

## Supplemental Online Content

He K, Nayak RB, Allori AC, et al. Correlation between postoperative antimicrobial prophylaxis use and surgical site infection in children undergoing nonemergent surgery. *JAMA Surg*. Published online October 5, 2022. doi:10.1001/jamasurg.2022.4729

**eMethods.** NSQIP-Pediatric Surgical Antibiotic Prophylaxis Variables

**eFigure.** Hospital-level correlation of log-transformed odds ratios between any surgical site infection (incisional or organ space) and use of any postoperative surgical antimicrobial prophylaxis at 93 hospitals, stratified by all surgical specialties.

This supplemental material has been provided by the authors to give readers additional information about their work.

**eMethods**

**NSQIP-Pediatric**

**Surgical Antibiotic Prophylaxis**

**Variables**

**Intent:**

These variables were created with the intent to promote stewardship in the use of surgical antibiotic prophylaxis (SAP) as there is wide variation in SAP utilization amongst children's hospitals and increasing public health implications associated with antibiotic overuse.

**Cohort Definition:**

The intent of data collection for Surgical Antibiotic Prophylaxis is to characterize the utilization of antibiotic prophylaxis for non-emergent clean and clean-contaminated procedures.

\*The collection and recording of antibiotic utilization data should be completed **after** the standard case review for Operative Information and Preop Risk Factors is completed.

The registry will automatically exclude the following cases/procedures from the SAP data set by disabling the Surgical Antibiotic Prophylaxis data collection tab:

- CPT code 49320, laparoscopic procedures on the abdomen, peritoneum and omentum, is assigned as the primary procedure
- Wound Class is assigned as Contaminated or Dirty/Infected
- Case Status is selected as Emergent, with the exception of the CPT codes 43520, 43659, and 43800 (Pyloromyotomy)
- Any Concurrent Procedure is entered
- "Yes" is assigned for preoperative risk factor Hematologic Disorder
- "Yes" is assigned for preoperative risk factor Steroid Use
- "Current Cancer or Active Treatment of Cancer" is assigned for preoperative risk factor Childhood Malignancy

There are also exclusion questions embedded within the SAP variables. If "Yes" is selected for any of the following variables, the remaining variables will be disabled. These cases will not be analyzed for SAP.

- Procedure Indication for Infection
- Immunodeficiency Diagnosis
- Received IV Antibiotics Before Prophylaxis Window

**Notes:**

There are no age limitations. Patients of any age would be included if all inclusion criteria are met.

A "Concurrent procedure" is automatically excluded, however, if only "Other Procedures" are entered, the case would still be eligible if all SAP inclusion variable criteria are met.

**Variable Name: Procedure Indication for Infection**

**Program Legend:** Pediatric

**Intent of Variable:** To identify and exclude procedures for which infection, or concern for infection, is documented prior to the primary procedure.

**Definition:** The preoperative diagnosis and/or indication for the primary procedure involves infection or concern for infection.

**Criteria:** Answer “Yes” if there is preoperative documentation of infection or concern for infection prior to the primary procedure.

**Options:**

- Yes
- No

**Scenarios to Clarify (Assign Variable):**

- Appendectomy performed for acute appendicitis without evidence of perforation.
- Shunt revision performed due to possible infection.

**Scenarios to Clarify (Do Not Assign Variable):**

- Cholecystectomy performed due to chronic cholecystitis.
- Do not utilize intraoperative findings to answer this variable
- Small bowel resection performed due to duodenal atresia with no indication of perforation or leakage of enteric contents.

**Notes:**

- If “Yes” is selected, the additional Surgical Antibiotic Prophylaxis variables will be disabled.

**Variable Name: Immunodeficiency Diagnosis**

**Program Legend:** Pediatric

**Intent of Variable:** To identify and exclude patients with a current or historical immunodeficiency diagnosis.

**Definition:** The patient has one of the immunodeficiency diagnoses listed in the criteria.

**Criteria:** Answer “Yes” if the patient has ONE of the following immunodeficiency diagnoses (current or historical). This list is all-inclusive:

- Chronic granulomatous disease
- Congenital hypogammaglobulinemia
- Human immunodeficiency virus (HIV)

**Options:**

- Yes
- No

**Scenarios to Clarify (Assign Variable):**

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**Scenarios to Clarify (Do Not Assign Variable):**

- Patient had a kidney transplant 2 years ago and is currently on immunosuppressant therapy.
- Patient with a diagnosis of DiGeorge Syndrome.

**Notes:**

- If “Yes” is selected the additional Surgical Antibiotic Prophylaxis variables will be disabled.
- The list above is all-inclusive; do not assign for other conditions that may be associated with immunosuppression.

## Variable Name: Received IV Antibiotics Before Prophylaxis Window

**Program Legend:** Pediatric

**Intent of Variable:** To identify and exclude patients receiving intravenous antibiotics for a pre-existing infection or condition.

**Definition:** The preoperative prophylaxis window consists of the 3 hours prior to the Procedure/Surgery Start Time. This variable captures antibiotic administration from 3-48 hours prior to the Procedure/Surgery Start Time as this would be considered treatment for a pre-existing infection or condition.

**Criteria:** Assign “Yes” if the patient received intravenous antibiotic within 3-48 hours prior to the Procedure/Surgery Start Time.

### Options:

- Yes
- No

### Scenarios to Clarify (Assign Variable):

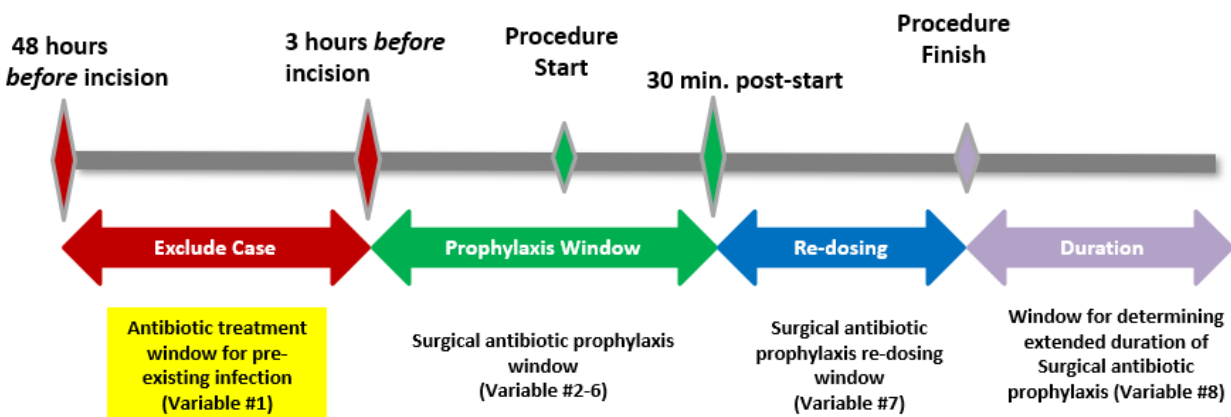
- Patient receives Rocephin 24 hours prior to the Procedure/Surgery Start Time.

### Scenarios to Clarify (Do Not Assign Variable):

- Vancomycin is administered in preoperative holding 1 hour prior to the Procedure/Surgery Start Time.

### Notes:

- If “Yes” is selected the additional Surgical Antibiotic Prophylaxis variables will be disabled.
- If a patient was transferred from another hospital, transfer documentation should be reviewed to determine if intravenous antibiotics were given prior to transfer.
- If this is an ambulatory procedure, or if a patient was admitted to the hospital within the 48-hour period before the incision, use the admission history/note to establish whether antibiotics had been given prior to hospital presentation.





## Variable Name: **Received Surgical IV Antibiotic Prophylaxis**

**Program Legend:** Pediatric

**Intent of Variable:** To capture the timeline for prophylaxis, including prophylaxis that may have been given late (after the incision).

**Definition:** The surgical antibiotic prophylaxis window consists of the 3 hours prior to the Procedure/Surgery Start Time. This variable captures antibiotic administration beginning 3 hours before the Procedure/Surgery Start Time and ending 30 minutes after Procedure/Surgery Start Time as this would be considered prophylactic antibiotic administration.

**Criteria:** Answer “Yes” if the patient received intravenous antibiotics during the surgical antibiotic prophylaxis window, within 3 hours prior to the Procedure/Surgery Start Time up to and including 30 minutes after the Procedure/Surgery Start Time.

### **Options:**

- Yes
- No

### **Scenarios to Clarify (Assign Variable):**

- Intravenous antibiotic is administered 2.5 hours prior to surgery on the inpatient unit. Select “Yes.”
- Intravenous antibiotic is administered 10 minutes after Procedure/Surgery Start Time. Select “Yes.”

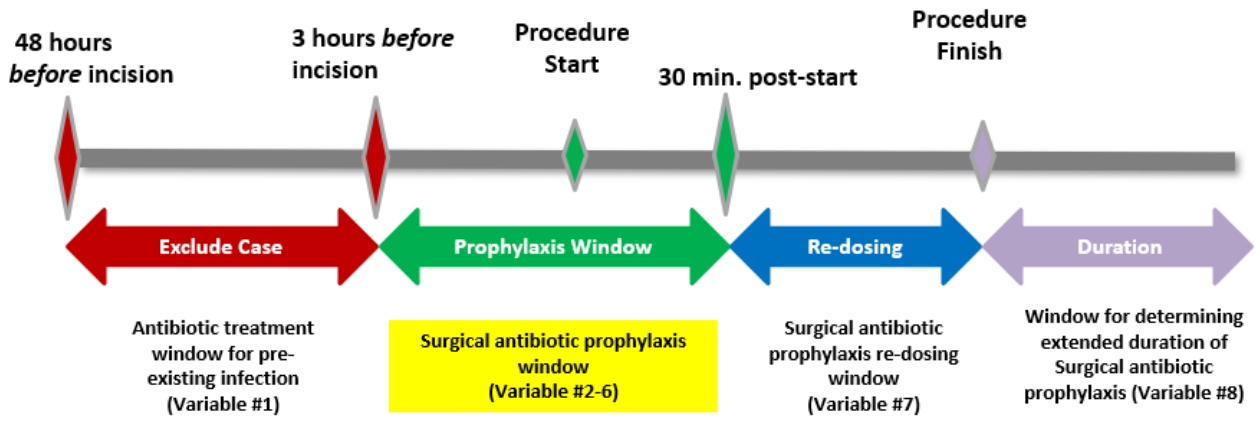
### **Scenarios to Clarify (Do Not Assign Variable):**

- Intravenous antibiotic is administered 4 hours prior to surgery on the inpatient unit. Select “No.”
- Answer “No” if the *first* dose of any intravenous antibiotics was given after Procedure/Surgery Finish.
- Answer “No” if prophylactic antibiotic information is unknown.
- Answer “No” if only oral antibiotics were administered during the surgical antibiotic prophylaxis window.

### **Notes:**

- If “No” is selected the additional Surgical Antibiotic Prophylaxis variables will be disabled.
- Antibiotic administration time can be obtained from the medication administration record in the electronic medical record or in anesthesia documentation.
- If multiple time points are available surrounding antibiotic administration (e.g., infusion start, infusion complete), choose infusion start.
- Select answer based on the documentation from your facility.





## Variable Name: Allergy to Penicillin (new variable)

### Program Legend: Pediatric

**Intent of Variable:** To provide a flag for determining compliance with established guidelines of first-line prophylactic agent(s) for cases where prophylaxis was indicated.

**Definition:** Patient has a preoperatively documented allergy to penicillin-based antibiotics. The following medications would be considered penicillin-based antibiotics:

- Amoxicillin
- Ampicillin
- Azlocillin
- Carbenicillin
- Cloxacillin
- Dicloxacillin
- Methicillin
- Mezlocillin
- Nafcillin
- Oxacillin
- PenicillinG
- PenicillinV
- Piperacillin
- Ticarcillin

\*This is not an all-inclusive list, please consult your pharmacist at your facility for commonly used penicillins at your site.

**Criteria:** Answer “Yes” if the patient has a documented allergy to penicillin-based antibiotics.

### Options:

- Yes
- No

### Scenarios to Clarify (Assign Variable):

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### Scenarios to Clarify (Do Not Assign Variable):

- Answer “No” if there is no information documented related to a penicillin allergy.
- Answer “No” if there is only documentation of a family history of PCN allergy.

### Notes:

- This variable is not assessing the severity of the allergy. Answer “Yes” for any documented allergy to any penicillin antibiotic.
- If an allergy to penicillin is designated, this will enable an additional variable to document the PCN Allergy Severity.
- Any brand name antibiotic that is not included as an option for this variable would be assigned as the generic name antibiotic if it is included on the list.

## Variable Name: PCN Allergy Severity (new variable)

**Program Legend:** Pediatric

**Intent of Variable:** To identify the severity of the penicillin allergy as documented for the patient in order to assess whether the choice of prophylaxis (first-line agents or substitutions) was appropriate for the primary procedure.

**Definition:** Reported allergies range in severity and presentation. Designate the symptom(s) associated with the penicillin allergy from the list below.

**Criteria:** Designate the symptom(s) associated with the penicillin allergy that were preoperatively documented from the primary procedure. Check all that apply.

**Options:** Select **all that apply** from the below:

- GI symptoms (e.g., diarrhea, nausea, vomiting, abdominal pain, stomach upset)
- Rash NOT associated with pruritus (itchiness) or urticaria (hives)
- Rash associated with pruritus (itchiness) or urticaria (hives)
- Rash without further available information about pruritus or urticaria
- Pruritus (itchiness) or urticaria (hives) without mention of associated rash
- Angioedema (swelling of eyes, lips, or mucous membranes of the mouth - BUT NOT AIRWAY COMPROMISE AS CHARACTERIZED BY SHORTNESS OF BREATH)
- History of anaphylaxis (documented in the chart as "anaphylaxis", hypotension, wheezing, breathing difficulty, or any description of airway involvement that does not include angioedema of the mouth)
- History of positive penicillin skin testing
- History of severe, atypical response to PCN (interstitial nephritis, hepatitis, hemolytic anemia, serum sickness, Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN))
- Unknown/Not Documented

**Scenarios to Clarify (Assign Variable):**

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**Scenarios to Clarify (Do Not Assign Variable):**

- Documentation from the postoperative timeframe

**Notes:**

- Information for this variable should be obtained specifically from the patient's medication allergy profile.
- If there is no specific documentation that the rash is or is not associated with pruritus (itchiness) or urticaria (hives), then select "Rash without further available information about pruritus or urticaria"
- Do not document Cephalosporin allergy severity in this variable.
- This variable will only be enabled if the answer to the Allergy to Penicillin is "Yes."

## Variable Name: Allergy to Cephalosporin (new variable)

### Program Legend: Pediatric

**Intent of Variable:** To provide a flag for determining compliance with established guidelines of first-line prophylactic agent(s) for cases where prophylaxis was indicated.

**Definition:** Patient has a preoperatively documented allergy to cephalosporin-based antibiotics. The following medications would be considered Cephalosporin-based antibiotics. In general, the name of cephalosporin-based antibiotics will begin with “Cef” or “Ceph”, and the most commonly used cephalosporin antibiotics are listed first in **bold**):

- **Cefazolin**
- **Cefdinir**
- **Cefepime**
- **Cefoxitin**
- **Cefotetan**
- **Cefotaxime**
- **Ceftazidime**
- **Cefuroxime**
- **Cephalexin**
- Cefaclor
- Cefadroxil
- Cefamandole
- Cefmetazole
- Cefonicid
- Cefoperazone
- Cefozopran
- Cefpirome
- Cefquinome
- Ceftaroline fosamil
- Ceftobiprole
- Cephalothin
- Cephapirin
- Cephradine
- Moxalactam

\*This is not an all-inclusive list, please consult your pharmacist at your facility for commonly used cephalosporins at your site.

**Criteria:** Answer “Yes” if the patient has a documented allergy to cephalosporin-based antibiotics.

### Options:

- Yes
- No

### Scenarios to Clarify (Assign Variable):

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### Scenarios to Clarify (Do Not Assign Variable):

- Answer “No” if there is no information documented related to a cephalosporin allergy.
- Answer “No” if there is documentation of only a family history of cephalosporin allergy.

### Notes:

- This variable is not assessing the severity of the allergy. Answer “Yes” for any documented allergy to any cephalosporin-based antibiotic.
- If an allergy to cephalosporin-based antibiotic is designated, this will enable an additional variable to document the Cephalosporin Allergy Severity.
- Any brand name antibiotic that is not included as an option for this variable would be assigned as the generic name antibiotic if it is included on the list.

## Variable Name: Cephalosporin Allergy Severity (new variable)

### Program Legend: Pediatric

**Intent of Variable:** To identify the severity of the Cephalosporin allergy as documented for the patient in order to assess whether the choice of prophylaxis (first-line agents or substitutions) was appropriate for the primary procedure.

**Definition:** Reported allergies range in severity and presentation. Designate the symptom(s) associated with the Cephalosporin allergy from the list below.

**Criteria:** Designate the symptom(s) associated with the Cephalosporin allergy that were preoperatively documented from the primary procedure. Check all that apply.

**Options:** Select **all that apply** from the below:

- GI symptoms (e.g., diarrhea, nausea, vomiting, abdominal pain, stomach upset)
- Rash NOT associated with pruritus (itchiness) or urticaria (hives)
- Rash associated with pruritus (itchiness) or urticaria (hives)
- Rash without further available information about pruritus or urticaria
- Pruritus (itchiness) or urticaria (hives) without mention of associated rash
- Angioedema (swelling of eyes, lips, or mucous membranes of the mouth - BUT NOT AIRWAY COMPROMISE AS CHARACTERIZED BY SHORTNESS OF BREATH)
- History of anaphylaxis (documented in chart as "anaphylaxis", hypotension, wheezing, breathing difficulty or any description of airway involvement that does not include angioedema of the mouth)
- History of positive cephalosporin skin testing
- History of severe, atypical response to cephalosporins (interstitial nephritis, hepatitis, hemolytic anemia, serum sickness, Stevens-Johnson syndrome (SJS), toxic epidermal necrolysis (TEN))
- Unknown/Not Documented

**Scenarios to Clarify (Assign Variable):**

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**Scenarios to Clarify (Do Not Assign Variable):**

- Documentation from the postoperative timeframe

**Notes:**

- Information for this variable should be obtained specifically from the patient's medication allergy profile.
- If there is no specific documentation that the rash is or is not associated with pruritus (itchiness) or urticaria (hives), then select "Rash without further available information about pruritus or urticaria"
- Do not document Penicillin allergy severity in this variable.
- This variable will only be enabled if the answer to the Allergy to Cephalosporins is "Yes."

## **Variable Name: Preoperative Urine Culture (SAP)\***

**Intent of Variable:** To identify whether the patient had a urine culture within 2 weeks preoperatively or on the day of the urology procedure and to further differentiate the amount of bacterial growth identified.

**Definition:** A urine culture is obtained within 2 weeks before the urology procedure “in room time”.

**Criteria:** Determine whether a urine culture was obtained  $\leq 2$  weeks before the urologic procedure “in room time” per the preoperative H&P, clinic record, or preoperative notes. Select the option which best describes the result of the culture obtained.

### **Options:**

Select one of the following:

- Yes, bacterial growth present, (culture of  $\geq 10^5$ CFU/ml with no more than 2 species of microorganisms)
- Yes, bacterial growth present, (culture of  $< 10^5$ CFU/ml with no more than 2 species of microorganisms or  $\geq 10^5$ CFU/ml with more than 2 species of microorganisms)
- Yes, no bacterial growth
- Yes, culture results not available
- No or unknown

### **Scenarios to clarify (assign variable):**

- Use “Yes, culture results not available” if a urine culture was obtained per report or clinic note (perhaps at another institution) but the results are not mentioned or available in the clinical record.

### **Scenarios to clarify (do not assign variable):**

- “No or unknown” should be used if the medical record does not contain any reference to a preoperative urine culture.
- A culture obtained intraoperatively would not be assigned. This would be collected under the variable Intraoperative Urine Culture (SAP).

### **Notes:**

- This variable is enabled for urology cases when any of the following CPT codes are entered for the primary procedure: 50220, 50225, 50230, 50234, 50236, 50240, 50543, 50545, 50546, 50548, 50080, 50081, 50400, 50405, 50544, 50750, 50760, 50727, 50860, 51980, 50830, 50650, 50660, 50780, 50782, 50783, 50947, 50948, 51525, 51535, 51550, 51555, 51565, 51820, 51880, 51940, 50845, 51960, 52327, 52353, 52356
- Use the most recent urine culture if more than one culture was obtained within the 2 weeks preoperatively.
- Culture results ideally are available at the NSQIP institution but may be reported in the clinic notes from another facility or scanned into the EMR.
- If the urine culture is reported only as “positive” per the clinic record or H&P, choose “Yes, culture results not available.”

**Variable Name: Antibiotic #1 Name**

**Program Legend:** Pediatric

**Intent of Variable:** To identify the antibiotic(s) administered for surgical prophylaxis.

**Definition:** The intravenous antibiotic administered during the surgical antibiotic prophylaxis window beginning 3 hours before the Procedure/Surgery Start Time and ending 30 minutes after the Procedure/Surgery Start Time.

**Criteria:** Select the name of the intravenous antibiotic administered during the surgical antibiotic prophylaxis window.

**Options:**

- CeFAZolin (Kefzol)
- Clindamycin (Cleocin)
- Vancomycin
- CefOXitin
- CefTRIAxone (Rocephin)
- Amikacin
- Ampicillin WITHOUT sulbactam
- Ampicillin/sulbactam (Unasyn)
- Azithromycin
- Aztreonam
- Cefepime (Maxipime)
- Cefotaxime (Claforan)
- CefoTEtan (Cefotan)
- CefTAZidime (Fortaz/Tazicef)
- Ceftizoxime sodium
- Cefuroxime
- Ciprofloxacin
- Doxycycline
- Ertapenem (Invanz)
- Gentamicin (Garamycin)
- Imipenem/cilastatin (Primaxin)
- Levofloxacin (Levaquin)
- Linezolid
- Meropenem (Merrem)
- Metronidazole (Flagyl)
- Nafcillin
- Oxacillin
- Piperacillin/tazobactam (Zosyn)
- Sulfamethoxazole/tri methoprim (Bactrim/Septtra)
- Tobramycin
- Other

**Scenarios to Clarify (Assign Variable):**

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**Scenarios to Clarify (Do Not Assign Variable):**

- Do not select antibiotics that were administered orally.

**Notes:**

- When multiple antibiotics are administered intravenously during the surgical antibiotic prophylaxis window, enter the antibiotics into the registry in any order.
- Any brand name antibiotic that is not included as an option for this variable would be assigned as the generic name antibiotic if it is included on the list.

**Variable Name: Antibiotic #1 Date/Time**

**Program Legend:** Pediatric

**Intent of Variable:** To identify the date and time of the antibiotic(s) administered for surgical prophylaxis.

**Definition:** The date and time of the intravenous antibiotic administered during the surgical antibiotic prophylaxis window beginning 3 hours before the Procedure/Surgery Start Time and ending 30 minutes after the Procedure/Surgery Start Time.

**Criteria:** Enter the date and time of the intravenous antibiotic administered during the surgical antibiotic prophylaxis window.

**Options:**

- Enter Date (MM-DD-YY)
- Enter Time (HH:MM)
- Unknown

**Scenarios to Clarify (Assign Variable):**

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**Scenarios to Clarify (Do Not Assign Variable):**

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**Notes:**

- If multiple time points are available surrounding antibiotic administration (e.g., infusion start, infusion complete), choose the infusion start as the reference for this variable.



**Variable Name: Antibiotic #2 Name**

**Program Legend:** Pediatric

**Intent of Variable:** To identify the antibiotic(s) administered for surgical prophylaxis.

**Definition:** The intravenous antibiotic administered during the surgical antibiotic prophylaxis window beginning 3 hours before the Procedure/Surgery Start Time and ending 30 minutes after the Procedure/Surgery Start Time.

**Criteria:** Select the name of the intravenous antibiotic administered during the surgical antibiotic prophylaxis window.

**Options:**

- CeFAZolin (Kefzol)
- Clindamycin (Cleocin)
- Vancomycin
- CefOXitin
- CefTRIAxone (Rocephin)
- Amikacin
- Ampicillin WITHOUT sulbactam
- Ampicillin/sulbactam (Unasyn)
- Azithromycin
- Aztreonam
- Cefepime (Maxipime)
- Cefotaxime (Claforan)
- CefoTEtan (Cefotan)
- CefTAZidime (Fortaz/Tazicef)
- Ceftizoxime sodium
- Cefuroxime
- Ciprofloxacin
- Doxycycline
- Ertapenem (Invanz)
- Gentamicin (Garamycin)
- Imipenem/cilastatin (Primaxin)
- Levofloxacin (Levaquin)
- Linezolid
- Meropenem (Merrem)
- Metronidazole (Flagyl)
- Nafcillin
- Oxacillin
- Piperacillin/tazobactam (Zosyn)
- Sulfamethoxazole/trimethoprim (Bactrim/Septtra)
- Tobramycin
- Other

**Scenarios to Clarify (Assign Variable):**

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**Scenarios to Clarify (Do Not Assign Variable):**

- Do not select antibiotics that were administered orally.

**Notes:**

- When multiple antibiotics are administered intravenously during the surgical antibiotic prophylaxis window, enter the antibiotics into the registry in any order.
- Any brand name antibiotic that is not included as an option for this variable would be assigned as the generic name antibiotic if it is included on the list.

**Variable Name: Antibiotic #2 Date/Time**

**Program Legend:** Pediatric

**Intent of Variable:** To identify the date and time of the antibiotic(s) administered for surgical prophylaxis.

**Definition:** The date and time of the intravenous antibiotic administered during the surgical antibiotic prophylaxis window beginning 3 hours before the Procedure/Surgery Start Time and ending 30 minutes after the Procedure/Surgery Start Time.

**Criteria:** Enter the date and time of the intravenous antibiotic administered during the surgical antibiotic prophylaxis window.

**Options:**

- Enter Date (MM-DD-YY)
- Enter Time (HH:MM)
- Unknown

**Scenarios to Clarify (Assign Variable):**

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**Scenarios to Clarify (Do Not Assign Variable):**

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**Notes:**

- If multiple time points are available surrounding antibiotic administration (e.g., infusion start, infusion complete), choose the infusion start as the reference for this variable.

**Variable Name: Antibiotic #3 Name**

**Program Legend:** Pediatric

**Intent of Variable:** To identify the antibiotic(s) administered for surgical prophylaxis.

**Definition:** The intravenous antibiotic administered during the surgical antibiotic prophylaxis window beginning 3 hours before the Procedure/Surgery Start Time and ending 30 minutes after the Procedure/Surgery Start Time.

**Criteria:** Select the name of the intravenous antibiotic administered during the surgical antibiotic prophylaxis window.

**Options:**

- CeFAZolin (Kefzol)
- Clindamycin (Cleocin)
- Vancomycin
- CefOXitin
- CefTRIAxone (Rocephin)
- Amikacin
- Ampicillin WITHOUT sulbactam
- Ampicillin/sulbactam (Unasyn)
- Azithromycin
- Aztreonam
- Cefepime (Maxipime)
- Cefotaxime (Claforan)
- CefoTEtan (Cefotan)
- CefTAZidime (Fortaz/Tazicef)
- Ceftizoxime sodium
- Cefuroxime
- Ciprofloxacin
- Doxycycline
- Ertapenem (Invanz)
- Gentamicin (Garamycin)
- Imipenem/cilastatin (Primaxin)
- Levofloxacin (Levaquin)
- Linezolid
- Meropenem (Merrem)
- Metronidazole (Flagyl)
- Nafcillin
- Oxacillin
- Piperacillin/tazobactam (Zosyn)
- Sulfamethoxazole/tri methoprim (Bactrim/Septtra)
- Tobramycin
- Other

**Scenarios to Clarify (Assign Variable):**

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**Scenarios to Clarify (Do Not Assign Variable):**

- Do not select antibiotics that were administered orally.

**Notes:**

- When multiple antibiotics are administered intravenously during the surgical antibiotic prophylaxis window, enter the antibiotics into the registry in any order.
- Any brand name antibiotic that is not included as an option for this variable would be assigned as the generic name antibiotic if it is included on the list.

**Variable Name: Antibiotic #3 Date/Time**

**Program Legend:** Pediatric

**Intent of Variable:** To identify the date and time of the antibiotic(s) administered for surgical prophylaxis.

**Definition:** The date and time of the intravenous antibiotic administered during the surgical antibiotic prophylaxis window beginning 3 hours before the Procedure/Surgery Start Time and ending 30 minutes after the Procedure/Surgery Start Time.

**Criteria:** Enter the date and time of the intravenous antibiotic administered during the surgical antibiotic prophylaxis window.

**Options:**

- Enter Date (MM-DD-YY)
- Enter Time (HH:MM)
- Unknown

**Scenarios to Clarify (Assign Variable):**

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**Scenarios to Clarify (Do Not Assign Variable):**

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**Notes:**

- If multiple time points are available surrounding antibiotic administration (e.g., infusion start, infusion complete), choose the infusion start as the reference for this variable.

## Variable Name: **IV Antibiotics Re-dosed During Case**

**Program Legend:** Pediatric

**Intent of Variable:** To identify if any of the intravenous antibiotics used for prophylaxis were re-dosed intraoperatively during the primary procedure.

**Definition:** An antibiotic given during the surgical antibiotic prophylaxis window was re-dosed during the primary procedure within the period beginning 30 minutes after Procedure/Surgery Start Time and ending at Procedure/Surgery Finish.

**Criteria:** Answer “Yes” for an antibiotic administered during the surgical antibiotic prophylaxis window which was re-dosed during the primary procedure within the period beginning 30 minutes after Procedure/Surgery Start Time and ending at Procedure/Surgery Finish.

**Options:**

- Yes
- No

**Scenarios to Clarify (Assign Variable):**

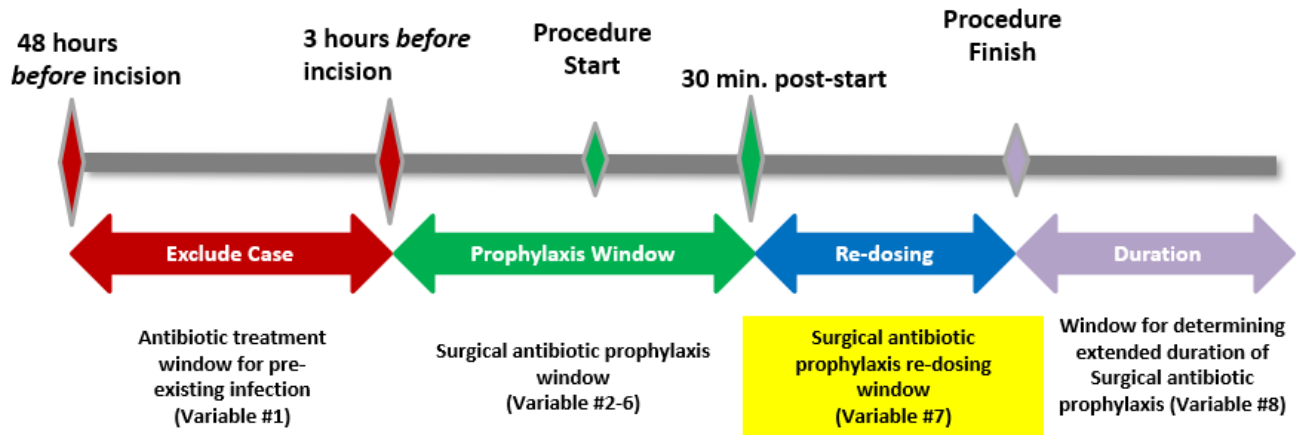
- If multiple intravenous antibiotics were used for prophylaxis, answer “Yes” if *any* of the antibiotics were re-dosed during the primary procedure.

**Scenarios to Clarify (Do Not Assign Variable):**

- An additional dose of an intravenous antibiotic already given prior to incision is given again within 30 minutes after Procedure/Surgery Start Time (still within the prophylactic window). This dose is still considered a prophylactic dose and would not be included in this variable.

**Notes:**

- Prophylaxis antibiotics are drugs administered during the period extending 3 hours before the Procedure/Surgery Start Time to 30 minutes after the Procedure/Surgery Start Time.
- Redosing refers to giving another administration (of any dosage) of the same intravenous antibiotic used for prophylaxis during the primary procedure.



**Variable Name: Intraoperative Urine Culture (SAP)\***

**Intent of Variable:** To identify whether the patient had a urine culture obtained during the urology procedure and to further differentiate the amount of bacterial growth identified.

**Definition:** A urine culture is obtained during the urology procedure (intraoperatively).

**Criteria:** Determine whether a urine culture was obtained intra-operatively per the operative report, brief operative report, or intraoperative nursing record. Select the option which best describes the result of the culture obtained.

**Options:**

Select one of the following:

- Yes, bacterial growth present, (culture of  $\geq 10^5$ CFU/ml with no more than 2 species of microorganisms)
- Yes, bacterial growth present, (culture of  $< 10^5$ CFU/ml with no more than 2 species of microorganisms or  $\geq 10^5$ CFU/ml with more than 2 species of microorganisms)
- Yes, no bacterial growth
- Yes, culture results not available
- No or unknown

**Scenarios to clarify (assign variable):**

- Select “Yes, culture results not available” if a urine culture was obtained per report or clinic note (perhaps at another institution) but the results are not mentioned or available in the clinical record.

**Scenarios to clarify (do not assign variable):**

- “No or unknown” should be used if the medical record does not contain any reference to a preoperative or intraoperative urine culture.

**Notes:**

- This variable is enabled for urology cases when any of the following CPT codes are entered for the primary procedure: 50220, 50225, 50230, 50234, 50236, 50240, 50543, 50545, 50546, 50548, 50080, 50081, 50400, 50405, 50544, 50750, 50760, 50727, 50860, 51980, 50830, 50650, 50660, 50780, 50782, 50783, 50947, 50948, 51525, 51535, 51550, 51555, 51565, 51820, 51880, 51940, 50845, 51960, 52327, 52353, 52356
- Use only a urine culture obtain during the intraoperative timeframe, which is defined as the patient in room time up to and including the patient out of room time.
- If the urine culture is reported only as “positive” per the medical record, choose “Yes, culture results not available”

## **Variable Name: Intraoperative Findings of Infection**

**Intent of Variable:** To identify if infectious findings were noted during the primary procedure to aid in case exclusion for analysis from postoperative antibiotic duration. These cases could still be analyzed for preop prophylaxis.

**Definition:** Infection that involves any part of the anatomy (e.g., organs or spaces) identified during the primary procedure.

**Criteria:** Select “Yes” if one of these was identified during the primary procedure

- Purulence or abscess found on direct examination.
- Organisms isolated from an aseptically obtained culture of fluid or tissue.
- Bowel or viscus perforation found on direct examination or due to an iatrogenic injury.
- Gangrenous or infarcted bowel/other viscus

### **Options:**

- Yes
- No

### **Scenarios to clarify (assign variable):**

- Gangrenous or infarcted bowel/other viscus

### **Scenarios to clarify (do not assign variable):**

- Do not select “Yes” for a positive urine culture alone for urologic procedures with CPT codes included in the Notes section of the variable “Intraoperative Urine Culture (SAP).” This will be indicated with the urologic specific variable “Intraoperative Urine Culture (SAP)”.
- Findings noted only on pathology would not be utilized to assign this variable



## Variable Name: IV Antibiotics Continued After Procedure Finish

**Program Legend:** Pediatric

**Intent of Variable:** To capture the practice and duration of antimicrobial prophylaxis therapy following Procedure/Surgery Finish.

**Definition:** Postoperative (after Procedure/Surgery Finish) administration of one or more of the same intravenous antibiotic agents administered during the Surgical Antibiotic Prophylaxis Window for the primary procedure.

**Criteria:** Select “Yes” if one or more of the surgical prophylactic antibiotics were continued postoperatively after Procedure/Surgery Finish.

**Options:**

- Yes
- No

**Scenarios to Clarify (Assign Variable):**

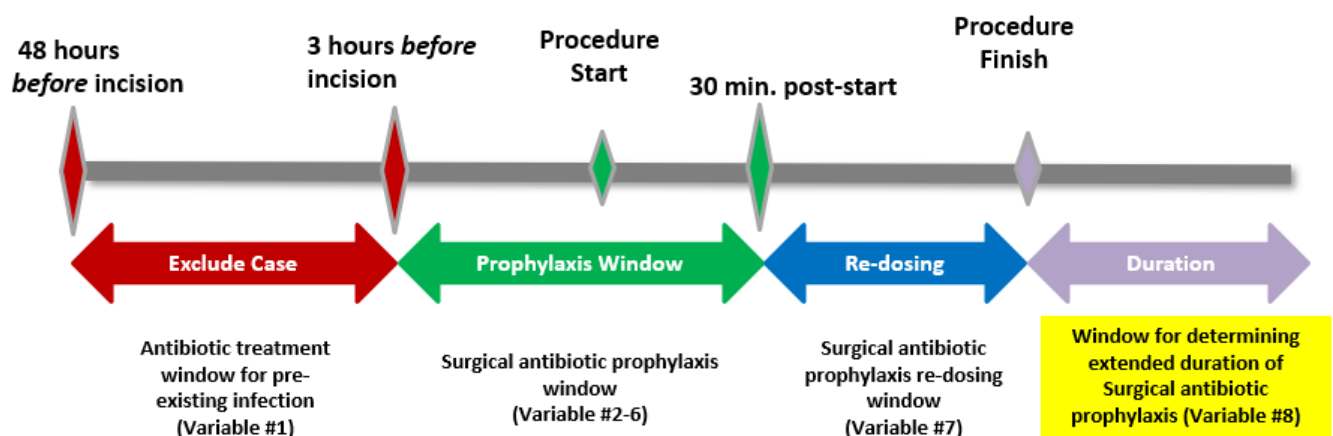
- IV Ancef is administered preoperatively during the Surgical Antibiotic Prophylaxis Window. Postoperatively, Ancef is continued at a different dosage. Answer “Yes” for this variable.

**Scenarios to Clarify (Do Not Assign Variable):**

- One dose of IV Ancef is administered preoperatively during the Surgical Antibiotic Prophylaxis Window. Unasyn is ordered postoperatively. Answer “No” for this variable.

**Notes:**

- If “No” is selected for this variable, the next variable, Date/Time of Last Dose of IV Prophylactic Antibiotics, will be disabled.



**Variable Name: Date/Time of Last Dose of IV Prophylactic Antibiotics**

**Program Legend:** Pediatric

**Intent of Variable:** To capture the practice and duration of antimicrobial prophylaxis therapy following Procedure/Surgery Finish.

**Definition:** The date and time of the final dose of intravenous prophylactic antibiotics given following the Procedure/Surgery Finish. This variable is based on an extension of one or more of the same intravenous antibiotic agents used for prophylaxis for the procedure and not a different antibiotic agent started after procedure completion.

**Criteria:** Enter the date and time of the final intravenous dose of the prophylactic antibiotic administered following the primary procedure. If more than one antibiotic used for prophylaxis was continued postoperatively, base your answer on the antibiotic with the longest duration following Procedure/Surgery Finish.

**Options:**

- Enter Date (MM-DD-YY)
- Enter Time (HH:MM)
- Unknown

**Scenarios to Clarify (Assign Variable):**

- Both Ampicillin and Gentamicin are given during the Surgical Antibiotic Prophylaxis Window and continued postoperatively. Ampicillin is stopped on POD 3 and Gentamicin is stopped on POD 5. Utilize the date and time of last dose of Gentamicin for this variable.

**Scenarios to Clarify (Do Not Assign Variable):**

- 

**Notes:**

- Enter the start time of drug administration time, rather than the completion of the infusion.
- The final dose of prophylactic antibiotics should be considered the dose where no further administration of the same antibiotic agent occurs for at least 30 hours following that dose.

eFigure – Hospital-level correlation of log-transformed\* odds ratios between any surgical site infection (incisional or organ space) and use of any postoperative surgical antimicrobial prophylaxis at 93 hospitals, stratified by all surgical specialties. SSI odds ratios were adjusted for differences in procedure mix, patient characteristics, and comorbidity profiles, while prophylaxis utilization odds ratios accounted for clinically-related procedure groups.

\*The log transformation of ORs was used to meet assumptions of normality.

