****NQF-ENDORSED VOLUNTARY CONSENSUS STANDARDS FOR HOSPITAL CARE****

Measure Information Form

Measure Set: Surgical Infection Prevention (SIP)

Set Measure ID #: SIP-2

Set Measure ID #	Performance Measure Name
SIP-2a	Prophylactic Antibiotic Selection for Surgical Patients - Overall Rate
SIP-2b	Prophylactic Antibiotic Selection for Surgical Patients - CABG
SIP-2c	Prophylactic Antibiotic Selection for Surgical Patients - Cardiac Surgery
SIP-2d	Prophylactic Antibiotic Selection for Surgical Patients - Hip Arthroplasty
SIP-2e	Prophylactic Antibiotic Selection for Surgical Patients - Knee Arthroplasty
SIP-2f	Prophylactic Antibiotic Selection for Surgical Patients - Colon Surgery
SIP-2g	Prophylactic Antibiotic Selection for Surgical Patients - Hysterectomy
SIP-2h	Prophylactic Antibiotic Selection for Surgical Patients - Vascular Surgery

Performance Measure Name: Prophylactic Antibiotic Selection for Surgical Patients

Description: Surgical patients who received prophylactic antibiotics consistent with current guidelines (specific to each type of surgical procedure).

Rationale: A goal of prophylaxis with antibiotics is to use an agent that is safe, cost-effective, and has a spectrum of action that covers most of the probable intraoperative contaminants for the operation. First or second-generation cephalosporins satisfy these criteria for most operations, although anaerobic coverage is needed for colon surgery. Vancomycin is not recommended for routine use because of the potential for development of antibiotic resistance, but is acceptable if a patient is allergic to beta-lactams, as are fluoroquinolones and clindamycin in selected situations.

Type of Measure: Process

Improvement Noted As: An increase in the rate

Numerator Statement: Number of surgical patients who received prophylactic antibiotics recommended for their specific surgical procedure

Included populations: Not Applicable

Excluded Populations: None

Data Elements:

- *Antibiotic Administration Route*
- *Antibiotic Allergy*
- *Antibiotic Name*
- *Oral Antibiotics*

The antibiotic regimens described in the table which follows later in this section reflect the combined, published recommendations of the American Society of Health-System Pharmacists, the Medical Letter, the Infectious Diseases Society of America, the Sanford Guide to Antimicrobial Therapy 2001, and the Surgical Infection Society.

Denominator Statement: All selected surgical patients with no evidence of prior infection

Included Populations:

- *ICD-9-CM Principal Procedure Code* or *ICD-9-CM Other Procedure Code* of selected surgeries (refer to Appendix A, Table 5.01-5.08 for ICD-9-CM codes)

Excluded Populations:

- Patients who had a principal or admission diagnosis suggestive of preoperative infectious diseases (refer to Appendix A, Table 5.09 for ICD-9-CM codes)
- Patients who were receiving antibiotics within 24 hours prior to arrival (except colon surgery patients taking oral prophylactic antibiotics)
- Patients who were receiving antibiotics more than 24 hours prior to surgery (except colon surgery patients taking oral prophylactic antibiotics)
- Patients who did not receive any antibiotics before or during surgery, or within 24 hours after surgery end time (i.e., patient did not receive prophylactic antibiotics)
- Patients who did not receive any antibiotics during this hospitalization
- Patients less than 18 years of age
- Patients with physician documented infection prior to surgical procedure of interest

Data Elements:

- *Admission Date*
- *Admission Diagnosis of Infection*
- *Antibiotic Administration Date*
- *Antibiotic Administration Time*
- *Antibiotics During Stay*
- *Antibiotics Prior to Arrival*
- *Birthdate*
- *ICD-9-CM Other Procedure Code*
- *ICD-9-CM Principal Diagnosis Code*
- *ICD-9-CM Principal Procedure Code*
- *Infection Prior to Anesthesia*
- *Prophylactic Antibiotic*
- *Surgery Performed During Stay*
- *Surgery Start Date*
- *Surgical Incision Time*
- *Type of Surgery*

Risk Adjustment: No

Data Collection Approach: Retrospective data sources for required data elements include administrative data and medical records.

Data Accuracy: Abstracted antibiotics are those administered from the time of arrival through the first 48 hours after the surgery end time. Refer to Appendix C, Table 2.1 which contains a complete listing of antibiotics.

Measure Analysis Suggestions: Consideration may be given to relating this measure to SIP-1 and SIP-3 in order to evaluate which aspects of antibiotic prophylaxis would most benefit from an improvement effort. The process owners for selection of appropriate antibiotics could include physicians, their assistants, hospital committees (i.e., QA, Infection Control, Pharmacy and Therapeutics, Surgical Section Subcommittees, etc.) any of which may choose to address this physician practice issue as part of a larger surgical infection prevention initiative.

Sampling: Yes, for additional information see the Sampling section

Data Reported as: Overall aggregate rate for all surgeries and stratified rates by data element *Type of Surgery*, generated from count data reported as a proportion

Selected References:

- Bratzler DW, Houck PM, for the Surgical Infection Prevention Guidelines Writers Group. Antimicrobial prophylaxis for surgery: An advisory statement from the National Surgical Infection Prevention Project. *CID*. 2004:38(15 July):1706-1715
- Mangram AJ, Horan TC, Pearson ML, et al. Guidelines for prevention of surgical site infection, 1999. *Infect Control Hosp Epidemiol.* 1999;20:247-280.
- American Society of Health-System Pharmacists. ASHP therapeutic guidelines on antimicrobial prophylaxis in surgery. *Am J Health Syst Pharm.* 1999;56:1839-1888.
- The Medical Letter. Antimicrobial prophylaxis in surgery. *Med Lett Drugs Ther.* 1999;41:75-80.
- Dellinger EP, Gross PA, Barrett TL, et al. Quality standard for antimicrobial prophylaxis in surgical procedures. *Clin Infect Dis.* 1994;18:422-427.
- Gilbert DN, Moellering RC Jr., Sande MA, eds. *The Sanford Guide to Antimicrobial Therapy.* 31st ed. Hyde Park, VT: Antimicrobial Therapy, Inc; 2001.pp.116-117.
- Page CP, Bohnen JM, Fletcher JR, et al. Antimicrobial prophylaxis for surgical wounds. *Arch Surg.* 1993;128:79-88.

Antibiotic Selection Regimen for Surgery

Surgical Prophylactic Antibiotic Regimen

Surgical Procedure	Approved Antibiotics
Cardiac or Vascular	Cefazolin, Cefuroxime or Cefamandole Table 3.1 If β-lactam allergy: Vancomycin* Table 3.8 or Clindamycin* Table 3.9
Hip/Knee Arthroplasty	Cefazolin or Cefuroxime Table 3.2 If β-lactam allergy: Vancomycin* Table 3.8 or Clindamycin* Table 3.9
Colon	Oral: after effective mechanical bowel preparation, Neomycin Sulfate Table 3.3 + Erythromycin Base Table 3.4 **OR** Neomycin Sulfate Table 3.3 + Metronidazole Table 3.4 Administered for 18 hours preoperatively Parenteral: Cefotetan, Cefoxitin or Cefmetazole Table 3.5 **OR** Cefazolin Table 3.6 + Metronidazole Table 3.6a If β-lactam allergy: Clindamycin Table 3.9 + Gentamicin Table 3.11 , or Clindamycin Table 3.9 + Ciprofloxacin** Table 2.8, or Clindamycin Table 3.9 + Aztreonam Table 2.7 **OR** Metronidazole Table 3.4 with Gentamicin Table 3.11, or Metronidazole Table 3.4 + Ciprofloxacin** Table 2.8
Hysterectomy	Cefotetan, Cefazolin, Cefoxitin, or Cefuroxime Table 3.7 If β-lactam allergy: Clindamycin Table 3.9 + Gentamicin Table 3.11, or Clindamycin Table 3.9 + Ciprofloxacin** Table 2.8, or Clindamycin Table 3.9 + Aztreonam Table 2.7 **OR** Metronidazole Table 3.4 + Gentamicin Table 3.11, or Metronidazole Table 3.4 + Ciprofloxacin** Table 2.8 **OR** Clindamycin monotherapy Table 3.9
Special Considerations	*For cardiac, orthopedic, and vascular surgery, if the patient is allergic to β-lactam antibiotics, Vancomycin or Clindamycin are acceptable substitutes. ** Levofloxacin 750 mg given once may be substituted for Ciprofloxacin.

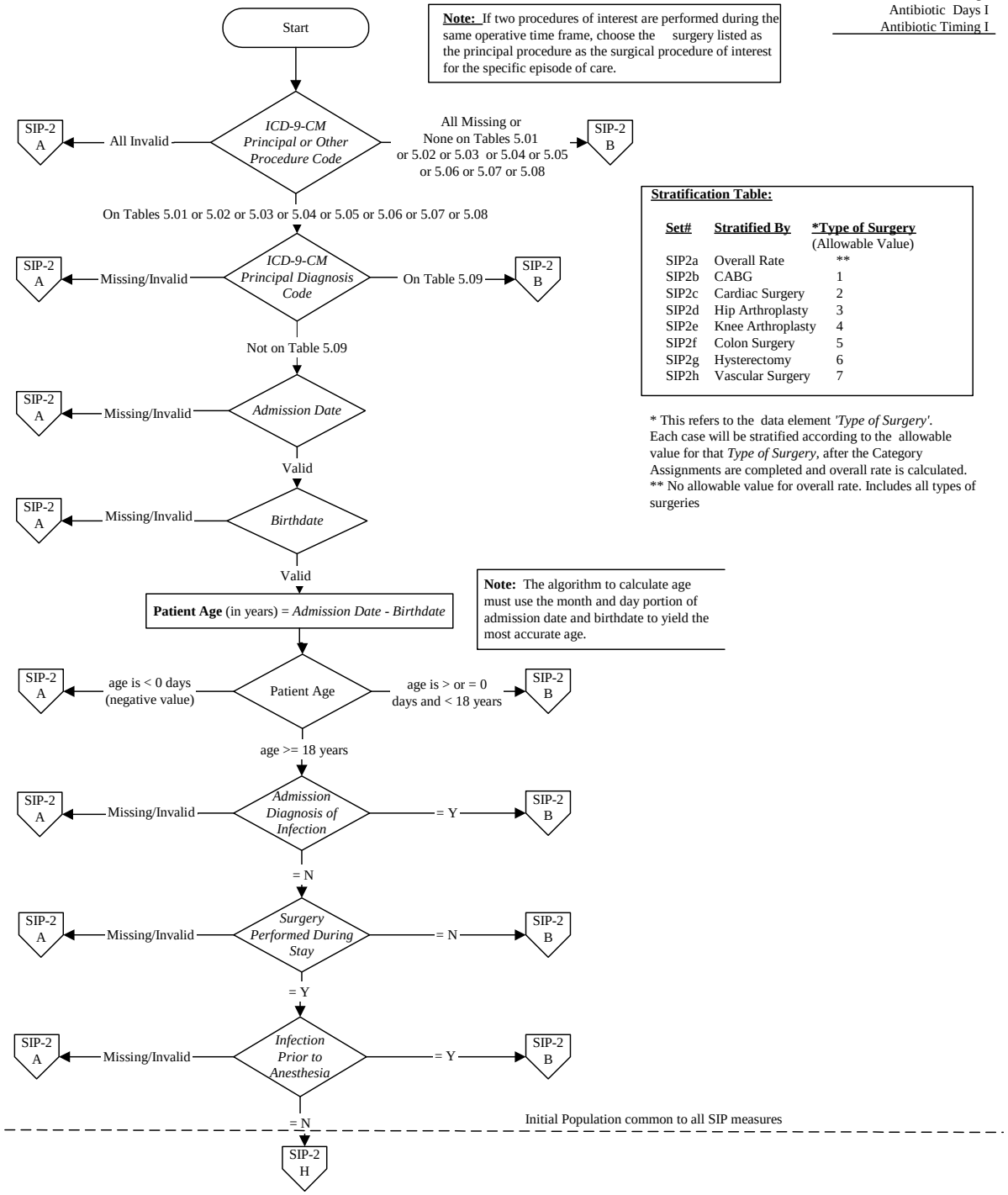
Note: The dosage listed is specified to reflect clinical expert recommendations.
We do not collect dosage information for the purposes of the SIP Project

SIP-2: Prophylactic Antibiotic Selection for Surgical Patients

Numerator: Number of surgical patients who received prophylactic antibiotics recommended for their specific surgical procedure.

Denominator: All selected surgical patients with no evidence of prior infection.

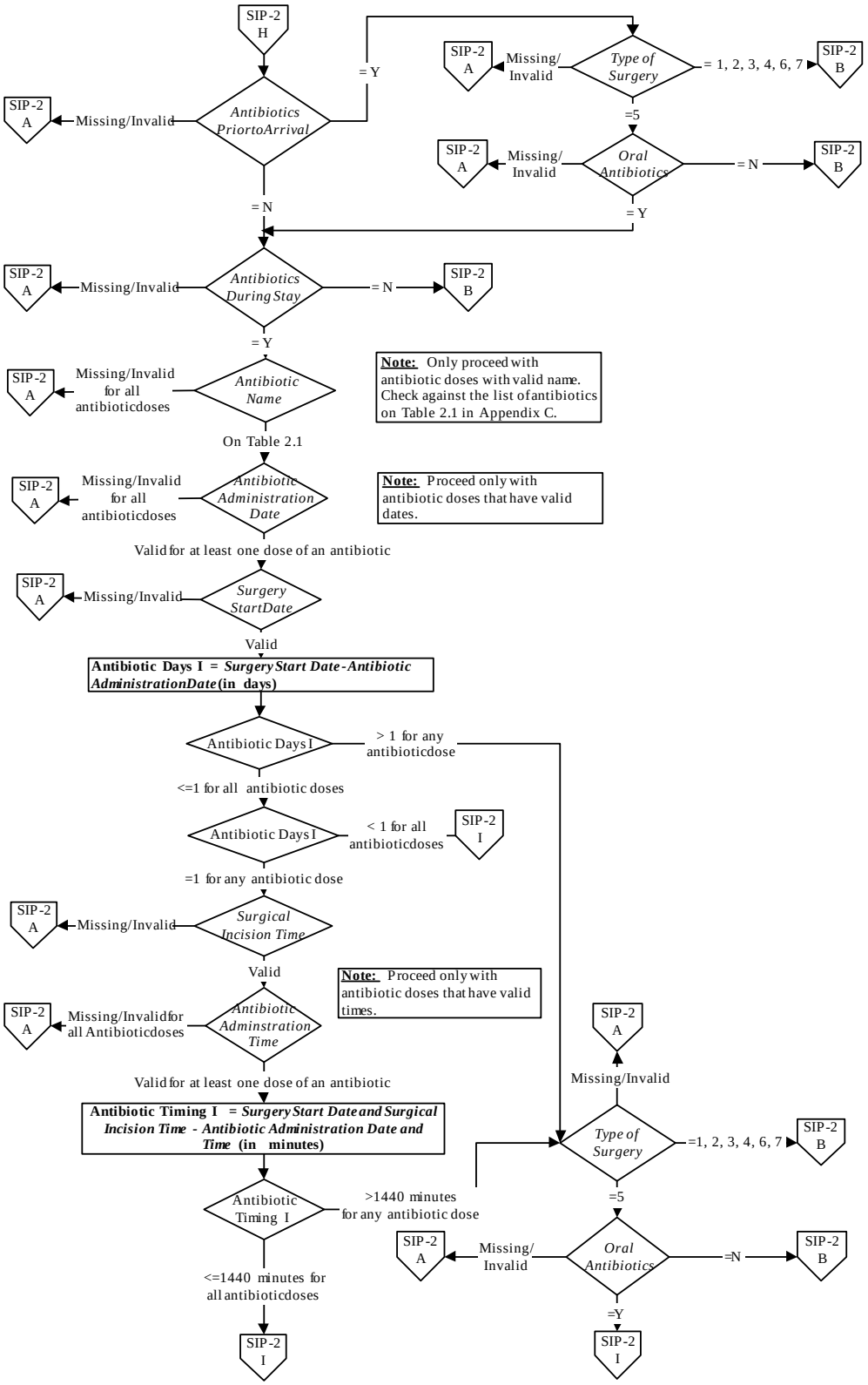
Variable Key:
Patient Age
Antibiotic Days I
Antibiotic Timing I

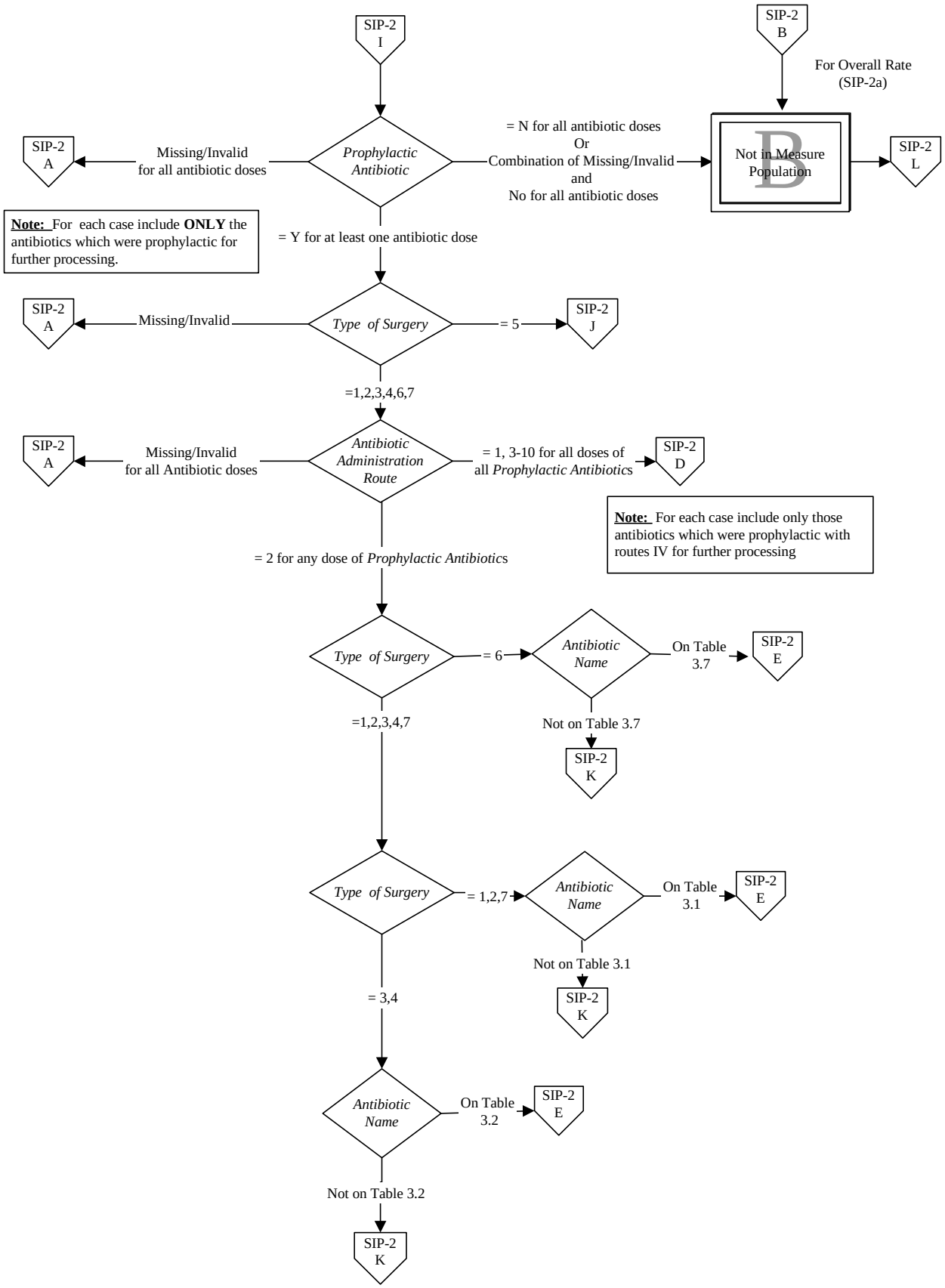


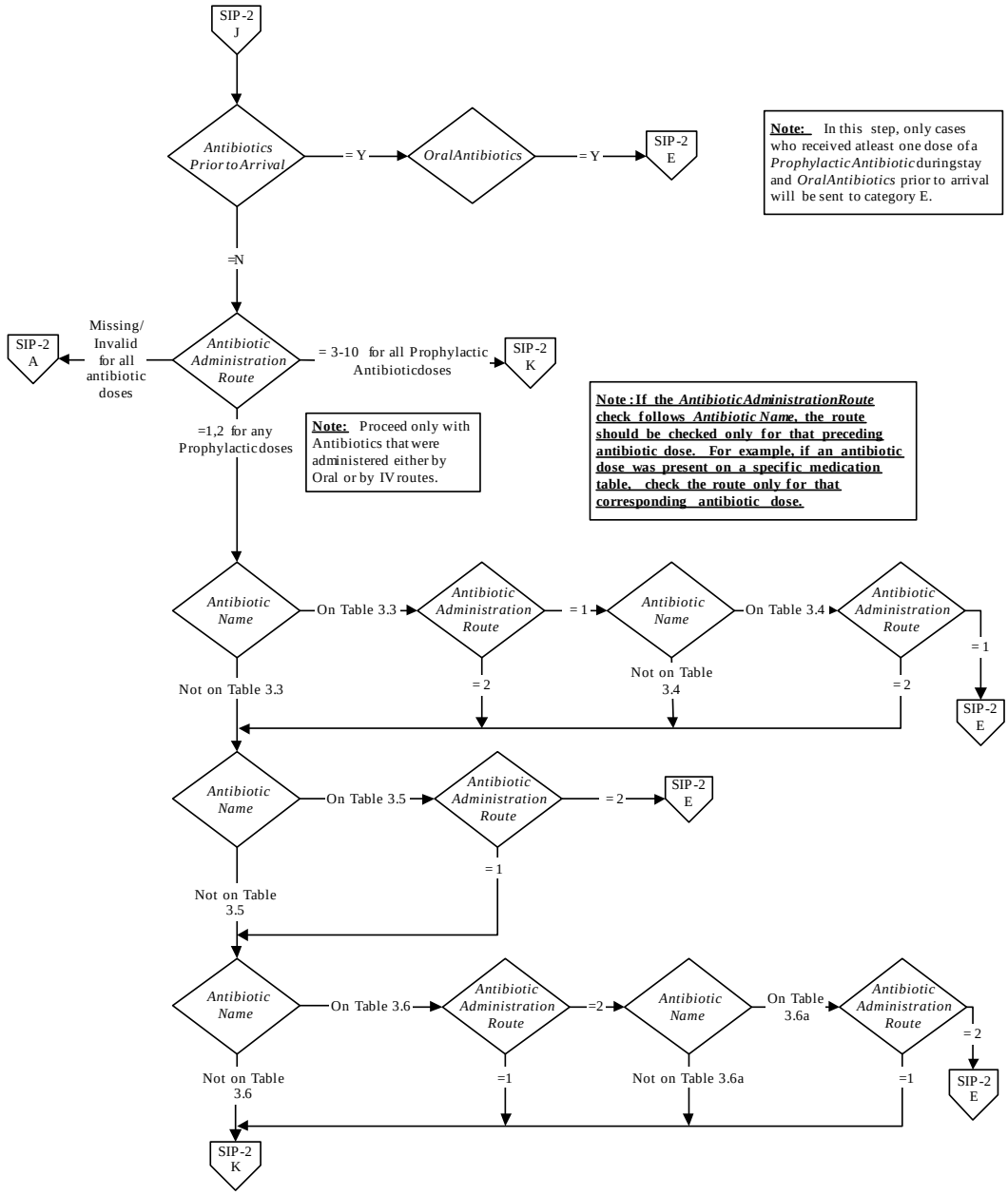
Stratification Table:

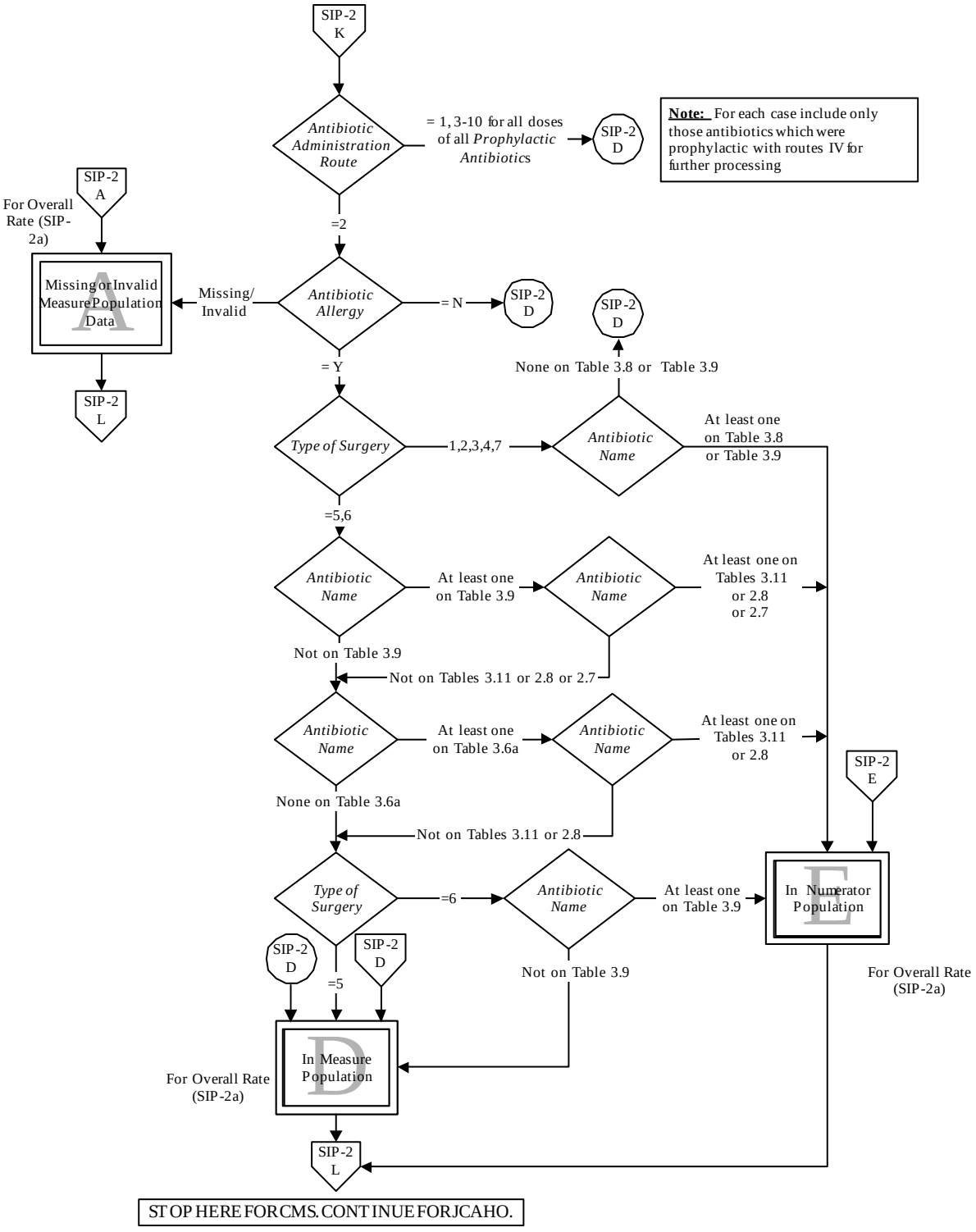
Set#	Stratified By	*Type of Surgery (Allowable Value)
SIP2a	Overall Rate	**
SIP2b	CABG	1
SIP2c	Cardiac Surgery	2
SIP2d	Hip Arthroplasty	3
SIP2e	Knee Arthroplasty	4
SIP2f	Colon Surgery	5
SIP2g	Hysterectomy	6
SIP2h	Vascular Surgery	7

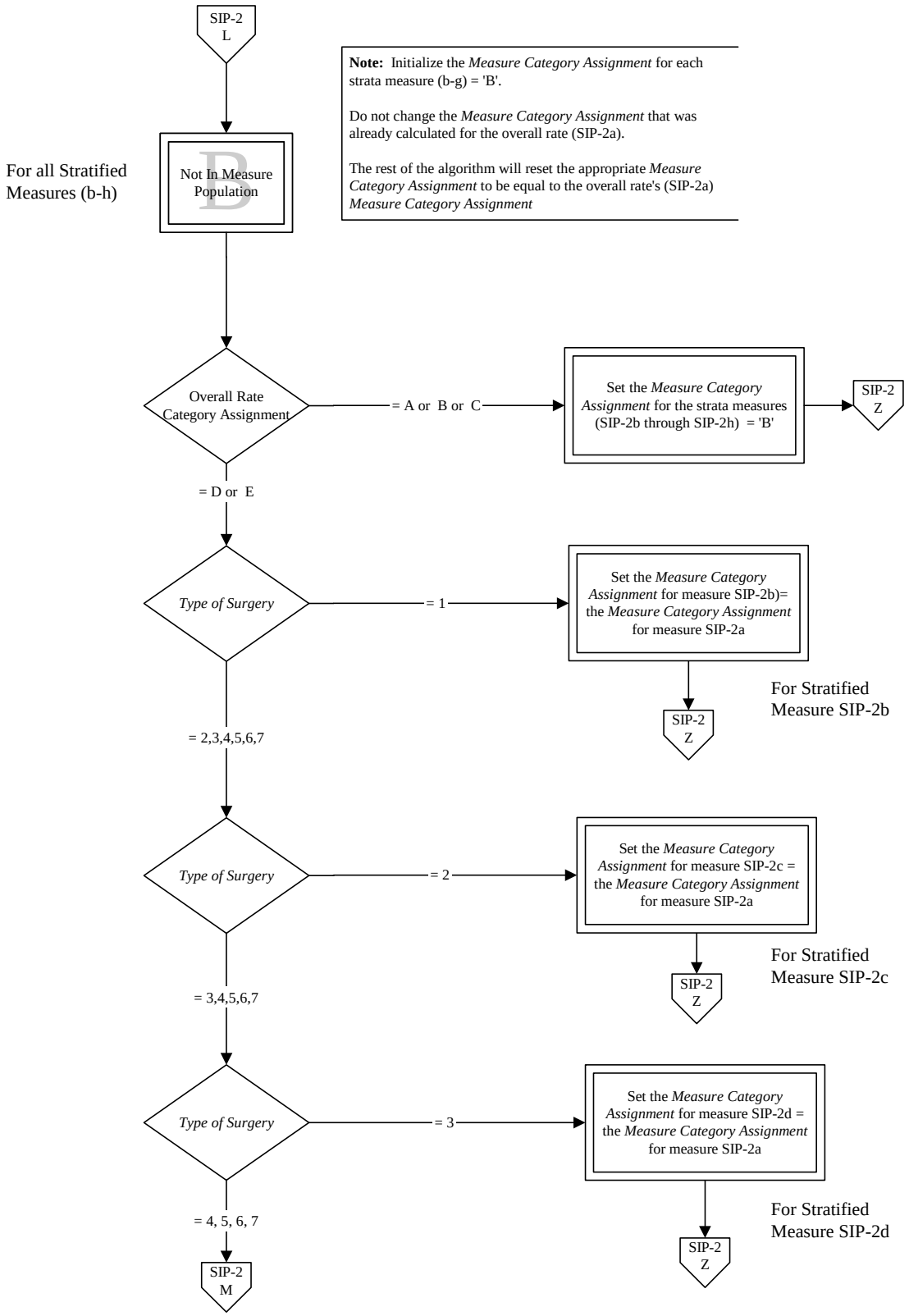
* This refers to the data element *'Type of Surgery'*. Each case will be stratified according to the allowable value for that *Type of Surgery*, after the Category Assignments are completed and overall rate is calculated.
** No allowable value for overall rate. Includes all types of surgeries

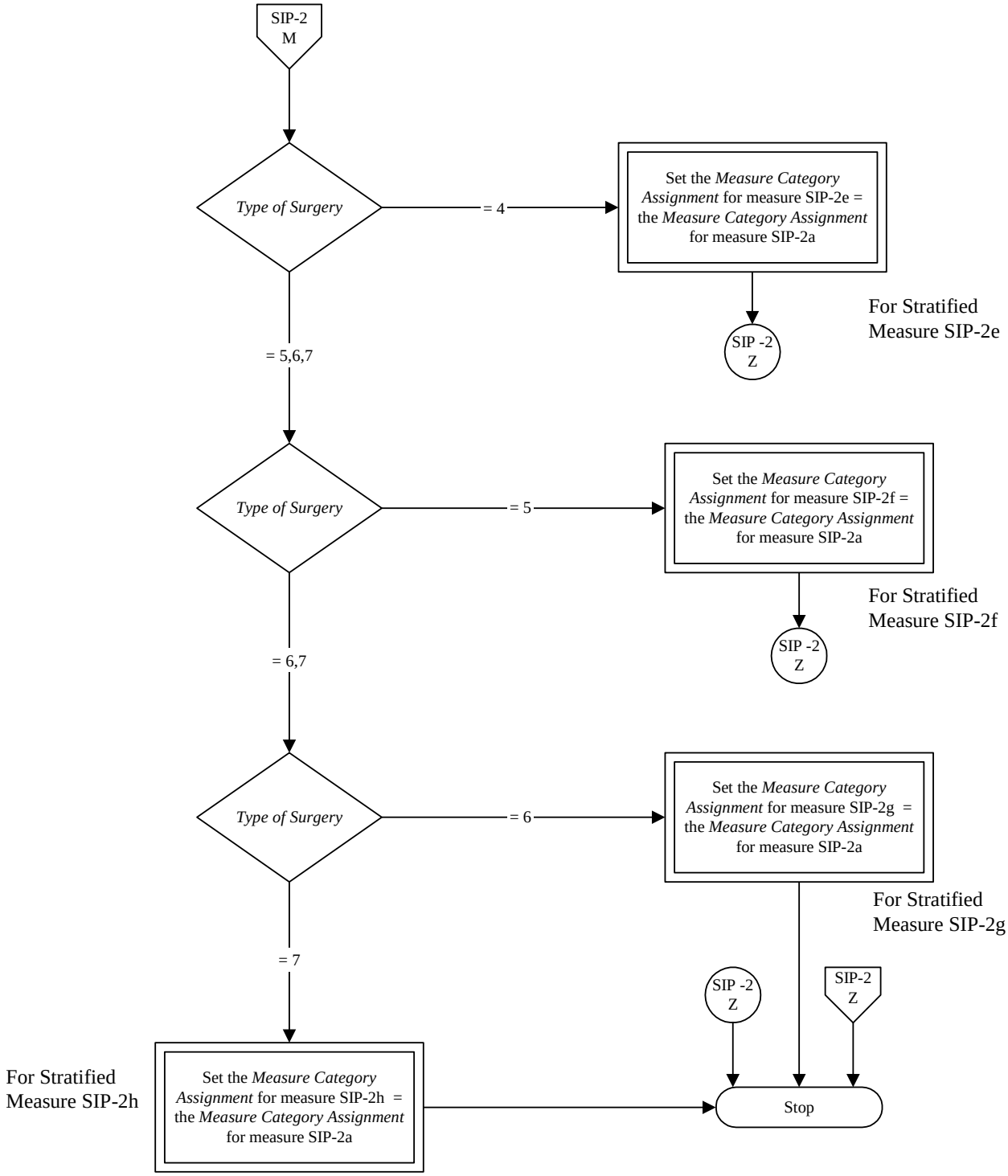

SIP-2 H
Antibiotics PriortoArrival
Missing/Invalid
SIP-2 A
= Y
= N
Type of Surgery
Missing/ Invalid
= 1, 2, 3, 4, 6, 7
SIP-2 B
=5
Oral Antibiotics
= N
= Y
Antibiotics During Stay
= N
= Y
Antibiotic Name
Missing/Invalid for all antibioticdoses
On Table 2.1
Note: Only proceed with antibiotic doses with valid name. Check against the list of antibiotics on Table 2.1 in Appendix C.
Antibiotic Administration Date
Note: Proceed only with antibiotic doses that have valid dates.
Valid for at least one dose of an antibiotic
Surgery StartDate
Valid
Antibiotic Days I = Surgery Start Date - Antibiotic AdministrationDate (in days)
Antibiotic Days I
> 1 for any antibioticdose
<=1 for all antibiotic doses
< 1 for all antibioticdoses
SIP-2 I
=1 for any antibiotic dose
Surgical Incision Time
Valid
Note: Proceed only with antibiotic doses that have valid times.
Antibiotic Adminstration Time
Missing/Invalid for all Antibioticdoses
Valid for at least one dose of an antibiotic
Antibiotic Timing I = Surgery Start Date and Surgical Incision Time - Antibiotic Administration Date and Time (in minutes)
Antibiotic Timing I
>1440 minutes for any antibiotic dose
<=1440 minutes for all antibioticdoses
Missing/Invalid
=1, 2, 3, 4, 6, 7
=5
=N
=Y


SIP-2 I
SIP-2 B
For Overall Rate (SIP-2a)
Prophylactic Antibiotic
Missing/Invalid for all antibiotic doses
SIP-2 A
= N for all antibiotic doses Or Combination of Missing/Invalid and No for all antibiotic doses
Not in Measure Population
B
SIP-2 L
Note: For each case include ONLY the antibiotics which were prophylactic for further processing.
= Y for at least one antibiotic dose
Type of Surgery
Missing/Invalid
SIP-2 A
= 5
SIP-2 J
=1,2,3,4,6,7
Antibiotic Administration Route
Missing/Invalid for all Antibiotic doses
SIP-2 A
= 1, 3-10 for all doses of all Prophylactic Antibiotics
SIP-2 D
Note: For each case include only those antibiotics which were prophylactic with routes IV for further processing
= 2 for any dose of Prophylactic Antibiotics
Type of Surgery
= 6
Antibiotic Name
On Table 3.7
SIP-2 E
Not on Table 3.7
SIP-2 K
=1,2,3,4,7
Type of Surgery
= 1,2,7
Antibiotic Name
On Table 3.1
SIP-2 E
Not on Table 3.1
SIP-2 K
= 3,4
Antibiotic Name
On Table 3.2
SIP-2 E
Not on Table 3.2
SIP-2 K


SIP-2 J
Antibiotics Prior to Arrival
= Y
Oral Antibiotics
= Y
SIP-2 E
Note: In this step, only cases who received atleast one dose of a Prophylactic Antibiotic during stay and Oral Antibiotics prior to arrival will be sent to category E.
=N
SIP-2 A
Missing/ Invalid for all antibiotic doses
Antibiotic Administration Route
= 3-10 for all Prophylactic Antibiotic doses
SIP-2 K
=1,2 for any Prophylactic doses
Note: Proceed only with Antibiotics that were administered either by Oral or by IV routes.
Note : If the Antibiotic Administration Route check follows Antibiotic Name, the route should be checked only for that preceding antibiotic dose. For example, if an antibiotic dose was present on a specific medication table, check the route only for that corresponding antibiotic dose.
Antibiotic Name
On Table 3.3
Antibiotic Administration Route
= 1
Antibiotic Name
On Table 3.4
Antibiotic Administration Route
= 1
SIP-2 E
Not on Table 3.3
= 2
Not on Table 3.4
= 2
Antibiotic Name
On Table 3.5
Antibiotic Administration Route
= 2
SIP-2 E
= 1
Not on Table 3.5
Antibiotic Name
On Table 3.6
Antibiotic Administration Route
=2
Antibiotic Name
On Table 3.6a
Antibiotic Administration Route
= 2
SIP-2 E
Not on Table 3.6
=1
Not on Table 3.6a
=1
SIP-2 K


SIP-2 K
Antibiotic Administration Route
= 1, 3-10 for all doses of all Prophylactic Antibiotics
SIP-2 D
Note: For each case include only those antibiotics which were prophylactic with routes IV for further processing
SIP-2 A
For Overall Rate (SIP-2a)
=2
Antibiotic Allergy
= N
SIP-2 D
Missing/ Invalid
Missing or Invalid Measure Population Data
A
SIP-2 L
= Y
None on Table 3.8 or Table 3.9
SIP-2 D
Type of Surgery
1,2,3,4,7
Antibiotic Name
At least one on Table 3.8 or Table 3.9
=5,6
Antibiotic Name
At least one on Table 3.9
Antibiotic Name
At least one on Tables 3.11 or 2.8 or 2.7
Not on Table 3.9
Not on Tables 3.11 or 2.8 or 2.7
Antibiotic Name
At least one on Table 3.6a
Antibiotic Name
At least one on Tables 3.11 or 2.8
SIP-2 E
None on Table 3.6a
Not on Tables 3.11 or 2.8
Type of Surgery
=6
Antibiotic Name
At least one on Table 3.9
In Numerator Population
E
SIP-2 D
SIP-2 D
=5
Not on Table 3.9
For Overall Rate (SIP-2a)
For Overall Rate (SIP-2a)
In Measure Population
D
SIP-2 L
STOP HERE FOR CMS. CONTINUE FOR JCAHO.


SIP-2
L
Note: Initialize the Measure Category Assignment for each strata measure (b-g) = 'B'.
Do not change the Measure Category Assignment that was already calculated for the overall rate (SIP-2a).
The rest of the algorithm will reset the appropriate Measure Category Assignment to be equal to the overall rate's (SIP-2a) Measure Category Assignment
For all Stratified Measures (b-h)
B
Not In Measure Population
Overall Rate Category Assignment
= A or B or C
Set the Measure Category Assignment for the strata measures (SIP-2b through SIP-2h) = 'B'
SIP-2
Z
= D or E
Type of Surgery
= 1
Set the Measure Category Assignment for measure SIP-2b)= the Measure Category Assignment for measure SIP-2a
SIP-2
Z
For Stratified Measure SIP-2b
= 2,3,4,5,6,7
Type of Surgery
= 2
Set the Measure Category Assignment for measure SIP-2c = the Measure Category Assignment for measure SIP-2a
SIP-2
Z
For Stratified Measure SIP-2c
= 3,4,5,6,7
Type of Surgery
= 3
Set the Measure Category Assignment for measure SIP-2d = the Measure Category Assignment for measure SIP-2a
SIP-2
Z
For Stratified Measure SIP-2d
= 4, 5, 6, 7
SIP-2
M


SIP-2 M
Type of Surgery
= 4
Set the Measure Category Assignment for measure SIP-2e = the Measure Category Assignment for measure SIP-2a
SIP -2 Z
For Stratified Measure SIP-2e
= 5,6,7
Type of Surgery
= 5
Set the Measure Category Assignment for measure SIP-2f = the Measure Category Assignment for measure SIP-2a
SIP -2 Z
For Stratified Measure SIP-2f
= 6,7
Type of Surgery
= 6
Set the Measure Category Assignment for measure SIP-2g = the Measure Category Assignment for measure SIP-2a
For Stratified Measure SIP-2g
= 7
SIP -2 Z
SIP-2 Z
For Stratified Measure SIP-2h
Set the Measure Category Assignment for measure SIP-2h = the Measure Category Assignment for measure SIP-2a
Stop