

NQF-ENDORSED VOLUNTARY CONSENSUS STANDARDS FOR HOSPITAL CARE

**Measure Information Form
Collected For:
CMS Voluntary Only**

Measure Set: Pneumonia (PN)

Performance Measure Identifier:

Organization	Set Measure ID#	Measure Population
CMS	PN-6	ICU & Non - ICU Patients

Performance Measure Name:

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

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 *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.

Included populations: Pneumonia patients who received antibiotics consistent with current guidelines

Excluded Populations: None

Data Elements

- *Antibiotic Administration Date*
- *Antibiotic Administration Route*
- *Antibiotic Administration Time*
- *Antibiotic Allergy*
- *Antibiotic Name*
- *Arrival Date*
- *Arrival Time*
- *Pseudomonas Risk*

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

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
- Patients with a *Reason for Alternative Empiric Antibiotic Therapy* 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*
- *Chest X-Ray*
- *Clinical Trial*
- *Comfort Measures Only*
- *Discharge Date*
- *ICD-9-CM Other Diagnosis Codes*
- *ICD-9-CM Principal Diagnosis Code*
- *ICU Admission or Transfer*
- *Pneumonia Diagnosis: ED/Direct Admit*
- *Pseudomonas Risk*
- *Reason for Alternative Empiric Antibiotic Therapy*
- *Transfer From Another Hospital or ASC*

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:

- Butler JC, Hofmann J, Cetron MS, et al. The continued emergence of drug-resistant *Streptococcus pneumoniae* in the United States: an update from the Centers for Disease Control and Prevention's Pneumococcal Sentinel Surveillance System. *J Infect Dis.* 1996;174:986-993.
- File TM, Low DE, Eckburg PB, Talbot GH, Friedland D, Lee J, Llorens L, Critchley I, Thye D. Integrated analysis of FOCUS 1 and FOCUS 2 randomized, double blinded, multicenter phase 3 trials of the efficacy and safety of ceftaroline fosamil versus ceftriaxone in patients with community acquired pneumonia. *CID.* December 2010; 51 (12): 1395-1405.
- Fine MJ, Smith MA, Carson CA, et al. Prognosis and outcomes of patients with community-acquired pneumonia. *JAMA.* 1996;275:134-141.
- Gleason PP, Meehan TP, Fine JM, et al. Associations between initial antimicrobial regimens and medical outcomes for elderly patients with pneumonia. *Arch Intern Med.* 1999;159:2562-2572.
- Heffelfinger JD, Dowell SF, Jorgensen JH, Klugman KP, et al. Management of Community-Acquired Pneumonia in the era of pneumococcal resistance: A Report From the Drug-Resistant *Streptococcus pneumoniae* Therapeutic Working Group. *Archives of Internal Medicine.* 2000, 160:1399-1408.
- Houck PM, MacLehose RF, Niederman MS, Lowery JK. Empiric antibiotic therapy and mortality among Medicare pneumonia inpatients in 10 western states, 1993, 1995, and 1997. *Chest.* 2001;119:1420-1426.
- Mandell LA, Marrie TJ, Grossman RF, et al. Canadian guidelines for the initial management of community-acquired pneumonia: an evidence-based update by the Canadian Infectious Disease Society and the Canadian Thoracic Society. *Clin Infect Dis.* 2000;31:383-421.
- Mandell LA, Wunderink RG, Anzueta A, Bartlett JG, Infectious Diseases Society of America; American Thoracic Society. Infectious Diseases Society of America/American Thoracic Society consensus guidelines on the management of community-acquired pneumonia in adults. *Clin Infect Dis.* 2007 March 1;44 Suppl 2:S27-72.
- Restrepo, M. I., E. M. Mortensen, J. Rello, J. Brody, and A. Anzueto. Late admission to the ICU in patients with community-acquired pneumonia is associated with higher mortality. *Chest* 2009.
- Tessmer, A., T. Welte, P. Martus, M. Schnoor, R. Marre, and N. Suttrop. Impact of intravenous beta-lactam/macrolide versus beta-lactam monotherapy on mortality in hospitalized patients with community-acquired pneumonia. *J Antimicrob Chemother* 2009; 63:1025-33.
- Wunderlink RJ, Waterer GW, Rello J. Management of Community-acquired Pneumonia in Adults. *Am J of Respir and Crit Care Med.* August 2010: 2-41.

Pneumonia Antibiotic Consensus Recommendations

Patient Type	Antibiotic Recommendation
Non – ICU Patient	<p>Antipneumococcal Quinolone monotherapy (IV or PO) Table 2.9 – <i>Regimen 1a</i></p> <p style="text-align: center;">Or</p> <p>Tigecycline monotherapy (IV) Table 2.12 – <i>Regimen 2a</i></p> <p style="text-align: center;">Or</p> <p>β-lactam (IV or IM) Table 2.3 + Macrolide (IV or PO) Table 2.5 – <i>Regimen 3a</i></p> <p style="text-align: center;">Or</p> <p>β-lactam (IV or IM) Table 2.3 + Doxycycline (IV or PO) Table 2.10 – <i>Regimen 3a</i></p>
Non-ICU patient with Pseudomonal Risk	<p>These regimens are acceptable for Non-ICU patients with Pseudomonal Risk ONLY:</p> <p>Antipneumococcal/Antipseudomonal β-lactam (IV) Table 2.4 + Antipseudomonal Quinolone (IV or PO) Table 2.8 – <i>Regimen 4a</i></p> <p style="text-align: center;">Or</p> <p>Antipneumococcal/Antipseudomonal β-lactam (IV) Table 2.4 + Aminoglycoside (IV) Table 2.11 + either Antipneumococcal Quinolone (IV or PO) Table 2.9 Or Macrolide (IV or PO) Table 2.5 – <i>Regimen 5a</i></p>
Non-ICU patients with β-lactam allergy and Pseudomonal Risk ONLY	<p>These regimens are acceptable for Non-ICU patients with β-lactam allergy and Pseudomonal Risk ONLY:</p> <p>Aztreonam (IV or IM) Table 2.7 + Antipneumococcal Quinolone (IV or PO) Table 2.9 + Aminoglycoside (IV) Table 2.11 – <i>Regimen 6a</i></p> <p style="text-align: center;">Or</p> <p>Aztreonam² (IV or IM) Table 2.7 + Levofloxacin¹ (IV or PO) Table 2.17 – <i>Regimen 7a</i></p> <p>¹ Levofloxacin should be used in 750mg dosage when used in the management of patients with pneumonia. ² For patients with renal insufficiency.</p>

Patient Type	Antibiotic Recommendation
ICU Patient	<p>Macrolide (IV) Table 2.6+ either β-lactam (IV) Table 2.16 OR Antipneumococcal/Antipseudomonal β-lactam (IV) Table 2.4 – Regimen 1b</p> <p style="text-align: center;">Or</p> <p>Antipseudomonal Quinolone (IV) Table 2.8 + either β-lactam (IV) Table 2.16 OR Antipneumococcal/Antipseudomonal β-lactam (IV) Table 2.4 – Regimen 2b</p> <p style="text-align: center;">Or</p> <p>Antipneumococcal Quinolone (IV) Table 2.14 + either β-lactam (IV) Table 2.16 OR Antipneumococcal/Antipseudomonal β-lactam (IV) Table 2.4 –Regimen 2b</p> <p style="text-align: center;">Or</p> <p>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 – Regimen 3b</p>
ICU Patient with <i>Francisella tularensis</i> or <i>Yersinia pestis</i> risk	<p>If the patient has <i>Francisella tularensis</i> or <i>Yersinia pestis</i> risk as determined by <i>Another Source of Infection</i> (see data element) the following is another acceptable regimen:</p> <p>Doxycycline (IV) Table 2.10 + either β-lactam (IV) Table 2.16 OR Antipneumococcal/Antipseudomonal β-lactam (IV) Table 2.4 – Regimen 4b</p>

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.

Note:

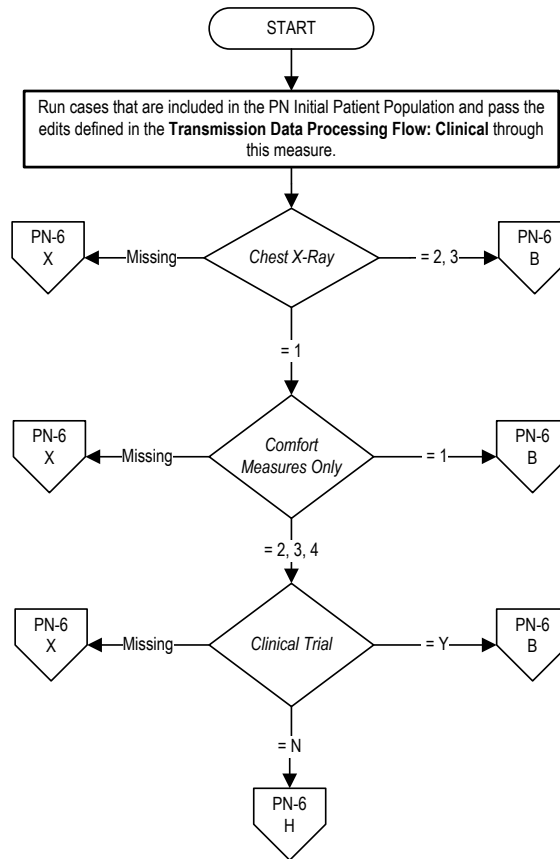
The regimen numbers following each antibiotic regimen on the Antibiotic Consensus Recommendation Table above correspond directly to the regimen numbers in the algorithm.

The dosage listed is specified to reflect clinical expert recommendations. We do not collect dosage information for the purposes of the Pneumonia Project.

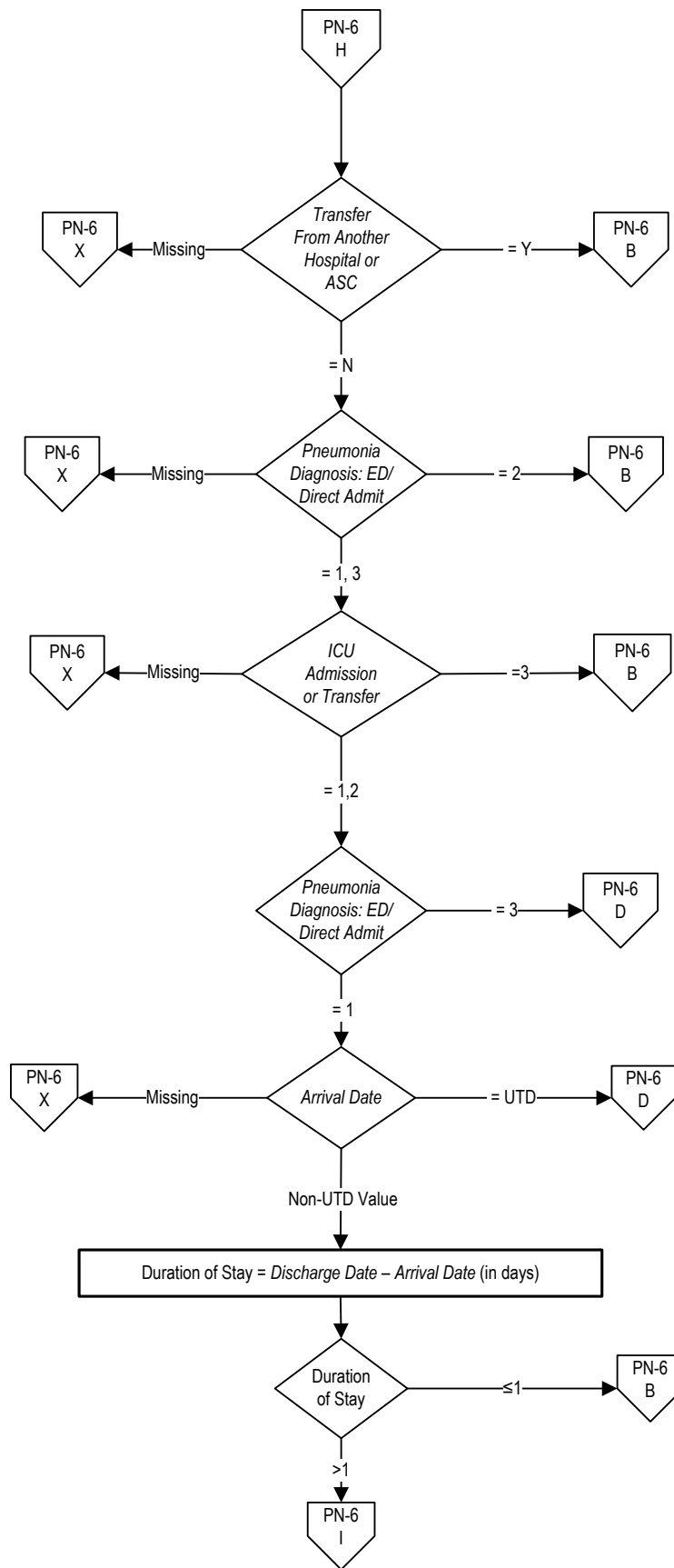
PN-6: Initial Antibiotic Selection for Community-Acquired Pneumonia (CAP) in Immunocompetent Patients

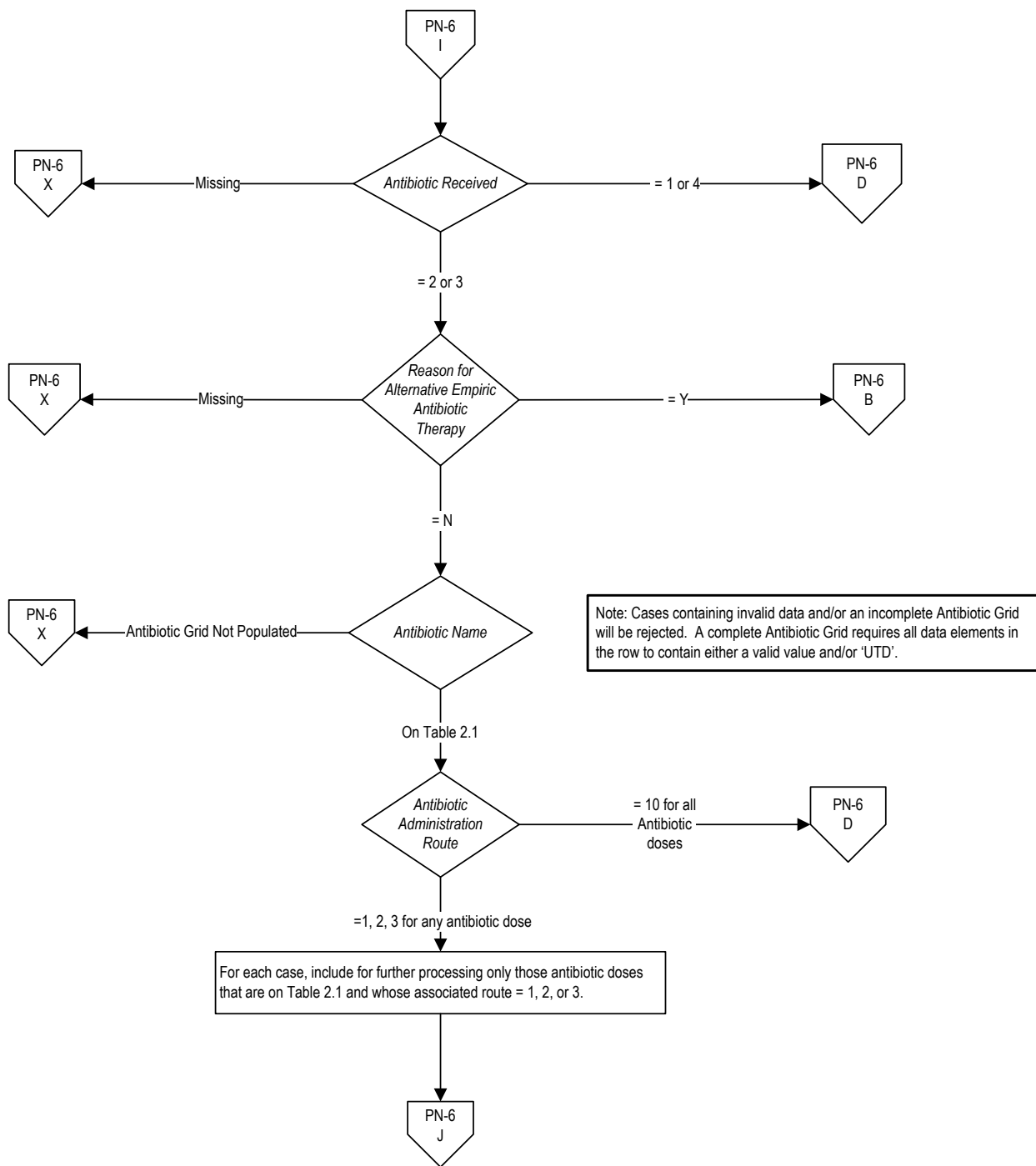
Numerator: Pneumonia patients who received an initial antibiotic regimen consistent with current guidelines during the first 24 hours of their hospitalization

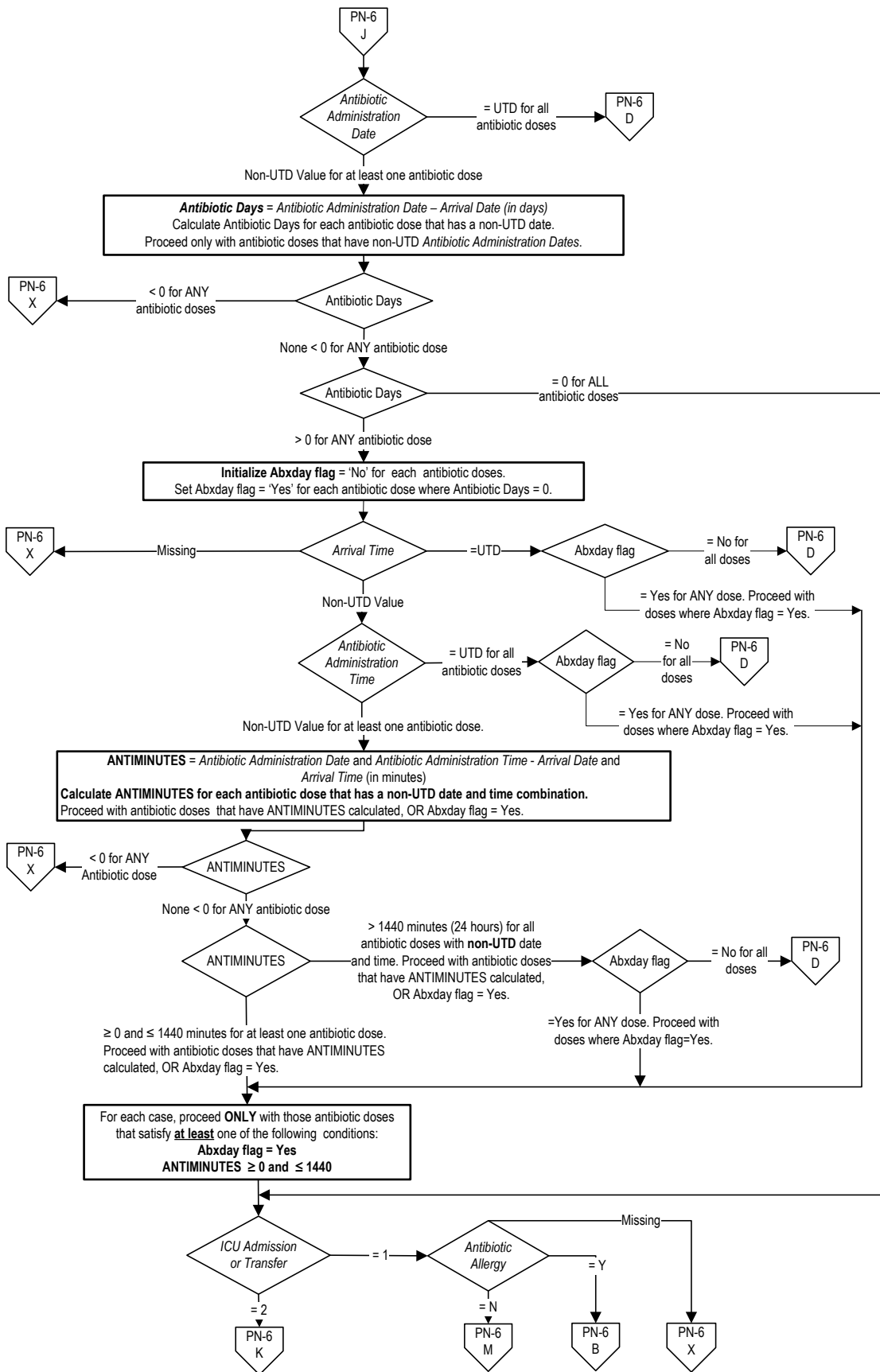
Denominator: Pneumonia patients 18 years of age and older.



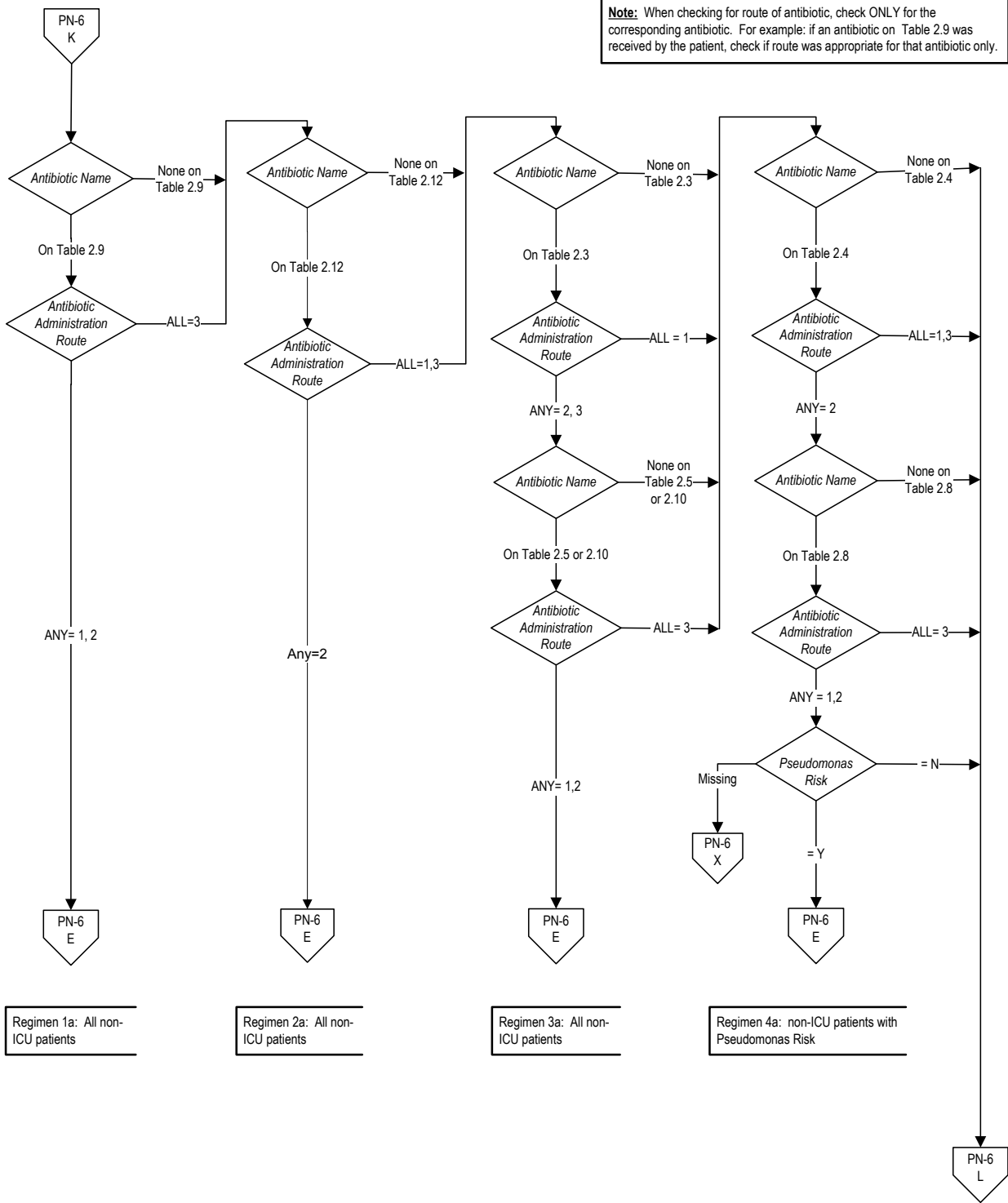
Variable Key:
 Patient Age
 Duration of Stay
 Antibiotic Days
 Abxday Flag
 ANTIMINUTES







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.

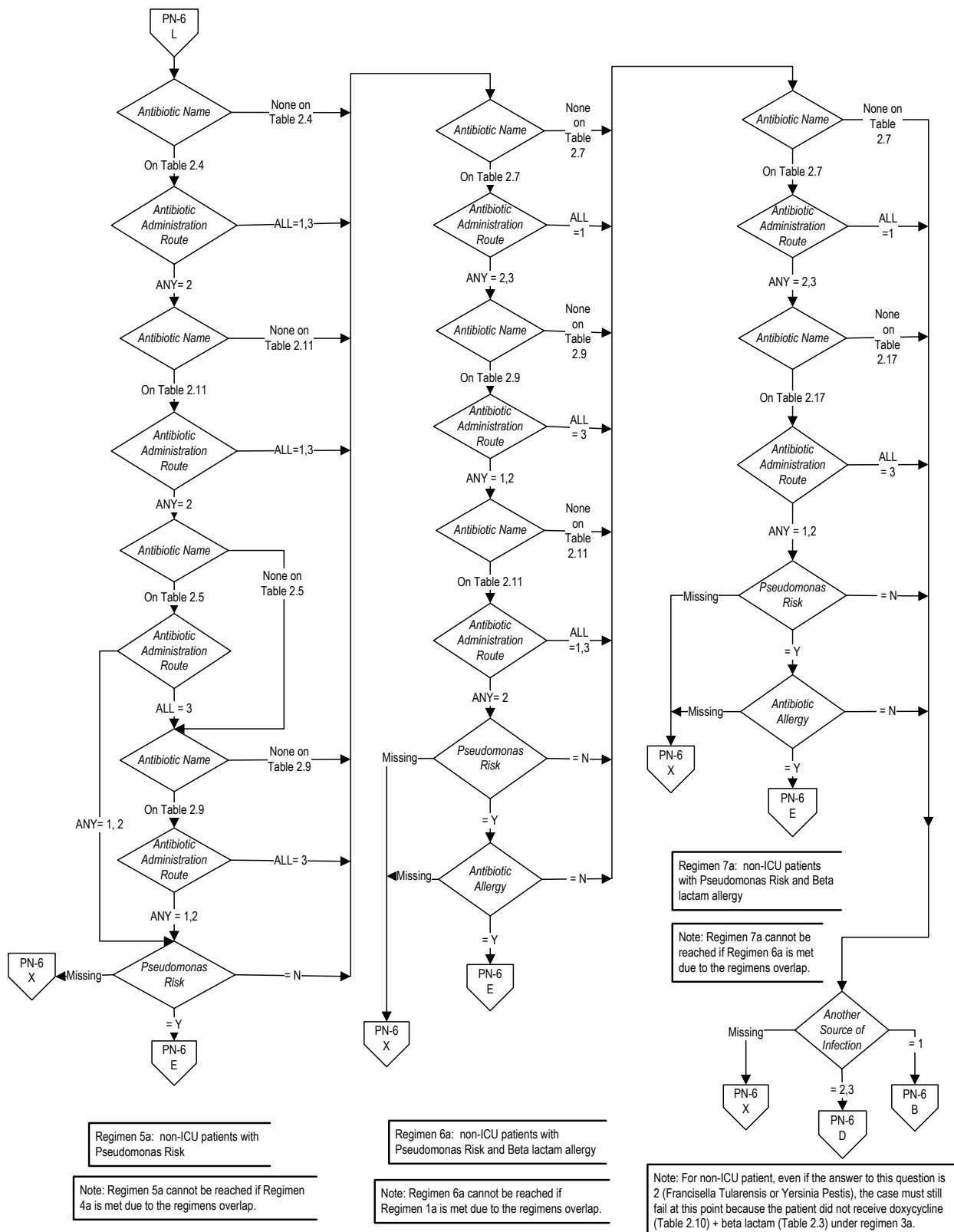


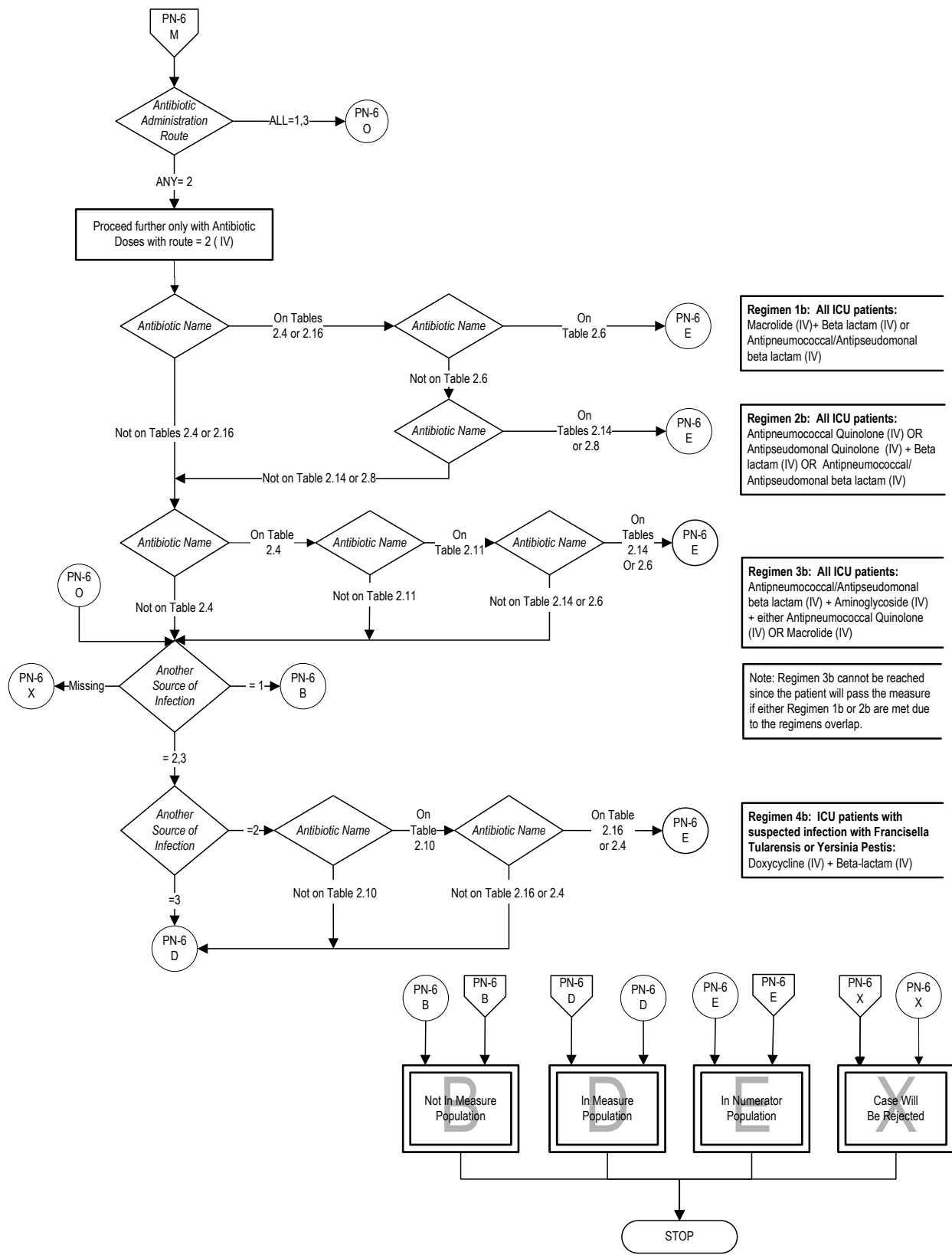
Regimen 1a: All non-ICU patients

Regimen 2a: All non-ICU patients

Regimen 3a: All non-ICU patients

Regimen 4a: non-ICU patients with Pseudomonas Risk





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.

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 Transfer From Another Hospital or ASC.

5. Check Transfer From Another Hospital or ASC
 - a. If Transfer From Another Hospital or ASC is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
 - b. If Transfer From Another Hospital or ASC equals Yes, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
 - c. If Transfer From Another Hospital or ASC equals No, continue processing and proceed to Pneumonia Diagnosis: ED/Direct Admit.
6. Check Pneumonia Diagnosis: ED/Direct Admit
 - a. If Pneumonia Diagnosis: ED/Direct Admit is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
 - b. If Pneumonia Diagnosis: ED/Direct Admit equals 2, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
 - c. If Pneumonia Diagnosis: ED/Direct Admit equals 1 or 3, 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 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.
8. Recheck Pneumonia Diagnosis: ED/Direct Admit
 - a. If Pneumonia Diagnosis: ED/Direct Admit equals 3, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
 - b. If Pneumonia Diagnosis: ED/Direct Admit equals 1, 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 Antibiotic Received.
12. 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 Reason for Alternative Empiric Antibiotic Therapy.
13. Check Reason for Alternative Empiric Antibiotic Therapy
 - a. If Reason for Alternative Empiric Antibiotic Therapy is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
 - b. If Reason for Alternative Empiric Antibiotic Therapy 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 Reason for Alternative Empiric Antibiotic Therapy equals No, continue processing and check Antibiotic Name.
14. 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: Cases containing invalid data and/or an incomplete Antibiotic Grid will be rejected. A complete Antibiotic Grid requires all data elements in the row to contain either a valid value and/or Unable to Determine.
15. 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 dose that are on Table 2.1 and whose associated route equals 1, 2 or 3. Proceed to Antibiotic Administration Date.

16. 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.
17. 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.
18. 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.
19. Recheck Antibiotic Days
 - a. If the Antibiotic Days is equal to zero for ALL antibiotic doses, continue processing and proceed to step 27 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.
20. Initialize Abxday Flag only if Antibiotic Days was greater than zero for any antibiotic dose. Initialize Abxday Flag to equal No for each antibiotic dose. Set Abxday flag to equal Yes for each antibiotic dose where Antibiotic Days is equal to zero.
21. 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 27 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.
22. 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 27 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.
23. 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 Abxday flag is equal to Yes.
24. 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.
25. 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.
26. 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.
27. Recheck ICU Admission or Transfer
- a. If ICU Admission or Transfer equals 1, continue processing and check Antibiotic Allergy.
 - b. If ICU Admission or Transfer equals 2, proceed to step 30 and check Regimen 1a.
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 step 75 and check Antibiotic Administration Route. Do not check Regimen 1a, 2a, 3a, 4a, 5a, 6a, or 7a.
29. Non ICU Regimens
30. Check Regimen 1a: All non ICU patients
31. Check Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.9, continue processing and proceed to step 33 and check Regimen 2a.
 - b. If the Antibiotic Name is on Table 2.9, continue processing and proceed to Antibiotic Administration Route.
32. 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, the case will proceed to a Measure Category Assignment of E and will be in the Numerator population. Stop processing.
33. Check Regimen 2a: All non ICU patients
34. Check Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.12, continue processing and proceed to step 36 and check Regimen 3a.
 - b. If the Antibiotic Name is on Table 2.12, continue processing and proceed to Antibiotic Administration Route.
35. Check Antibiotic Administration Route – Note: When checking for route of antibiotic, check ONLY for the corresponding antibiotic. For example, if an antibiotic on Table 2.12 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 Regimen 3a.
 - b. If ANY of the Antibiotic Administration Routes are equal to 2, the case will proceed to a Measure Category Assignment of E and will be in the Numerator population. Stop processing.
36. Check Regimen 3a: All non ICU patients
37. Check Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.3, continue processing and proceed to step 41 and check Regimen 4a.
 - b. If the Antibiotic Name is on Table 2.3, continue processing and proceed to Antibiotic Administration Route.
38. 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 41 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.

39. 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 41 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.
40. Recheck Antibiotic Administration Route
 - a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 41 and recheck Regimen 4a.
 - b. If ANY of the Antibiotic Administration Routes are equal to 1 or 2, the case will proceed to a Measure Category Assignment of E and the case will be in the Numerator Population. Stop processing.
41. Check Regimen 4a: non ICU patients with Pseudomonas Risk
42. Check Antibiotic Name
 - a. If None of the Antibiotic Names are on Table 2.4, continue processing and proceed to step 47 and check Regimen 5a.
 - b. If the Antibiotic Name is on Table 2.4, continue processing and proceed to Antibiotic Administration Route.
43. 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 47 and check Regimen 5a.
 - b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to recheck Antibiotic Name.
44. Recheck Antibiotic Name
 - a. If None of the Antibiotic Names are on Table 2.8, continue processing and proceed to step 47 and check Regimen 5a.
 - b. If the Antibiotic Name is on Table 2.8, continue processing and proceed to recheck Antibiotic Administration Route.
45. Recheck Antibiotic Administration Route
 - a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 47 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.
46. 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 47 and check Regimen 5a.
 - c. If Pseudomonas Risk equals Yes, the case will proceed to a Measure Category Assignment of E and the case will be in the Numerator Population. Stop processing.
47. Check Regimen 5a: non ICU patients with Pseudomonas Risk
48. Check Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.4, continue processing and proceed to step 57 and check Regimen 6a.
 - b. If the Antibiotic Name is on Table 2.4, continue processing and proceed to Antibiotic Administration Route.
49. 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 57 and check Regimen 6a.
 - b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to recheck Antibiotic Name.
50. Recheck Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.11, continue processing and proceed to step 57 and check Regimen 6a.
 - b. If the Antibiotic Name is on Table 2.11, continue processing and proceed to recheck Antibiotic Administration Route.
51. Recheck Antibiotic Administration Route
- a. If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 57 and check Regimen 6a.
 - b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to recheck Antibiotic Name.
52. Recheck Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.5, continue processing and proceed to step 54 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.
53. 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 56 and check Pseudomonas Risk. Do not recheck Antibiotic Name and Antibiotic Administration Route.
54. Recheck Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.9, continue processing and proceed to step 57 and check Regimen 6a.
 - b. If the Antibiotic Name is on Table 2.9, continue processing and proceed to recheck Antibiotic Administration Route.
55. Recheck Antibiotic Administration Route.
- a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 57 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.
56. 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, the case will proceed to a Measure Category Assignment of E and the case will be in the Numerator population. Stop processing. Note: Regimen 5a cannot be reached if Regimen 4a is met due to the regimens overlap.
57. Check Regimen 6a: non ICU patients with Pseudomonas Risk and Beta lactam allergy
58. Check Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.7, continue processing and proceed to step 66 and check Regimen 7a.
 - b. If the Antibiotic Name is on Table 2.7, continue processing and proceed to Antibiotic Administration Route.
59. 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 66 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.

60. Recheck Antibiotic Name
 - a. If None of the Antibiotic Names are on Table 2.9, continue processing and proceed to step 66 and check Regimen 7a.
 - b. If the Antibiotic Name is on Table 2.9, continue processing and proceed to recheck Antibiotic Administration Route.
61. Recheck Antibiotic Administration Route
 - a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 66 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.
62. Recheck Antibiotic Name
 - a. If None of the Antibiotic Names are on Table 2.11, continue processing and proceed to step 66 and check Regimen 7a.
 - b. If the Antibiotic Name is on Table 2.11, continue processing and proceed to recheck Antibiotic Administration Route.
63. Recheck Antibiotic Administration Route
 - a. If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 66 and check Regimen 7a.
 - b. If ANY of the Antibiotic Administration Routes are equal to 2, continue processing and proceed to Pseudomonas Risk.
64. 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 66 and check Regimen 7a. Do not check Antibiotic Allergy.
 - c. If Pseudomonas Risk equals Yes, continue processing and proceed to Antibiotic Allergy.
65. 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, the case will proceed to a Measure Category Assignment of E and the case will be in the Numerator Population. Stop processing. Note: Regimen 6a cannot be reached if Regimen 1a is met due to the regimens overlap.
66. Check Regimen 7a: non ICU patients with Pseudomonas Risk and Beta lactam allergy

67. Check Antibiotic Name
 - a. If None of the Antibiotic Names are on Table 2.7, continue processing and proceed to step 73 and check Another Source of Infection.
 - b. If the Antibiotic Name is on Table 2.7, continue processing and proceed to Antibiotic Administration Route.
68. 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 73 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.
69. Recheck Antibiotic Name
 - a. If None of the Antibiotic Names are on Table 2.17, continue processing and proceed to step 73 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.
70. Recheck Antibiotic Administration Route
 - a. If ALL of the Antibiotic Administration Routes are equal to 3, continue processing and proceed to step 73 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.
71. 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 73 and check Another Source of Infection.
 - c. If Pseudomonas Risk equals Yes, continue processing and proceed to Antibiotic Allergy.
72. 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 73 and check Another Source of Infection.
 - c. If Antibiotic Allergy equals Yes, the case will proceed to a Measure Category Assignment of E and the case will be in the Numerator Population. Stop processing.

73. Check Another Source of Infection
- If Another Source of Infection is missing, the case will proceed to a Measure Category Assignment of X and will be rejected. Stop processing.
 - If Another Source of Infection equals 1, the case will proceed to a Measure Category Assignment of B and will not be in the Measure Population. Stop processing.
 - If Another Source of Infection equals 2 or 3, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
74. ICU Regimens
75. Check Antibiotic Administration Route
- If ALL of the Antibiotic Administration Routes are equal to 1 or 3, continue processing and proceed to step 82 and check Another Source of Infection.
 - 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).
76. Check Antibiotic Name
- If None of the Antibiotic Names are on Table 2.4 or 2.16 continue processing and proceed to step 79 and recheck Antibiotic Name.
 - If the Antibiotic Name is on Table 2.4 or 2.16 continue processing and proceed to recheck Antibiotic Name.
77. Recheck Antibiotic Name
- 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).
 - If the Antibiotic Name is not on Table 2.6 continue processing and recheck Antibiotic Name.
78. Recheck Antibiotic Name
- If None of the Antibiotic Names are on Tables 2.14 or 2.8, continue processing and proceed to step 79 and recheck Antibiotic Name.
 - 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).

79. Recheck Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.4, continue processing and proceed to step 82 and check Another Source of Infection.
 - b. If the Antibiotic Name is on Table 2.4, continue processing and proceed to recheck Antibiotic Name.
80. Recheck Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.11, continue processing and proceed to step 82 and check Another Source of Infection.
 - b. If the Antibiotic Name is on Table 2.11, continue processing and recheck Antibiotic Name.
81. Recheck Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.6 or 2.14, continue processing and proceed to step 82 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.
82. 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 1, 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 3, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
 - d. If Another Source of Infection equals 2, continue processing and proceed to Recheck Antibiotic Name.
83. Recheck Antibiotic Name
- a. If None of the Antibiotic Names are on Table 2.10, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
 - b. If the Antibiotic Name is on Table 2.10, continue processing and recheck Antibiotic Name.

84. Recheck Antibiotic Name

- a. If None of the Antibiotic Names are on Table 2.16 or Table 2.4, the case will proceed to a Measure Category Assignment of D and will be in the Measure Population. Stop processing.
- b. If the Antibiotic Name is on Table 2.16 or Table 2.4, the case will go to Measure Category Assignment of E and will be in the Numerator Population. Stop processing. Regimen 4b: All ICU patients with suspected infection with Francisella Tularensis or Yersinia Pestis: Doxycycline (IV) + Beta-lactam (IV).