equal True. Continue processing and proceed to step 85 and check the Regimens.

76. ICU Regimens

77. Check Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 84 and check Another Suspected Source of Infection.
   b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to recheck Antibiotic Name. Proceed further with only those antibiotic doses where route equals 2 (intravenous).

78. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.4 or 2.16 continue processing and proceed to step 81 and recheck Antibiotic Name.
   b. If the Antibiotic Name is on Table 2.4 or 2.16 continue processing and proceed to recheck Antibiotic Name.
79. Recheck Antibiotic Name
   a. If the Antibiotic Name is on Table 2.6 the case will go to Measure Category Assignment of E and will be in the Numerator Population. Stop processing. Regimen 1b: All ICU patients: Macrolide (Intravenous) plus Beta lactam (Intravenous) or Antipneumococcal/Antipseudomonal Beta lactam (Intravenous)
   b. If the Antibiotic Name is not on Table 2.6 continue processing and recheck Antibiotic Name.

80. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Tables 2.14 or 2.8, continue processing and proceed to step 81 and recheck Antibiotic Name.
   b. If the Antibiotic Name is on Tables 2.14 or 2.8, the case will go to Measure Category Assignment of E and will be in the Numerator Population. Stop processing. Regimen 2b: All ICU patients: Antipneumococcal Quinolone (Intravenous) OR Antipseudomonal Quinolone (Intravenous) plus Beta lactam (Intravenous) OR Antipneumococcal/Antipseudomonal beta lactam (Intravenous).

81. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.4, continue processing and proceed to step 84 and check Another Source of Infection.
   b. If the Antibiotic Name is on Table 2.4, continue processing and proceed to recheck Antibiotic Name.

82. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.11, continue processing and proceed to step 84 and check Another Source of Infection.
   b. If the Antibiotic Name is on Table 2.11, continue processing and recheck Antibiotic Name.

83. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.6 or 2.14, continue processing and proceed to step 84 and check Another Source of Infection.
   b. If the Antibiotic Name is on Table 2.6 or 2.14, the case will go to Measure Category Assignment of E and will be in the Numerator Population. Stop processing. Regimen 3b: All ICU patients: Antipneumococcal/Antipseudomonal beta lactam (Intravenous) plus Aminoglycoside (Intravenous) plus either Antipneumococcal Quinolone (Intravenous) OR Macrolide (Intravenous) NOTE: Regimen 3b cannot be reached since the patient will pass the measure if either Regimen 1b or 2b are met due to the regimens overlap.
84. **Check Another Source of Infection**
   a. If Another Source of Infection is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Another Source of Infection equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If Another Source of Infection equals No, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.

85. **Check Regimen 1a**
   a. If Regimen 1a is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 1a is equal to False, continue processing and proceed to check Regimen 2a.

86. **Check Regimen 2a**
   a. If Regimen 2a is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 2a is equal to False, continue processing and proceed to check Regimen 3a.

87. **Check Regimen 3a**
   a. If Regimen 3a is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 3a is equal to False, continue processing and proceed to check Regimen 4a.

88. **Check Regimen 4a**
   a. If Regimen 4a is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 4a is equal to False, continue processing and proceed to check Regimen 5a.

89. **Check Regimen 5a**
   a. If Regimen 5a is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
b. If Regimen 5a is equal to False, continue processing and proceed to check Regimen 6a.

90. Check Regimen 6a
   a. If Regimen 6a is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 6a is equal to False, continue processing and proceed to check Regimen 7a.

91. Check Regimen 7a
   a. If Regimen 7a is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 7a is equal to False, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
PN-6a: Initial Antibiotic Selection For Community-Acquired Pneumonia (CAP)
In Immunocompetent Patients - Intensive Care Unit (ICU) Patients

Numerator: ICU pneumonia patients who received an initial antibiotic regimen consistent with current guidelines during the first 24 hours of their hospitalization.

Denominator: ICU pneumonia patients 18 years of age and older.

Variable Key:
Duration of Stay
Antibiotic Days
Antimicrobial
AbxDay Flag

Specifications Manual for National Hospital Inpatient Quality Measures
Discharges 10-01-10 (4Q10) through 03-31-11 (1Q11)
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 ‘UTD’.

For each case, include for further processing only those antibiotic doses that are on Table 2.1 and whose associated route = 1, 2, or 3.

Specifications Manual for National Hospital Inpatient Quality Measures
Discharges 10-01-10 (4Q10) through 03-31-11 (1Q11)
Antibiotic Days = Antibiotic Administration Date – Arrival Date (in days)
Calculate Antibiotic Days for each antibiotic dose that has a non-UTD date.
Proceed only with antibiotic doses that have non-UTD Antibiotic Administration Dates.

Antibiotic Days > 0 for ANY antibiotic dose

ANTIMINUTES = Antibiotic Administration Date and Antibiotic Administration Time - Arrival Date and Arrival Time (in minutes)
Calculate ANTIMINUTES for each antibiotic dose that has a non-UTD date and time combination.
Proceed with antibiotic doses that have ANTIMINUTES calculated, OR Abxday flag = Yes.

For each case, proceed ONLY with those antibiotic doses that satisfy at least one of the following conditions:
Abxday flag = Y
ANTIMINUTES ≥ 0 and ≤ 1440

Specifications Manual for National Hospital Inpatient Quality Measures
Discharges 10-01-10 (4Q10) through 03-31-11 (1Q11)
PN-6, 6ab-37
Pneumonia (PN)-6a: Initial Antibiotic Selection for Community-Acquired Pneumonia (CAP) in Immunocompetent Patients – Intensive Care Unit (ICU) Patients

**Numerator:** ICU pneumonia patients who received an initial antibiotic regimen consistent with current guidelines during the first 24 hours of their hospitalization.

**Denominator:** ICU pneumonia patients 18 years of age and older.

**Variable Key:** Duration of Stay, Antibiotic Days, ANTIMINUTES, Antibiotic Day (Abxday) Flag

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.
   c. If Chest X-Ray equals 1, continue processing and proceed to Comfort Measures Only.

3. Check Comfort Measures Only
   a. If Comfort Measures Only is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Comfort Measures Only equals 1, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If Comfort Measures Only equals 2, 3, or 4, continue processing and proceed to Clinical Trial.

4. Check Clinical Trial
   a. If Clinical Trial is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Clinical Trial equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
5. **Check Transfer From Another Hospital or ASC**
   a. If Transfer From Another Hospital or ASC is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Transfer From Another Hospital or ASC equals 1, 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 Transfer From Another Hospital or ASC equals 5, continue processing and proceed to Pneumonia Diagnosis: ED/Direct Admit.

6. **Check Pneumonia Diagnosis: ED/Direct Admit**
   a. If Pneumonia Diagnosis: ED/Direct Admit is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Pneumonia Diagnosis: ED/Direct Admit equals 3, 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 1, 2, or 4, continue processing and proceed to ICU Admission or Transfer.

7. **Check ICU Admission or Transfer**
   a. If ICU Admission or Transfer is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If ICU Admission or Transfer equals 2 or 3, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If ICU Admission or Transfer equals 1, continue processing and proceed to recheck Pneumonia Diagnosis: ED/Direct Admit.
8. Recheck Pneumonia Diagnosis: ED/Direct Admit
   a. If Pneumonia Diagnosis: ED/Direct Admit equals 4, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
   b. If Pneumonia Diagnosis: ED/Direct Admit equals 1 or 2, continue processing and proceed to Arrival Date.

9. Check Arrival Date
   a. If the Arrival Date is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If the Arrival Date equals Unable to Determine, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
   c. If the Arrival Date equals a Non Unable to Determine Value, continue processing and proceed to the Duration of Stay calculation.

10. Calculate Duration of Stay. Duration of Stay, in days, is equal to the Discharge Date minus the Arrival Date.

11. Check Duration of Stay
    a. If the Duration of Stay is less than or equal to 1, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
    b. If the Duration of Stay is greater than 1, continue processing and proceed to Health Care Associated Pneumonia (PN).

12. Check Health Care Associated PN
    a. If Health Care Associated PN is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
    b. If Health Care Associated PN equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
    c. If Health Care Associated PN equals No, continue processing and proceed to Compromised.

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

14. 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 D and will be in the Measure Population. Stop processing.
   c. If Antibiotic Received equals 2 or 3, continue processing and proceed to Antibiotic Name.

15. Check Antibiotic Name
   a. If the Antibiotic Name is on Table 2.1, continue processing and proceed to Antibiotic Administration Route.
   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.

16. Check Antibiotic Administration Route
   a. If the Antibiotic Administration Route is equal to 10 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 Route is equal to 1, 2 or 3 for any antibiotic dose, continue processing. For each case, include for further processing only those antibiotic doses that are on Table 2.1 and whose associated route equals 1, 2 or 3. Proceed to Antibiotic Administration Date.

17. 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 Antibiotic Days calculation.

18. Calculate the Antibiotic Days. The Antibiotic Days, in days, equals the Antibiotic Administration Date minus the Arrival Date. Calculate the Antibiotic Days for each antibiotic dose that has a non Unable to Determine date. Proceed only with
antibiotic doses that have non Unable to Determine Antibiotic Administration Dates.

19. Check Antibiotic Days
   a. If the Antibiotic Days is less than zero for ANY antibiotic dose, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If none of the Antibiotic Days is less than zero for ANY antibiotic dose, continue processing and recheck Antibiotic Days.

20. Recheck Antibiotic Days
   a. If the Antibiotic Days is equal to zero for ALL antibiotic doses, continue processing and proceed to step 28 and check Antibiotic Allergy. Do not check Arrival Time, Antibiotic Administration Time, and ANTIMINUTES.
   b. If the Antibiotic Days is greater than zero for ANY antibiotic dose, continue processing and proceed to Initialize Abxday Flag

21. Initialize Abxday Flag only if Antibiotic Days was greater than zero for any antibiotic dose. Initialize Abxday Flag to equal No for each antibiotic doses. Set Abxday flag to equal Yes for each antibiotic dose where Antibiotic Days is equal to zero.

22. 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, continue processing and check the Abxday flag.
      1. If the Abxday flag equals No for all doses, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
      2. If the Abxday flag equals Yes for Any dose, continue processing. Proceed only with those doses where the Abxflag equals Yes. Proceed to step 28 and check Antibiotic Allergy. Do not check Antibiotic Administration Time or ANTIMINUTES.
   c. If the Arrival Time equals a Non Unable To Determine Value, continue processing and proceed to Antibiotic Administration Time.

23. Check Antibiotic Administration Time only if the Arrival Time is a Non Unable to Determine Value
   a. If the Antibiotic Administration Time is equal to Unable to Determine for all antibiotic doses, continue processing and check the Abxday flag.
1. If the Abxday flag is equal to No for all doses, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.

2. If the Abxday flag is equal to Yes for ANY dose, continue processing. Proceed only with doses where the Abxday flag is equal to Yes. Proceed to step 28 and check Antibiotic Allergy. Do not check ANTIMINUTES.

b. If the Antibiotic Administration Time is a Non Unable to Determine value for at least one antibiotic dose, continue processing and proceed to the ANTIMINUTES calculation.

24. Calculate ANTIMINUTES only if the Antibiotic Administration Time is a Non Unable to Determine Value. ANTIMINUTES, in minutes, is equal to the Antibiotic Administration Date and Antibiotic Administration Time minus the Arrival Date and the Arrival Time. Calculate the ANTIMINUTES for each antibiotic dose that has a non Unable to Determine date and time combination. Proceed with antibiotic doses that have ANTIMINUTES calculated OR Abxflag is equal to Yes.

25. Check ANTIMINUTES
   a. If the ANTIMINUTES are less than zero for ANY antibiotic dose, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If none of the ANTIMINUTES is less than zero for ANY antibiotic dose, continue processing and recheck ANTIMINUTES.

26. Recheck ANTIMINUTES
   a. If the ANTIMINUTES are greater than 1440 minutes or 24 hours for all antibiotic doses with a Non Unable To Determine date and time, continue processing. Proceed with antibiotic doses that have ANTIMINUTES calculated or Abxflag equal to Yes. Proceed to the Abxday flag.
      1. If the Abxday flag is equal to No for all doses, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
      2. If the Abxday flag is equal to Yes for ANY dose, continue processing. Proceed only with doses where the Abxday flag is equal to Yes. Proceed to Antibiotic Allergy.
   b. If the ANTIMINUTES are greater than or equal to zero and less than or equal to 1440 minutes for at least one antibiotic dose, continue processing. Proceed only with antibiotic doses that have ANTIMINUTES calculated or Abxday Flag equal to Yes. Proceed to Antibiotic Allergy.
27. For each case, proceed ONLY with those antibiotic doses that satisfy at least one of the following conditions: Abxday flag is equal to Yes or ANTIMINUTES is greater or equal to zero and less than or equal to 1440. Check Antibiotic Allergy.

28. Check Antibiotic Allergy
   a. If Antibiotic Allergy is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Antibiotic Allergy equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If Antibiotic Allergy equals No, continue processing and proceed to check Antibiotic Administration Route

29. Check Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 36 and check Another Suspected Source of Infection.
   b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to recheck Antibiotic Name. Proceed further with only those antibiotic doses where route equals 2 (Intravenous).

30. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.4 or 2.16 continue processing and proceed to step 33 and recheck Antibiotic Name.
   b. If the Antibiotic Name is on Table 2.4 or 2.16 continue processing and proceed to recheck Antibiotic Name.

31. Recheck Antibiotic Name
   a. If the Antibiotic Name is on Table 2.6 the case will go to Measure Category Assignment of E and will be in the Numerator Population. Stop processing. Regimen 1: All ICU patients: Macrolide (Intravenous) plus Beta lactam (Intravenous) or Antipneumococcal/Antipseudomonal Beta lactam (Intravenous)
   b. If the Antibiotic Name is not on Table 2.6 continue processing and recheck Antibiotic Name.

32. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Tables 2.14 or 2.8, continue processing and proceed to step 33 and recheck Antibiotic Name.
   b. If the Antibiotic Name is on Tables 2.14 or 2.8, the case will go to Measure Category Assignment of E and will be in the Numerator Population. Stop processing. Regimen 2: All ICU patients: Antipneumococcal Quinolone
(Intravenous) OR Antipseudomonal Quinolone (Intravenous) plus Beta lactam (Intravenous) OR  Antipneumococcal/Antipseudomonal Beta lactam (Intravenous).

33. **Recheck Antibiotic Name**
   a. If None of the Antibiotic Names are on Table 2.4, continue processing and proceed to step 36 and check Another Source of Infection.
   b. If the Antibiotic Name is on Table 2.4, continue processing and proceed to recheck Antibiotic Name.

34. **Recheck Antibiotic Name**
   a. If None of the Antibiotic Names are on Table 2.11, continue processing and proceed to step 36 and check Another Source of Infection.
   b. If the Antibiotic Name is on Table 2.11, continue processing and recheck Antibiotic Name.

35. **Recheck Antibiotic Name**
   a. If None of the Antibiotic Names are on Table 2.6 or 2.14, continue processing and check Another Source of Infection.
   b. If the Antibiotic Name is on Table 2.6 or 2.14, the case will go to Measure Category Assignment of E and will be in the Numerator Population. Stop processing. Regimen 3: All ICU patients:
      Antipneumococcal/Antipseudomonal beta lactam (Intravenous) plus Aminoglycoside (Intravenous) plus either Antipneumococcal Quinolone (Intravenous) OR Macrolide (Intravenous) NOTE: Regimen 3 cannot be reached since the patient will pass the measure if either Regimen 1 or 2 are met due to the regimens overlap.

36. **Check Another Source of Infection**
   a. If Another Source of Infection is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Another Source of Infection equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If Another Source of Infection equals No, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
**PN-6b: Initial Antibiotic Selection For Community-Acquired Pneumonia (CAP)**

**In Immunocompetent Patients - Non Intensive Care Unit Patients**

**Numerator:** Non-ICU pneumonia patients who received an initial antibiotic regimen consistent with current guidelines during the first 24 hours of their hospitalization.

**Denominator:** Non-ICU pneumonia patients 18 years of age and older.

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**Variable Key:**
- Patient Age
- Duration of Stay
- Antibiotic Days
- Abxday Flag
- ANTMINUTES
- Regimen1
- Regimen2
- Regimen3
- Regimen4
- Regimen5
- Regimen6
- Regimen7
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 'UTD'.

Specifications Manual for National Hospital Inpatient Quality Measures
Discharges 10-01-10 (4Q10) through 03-31-11 (1Q11) PN-6, 6ab-49
Antibiotic Administration

Date

Antibiotic Days = Antibiotic Administration Date - Arrival Date (in days)
Proceed only with antibiotic doses that have non-UTD Antibiotic Administration Dates.

Calculate Antibiotic Days for each antibiotic dose that has a non-UTD date.

Antibiotic Days < 0 for any antibiotic dose

Initialize Abxday flag = No for each antibiotic dose.
Set Abxday flag = Yes for each antibiotic dose where Antibiotic Days = 0.

Antibiotic Days ≥ 0 and ≤ 1440 minutes for at least one antibiotic dose
Proceed with antibiotic doses that have Antibiotic Days calculated, OR Abxday flag = Yes.

Antibiotic Days > 1440 minutes (24 hours) for all antibiotic doses with non-UTD date and time. Proceed with antibiotic doses that have Antibiotic Days calculated, OR Abxday flag = Yes.

Abxday flag = Yes for any dose. Proceed with doses where Abxday flag = Yes.

For each case, proceed ONLY with those antibiotic doses that satisfy at least one of the following conditions:
Abxday flag = Y
Antiminutes ≥ 0 and ≤ 1440
Regimen 1: All non-ICU patients
Regimen 2: non-ICU patients without Drug Resistant Pneumococcus Risk
Regimen 3: All non-ICU patients
Specifications Manual for National Hospital Inpatient Quality Measures
Discharges 10-01-10 (4Q10) through 03-31-11 (1Q11) PN-6, 6ab-52
Note: This section of the logic should be reached only if no recommended regimen was administered.
Pneumonia (PN)- 6b: Initial Antibiotic Selection for Community-Acquired Pneumonia (CAP) In Immunocompetent Patients – Non Intensive Care Unit Patients

Numerator: Non Intensive Care Unit (ICU) pneumonia patients who received an initial antibiotic regimen consistent with current guidelines during the first 24 hours of their hospitalization.

Denominator: Non ICU pneumonia patients 18 years of age and older.

Variable Key: Patient Age, Duration of Stay, Antibiotic Days, Antibiotic Day (Abxday) Flag, ANTMINUTES, Regimen 1, Regimen 2, Regimen 3, Regimen 4, Regimen 5, Regimen 6, and Regimen 7.

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.
   c. If Chest X-Ray equals 1, continue processing and proceed to Comfort Measures Only.

3. Check Comfort Measures Only
   a. If Comfort Measures Only is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Comfort Measures Only equals 1, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If Comfort Measures Only equals 2, 3, or 4, continue processing and proceed to Clinical Trial.

4. Check Clinical Trial
   a. If Clinical Trial is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Clinical Trial equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
c. If Clinical Trial equals No, continue processing and proceed to Initialize Variables.

5. Initialize Variables. Initialize Variables as follows: Regimen 1 equal to false. Regimen 2 equal to false. Regimen 3 equal to false. Regimen 4 equal to false. Regimen 5 equal to false. Regimen 6 equal to false. Regimen 7 equal to false.

6. Check Transfer From Another Hospital or ASC
   a. If Transfer From Another Hospital or ASC is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Transfer From Another Hospital or ASC equals 1, 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 Transfer From Another Hospital or ASC equals 5, continue processing and proceed to Pneumonia Diagnosis: ED/Direct Admit.

7. 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 3, 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 1, 2, or 4, continue processing and proceed to ICU Admission or Transfer.

8. Check ICU Admission or Transfer
   a. If ICU Admission or Transfer is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If ICU Admission or Transfer equals 1 or 3, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If ICU Admission or Transfer equals 2, continue processing and proceed to recheck Pneumonia Diagnosis: ED/Direct Admit.

9. Recheck Pneumonia Diagnosis: ED/Direct Admit
   a. If Pneumonia Diagnosis: ED/Direct Admit equals 4, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
   b. If Pneumonia Diagnosis: ED/Direct Admit equals 1 or 2, continue processing and proceed to Arrival Date.
10. 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.

11. Calculate Duration of Stay. Duration of Stay, in days, is equal to the Discharge Date minus the Arrival Date.

12. Check Duration of Stay
   a. If the Duration of Stay is less than or equal to 1, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   b. If the Duration of Stay is greater than 1, continue processing and proceed to Health Care Associated Pneumonia (PN).

13. Check Health Care Associated PN
   a. If Health Care Associated PN is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Health Care Associated PN equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If Health Care Associated PN equals No, continue processing and proceed to Compromised.

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

15. 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 D and will be in the Measure Population. Stop processing.

c. If Antibiotic Received equals 2 or 3, continue processing and proceed to Antibiotic Name.

16. Check Antibiotic Name
   a. If the Antibiotic Name is on Table 2.1, continue processing and proceed to Antibiotic Administration Route.
   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.

17. Check Antibiotic Administration Route
   a. If the Antibiotic Administration Route is equal to 10 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 Route is equal to 1, 2 or 3 for any antibiotic dose, continue processing. For each case, include for further processing only those antibiotic doses that are on Table 2.1 and whose associated route equals 1, 2 or 3. Proceed to Antibiotic Administration Date.

18. 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 Antibiotic Days calculation.

19. Calculate the Antibiotic Days. The Antibiotic Days, in days, equals the Antibiotic Administration Date minus the Arrival Date. Calculate the Antibiotic Days for each antibiotic dose that has a non Unable to Determine date. Proceed only with antibiotic doses that have non Unable to Determine Antibiotic Administration Dates.
20. Check Antibiotic Days
   a. If the Antibiotic Days is less than zero for ANY antibiotic dose, the case
      will proceed to a Measure Category Assignment of X and will be rejected.
      Stop processing.
   b. If none of the Antibiotic Days is less than zero for ANY antibiotic dose,
      continue processing and recheck Antibiotic Days.

21. Recheck Antibiotic Days
   a. If the Antibiotic Days is equal to zero for ALL antibiotic dose, continue
      processing and proceed to step 29 and check Regimens. Do not check
      Arrival Time, Antibiotic Administration Time, and ANTIMINUTES.
   b. If the Antibiotic Days is greater than zero for ANY antibiotic dose, continue
      processing and proceed to Initialize Abxday Flag

22. Initialize Abxday Flag only if Antibiotic Days was greater than zero for any
    antibiotic dose. Initialize Abxday Flag to equal No for each antibiotic doses. Set
    Abxday flag to equal Yes for each antibiotic dose where Antibiotic Days is equal
    to zero.

23. 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, continue processing and
      check the Abxday flag.
      1. If the Abxday flag equals No for all doses, the case will proceed to
         a Measure Category Assignment of D and will be in the Measure
         Population. Stop processing.
      2. If the Abxday flag equals Yes for ANY dose, continue processing.
         Proceed only with those doses where the Abxflag equals Yes.
         Proceed to step 29 and check Regimens. Do not check Antibiotic
         Administration Time or ANTIMINUTES.
   c. If the Arrival Time equals a Non Unable To Determine Value, continue
      processing and proceed to Antibiotic Administration Time.
24. Check Antibiotic Administration Time only if the Arrival Time is a Non Unable to Determine Value
   a. If the Antibiotic Administration Time is equal to Unable to Determine for all antibiotic doses, continue processing and check the Abxday flag.
      1. If the Abxday flag is equal to No for all doses, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
      2. If the Abxday flag is equal to Yes for ANY dose, continue processing. Proceed only with doses where the Abxday flag is equal to Yes. Proceed to step 29 and check Regimens. Do not check ANTIMINUTES.
   b. If the Antibiotic Administration Time is a Non Unable to Determine value for at least one antibiotic dose, continue processing and proceed to the ANTIMINUTES calculation.

25. Calculate ANTIMINUTES only if the Antibiotic Administration Time is a Non Unable to Determine Value. ANTIMINUTES, in minutes, is equal to the Antibiotic Administration Date and Antibiotic Administration Time minus the Arrival Date and the Arrival Time. Calculate the ANITMINUTES for each antibiotic dose that has a non Unable to Determine date and time combination. Proceed with antibiotic doses that have ANTIMINUTES calculated OR Abxflag is equal to Yes.

26. Check ANTIMINUTES
   a. If the ANTIMINUTES are less than zero for ANY antibiotic dose, the case will proceed to a Measure Category Assignment of X and will be rejected. Stopped processing.
   b. If none of the ANTIMINUTES is less than zero for ANY antibiotic dose, continue processing and recheck ANTIMINUTES.

27. Recheck ANTIMINUTES
   a. If the ANTIMINUTES are greater than 1440 minutes or 24 hours for all antibiotic doses with a Non Unable To Determine date and time, continue processing. Proceed with antibiotic doses that have ANTIMINUTES calculated or Abxflag equal to Yes. Proceed to the Abxday flag.
      1. If the Abxday flag is equal to No for all doses, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
      2. If the Abxday flag is equal to Yes for ANY dose, continue processing. Proceed only with doses where the Abxday flag is equal to Yes. Proceed to step 29 and check Regimens.
b. If the ANTIMINUTES are greater than or equal to zero and less than or equal to 1440 minutes for at least one antibiotic dose, continue processing. Proceed only with antibiotic doses that have ANTIMINUTES calculated or Abxday Flag equal to Yes. Proceed to check Regimens.

28. For each case, proceed ONLY with those antibiotic doses that satisfy at least one of the following conditions: Abxday flag is equal to Yes or ANTIMINUTES is greater or equal to zero and less than or equal to 1440. Check Regimens.

29. Check Regimen 1: All non ICU patients

30. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.9, continue processing and proceed to step 32 and check Regimen 2.
   b. If the Antibiotic Name is on Table 2.9, continue processing and proceed to Antibiotic Administration Route.

31. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to Regimen 2.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, set Regimen 1 to equal True. Continue processing and proceed to step 75 and check Regimen variables. Do not check Regimen 2, 3, 4, 5, 6, or 7.

32. Check Regimen 2: Non ICU patients without Drug Resistant Pneumococcus Risk

33. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.5, continue processing and proceed to step 37 and check Regimen 3.
   b. If the Antibiotic Name is on Table 2.5, continue processing and proceed to Antibiotic Administration Route.

34. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 37 and check Regimen 3.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to Patient Age.
35. Check Patient Age. The Patient Age is calculated from Admission Date minus Birthdate as part of the Initial Patient Population logic.
   a. If the Patient Age is greater than or equal to 65, continue processing and proceed to step 37 and check Regimen 3.
   b. If the Patient Age is less than 65, continue processing and proceed to Risk Factors for Drug Resistant Pneumococcus.

36. Check Risk Factors for Drug Resistant Pneumococcus
   a. If Risk Factors for Drug Resistant Pneumococcus are missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Risk Factors for Drug Resistant Pneumococcus equal Yes, continue processing and proceed to Regimen 3.
   c. If Risk Factors for Drug Resistant Pneumococcus equal No, set Regimen 2 to equal True. Continue processing and proceed to step 76 and check Regimen variables. Do not check Regimen 3, 4, 5, 6, or 7.

37. Check Regimen 3: All non ICU patients

38. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.3, continue processing and proceed to step 42 and check Regimen 4.
   b. If the Antibiotic Name is on Table 2.3, continue processing and proceed to Antibiotic Administration Route.

39. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 1, continue processing and proceed to step 42 and check Regimen 4.
   b. If ANY of the Antibiotic Administration Routes are equal to 2 or 3, continue processing and proceed to recheck Antibiotic Name.

40. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.5 or Table 2.10, continue processing and proceed to step 42 and check Regimen 4.
   b. If the Antibiotic Name is on Table 2.5 or Table 2.10, continue processing and proceed to recheck Antibiotic Administration Route.

41. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to Regimen 4.
42. Check Regimen 4: non ICU patients with Pseudomonas Risk

43. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.4, continue processing and proceed to step 48 and check Regimen 5.
   b. If the Antibiotic Name is on Table 2.4, continue processing and proceed to Antibiotic Administration Route.

44. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 48 and check Regimen 5.
   b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to recheck Antibiotic Name.

45. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.8, continue processing and proceed to step 48 and check Regimen 5.
   b. If the Antibiotic Name is on Table 2.8, continue processing and proceed to recheck Antibiotic Administration Route.

46. Recheck Antibiotic Administration Route.
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 48 and check Regimen 5.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to Pseudomonas Risk.

47. Check Pseudomonas Risk
   a. If Pseudomonas Risk is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Pseudomonas Risk equals No, continue processing and proceed to Regimen 5.
   c. If Pseudomonas Risk equals Yes, set Regimen 4 to equal True. Continue processing and proceed to step 76 and check Regimen variables. Do not check Regimen 5, 6, or 7.

48. Check Regimen 5: non ICU patients with Pseudomonas Risk
49. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.4, continue processing and proceed to step 58 and check Regimen 6.
   b. If the Antibiotic Name is on Table 2.4, continue processing and proceed to Antibiotic Administration Route.

50. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 58 and check Regimen 6.
   b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to recheck Antibiotic Name.

51. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.11, continue processing and proceed to step 58 and check Regimen 6.
   b. If the Antibiotic Name is on Table 2.11, continue processing and proceed to recheck Antibiotic Administration Route.

52. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 58 and check Regimen 6.
   b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to recheck Antibiotic Name.

53. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.5, continue processing and proceed to step 55 and check Antibiotic Name. Do not recheck Antibiotic Administration Route.
   b. If the Antibiotic Name is on Table 2.5, continue processing and proceed to recheck Antibiotic Administration Route.

54. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to recheck Antibiotic Name.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to step 57 and check Pseudomonas Risk. Do not recheck Antibiotic Name and Antibiotic Administration Route.
55. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.9, continue processing and proceed to step 58 and check Regimen 6.
   b. If the Antibiotic Name is on Table 2.9, continue processing and proceed to recheck Antibiotic Administration Route.

56. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 58 and check Regimen 6.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to Pseudomonas Risk.

57. Check Pseudomonas Risk
   a. If Pseudomonas Risk is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Pseudomonas Risk equals No, continue processing and proceed to Regimen 6.
   c. If Pseudomonas Risk equals Yes, set Regimen 5 to equal True. Continue processing and proceed to step 76 and check Regimen variables. Do not check Regimen 6 or 7. Note: Regimen 5 cannot be reached if Regimen 4 is met due to the regimens overlap.

58. Check Regimen 6: non ICU patients with Pseudomonas Risk and Beta lactam allergy

59. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.7, continue processing and proceed to step 67 and check Regimen 7.
   b. If the Antibiotic Name is on Table 2.7, continue processing and proceed to Antibiotic Administration Route.

60. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 1, continue processing and proceed to step 67 and check Regimen 7.
   b. If ANY of the Antibiotic Administration Routes are equal to 2 or 3, continue processing and proceed to recheck Antibiotic Name.

61. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.9, continue processing and proceed to step 67 and check Regimen 7.
b. If the Antibiotic Name is on Table 2.9, continue processing and proceed to recheck Antibiotic Administration Route.

62. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 67 and check Regimen 7.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to recheck Antibiotic Name.

63. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.11, continue processing and proceed to step 67 and check Regimen 7.
   b. If the Antibiotic Name is on Table 2.11, continue processing and proceed to recheck Antibiotic Administration Route.

64. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 1, 3, continue processing and proceed to step 67 and check Regimen 7.
   b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to Pseudomonas Risk.

65. Check Pseudomonas Risk
   a. If Pseudomonas Risk is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Pseudomonas Risk equals No, continue processing and proceed to step 67 and check Regimen 7. Do not check Antibiotic Allergy.
   c. If Pseudomonas Risk equals Yes, continue processing and proceed to Antibiotic Allergy.

66. Check Antibiotic Allergy
   a. If Antibiotic Allergy is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Antibiotic Allergy equals No, continue processing and proceed to Regimen 7.
   c. If Antibiotic Allergy equals Yes, set Regimen 6 to equal True. Continue processing and proceed to step 76 and check Regimen variables. Do not check Regimen 7. Note: Regimen 6 cannot be reached if Regimen 5 is met due to the regimens overlap

67. Check Regimen 7: non ICU patients with Pseudomonas Risk and Beta lactam allergy
68. Check Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.7, continue processing and proceed to step 75 and check Another Source of Infection.
   b. If the Antibiotic Name is on Table 2.7, continue processing and proceed to Antibiotic Administration Route.

69. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.9 was received by the patient, check if route was appropriate for that antibiotic only.
   a. If ALL of the Antibiotic Administration Routes are equal to 1, continue processing and proceed to step 75 and check Another Source of Infection.
   b. If ANY of the Antibiotic Administration Routes are equal to 2 or 3, continue processing and proceed to recheck Antibiotic Name.

70. Recheck Antibiotic Name
   a. If None of the Antibiotic Names are on Table 2.17, continue processing and proceed to step 75 and check Another Source of Infection.
   b. If the Antibiotic Name is on Table 2.17, continue processing and proceed to recheck Antibiotic Administration Route.

71. Recheck Antibiotic Administration Route
   a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 74 and check Another Source of Infection.
   b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, continue processing and proceed to Pseudomonas Risk.

72. Check Pseudomonas Risk
   a. If Pseudomonas Risk is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Pseudomonas Risk equals No, continue processing and proceed to step 74 and check Another Source of Infection.
   c. If Pseudomonas Risk equals Yes, continue processing and proceed to Antibiotic Allergy.

73. Check Antibiotic Allergy
   a. If Antibiotic Allergy is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Antibiotic Allergy equals No, continue processing and proceed to Another Source of Infection.
   c. If Antibiotic Allergy equals Yes, set Regimen 7 to equal True. Continue processing and proceed to step 76 and check Regimen variables. Do not
check Another Source of Infection. Note: Regimen 7 cannot be reached if Regimen 6 is met due to regimen overlap.

74. Note: This section of the logic should be reached only if no recommended regimen was administered.

75. Check Another Source of Infection
   a. If Another Source of Infection is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
   b. If Another Source of Infection equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
   c. If Another Source of Infection equals No, continue processing and check Regimen variables.

76. Check Regimens 1, 2, 3, 4, 5, 6, and 7

77. Check Regimen 1
   a. If Regimen 1 is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 1 is equal to False, continue processing and proceed to check Regimen 2.

78. Check Regimen 2
   a. If Regimen 2 is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 2 is equal to False, continue processing and proceed to check Regimen 3.

79. Check Regimen 3
   a. If Regimen 3 is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 3 is equal to False, continue processing and proceed to check Regimen 4.

80. Check Regimen 4
   a. If Regimen 4 is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
b. If Regimen 4 is equal to False, continue processing and proceed to check Regimen 5.

81. Check Regimen 5
   a. If Regimen 5 is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 5 is equal to False, continue processing and proceed to check Regimen 6.

82. Check Regimen 6
   a. If Regimen 6 is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 6 is equal to False, continue processing and proceed to check Regimen 7.

83. Check Regimen 7
   a. If Regimen 7 is equal to True, the case will proceed to a Measure Category Assignment of E and will be in the Numerator Population. Stop processing.
   b. If Regimen 7 is equal to False, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.