Antibiotic Audit Tool

# Introduction

## Problem Statement

Perioperative antimicrobial prophylaxis is an important strategy to prevent surgical site infection. Appropriate selection, dosing, and redosing ensure that the antibiotic concentration in surgical site tissue is maintained above the minimum inhibitory concentration required for eliminating an infectious organism. Antibiotic usage is a complex process that requires the coordination and responsiveness of individuals and systems within and outside of the operating room. There are often many opportunities to improve the use of perioperative antimicrobial prophylaxis.

## Purpose of This Tool

This tool will help your safety program team understand how appropriately you are using prophylactic antibiotics throughout the perioperative period. It can help your team identify practice patterns, so you can more easily pinpoint opportunities for intervention.

## Please Adapt This Tool

A team of clinicians designed this tool to evaluate antimicrobial prophylaxis in patients undergoing colorectal surgery. We have attached two versions based on two different antibiotic regimens to illustrate how your safety team can adapt it. You may use a different antibiotic regimen with colorectal patients in your hospital, or you may want to assess antibiotic prophylaxis in a different group of patients. You may have different guidelines for adjusting dosages based on body weight. Please modify this tool to best fit your team’s needs.

## How To Use This Tool

Complete the relevant data table included in this document. We recommend that you collect data from 10 patients undergoing surgery, but there is no right or wrong number of patients to review. The more patients you review, the more likely you are to identify opportunities to improve your use of perioperative antimicrobial prophylaxis. Keep in mind that this data is for internal use only. How you collect this data is up to you. For example, you may abstract data retrospectively from patient charts. Alternatively, you can attach one of the data tables included in this document on the patient chart and complete it in real time as the patient moves through your perioperative area. Only your team knows the approach that will work best in your perioperative area.

## How To Use Audit Data

Though data collection may involve only a few team members, the entire improvement team is responsible for creating a cohesive plan to address performance gaps. If the data reveal defects in perioperative antimicrobial prophylaxis, your safety program team can design a quality improvement intervention to address it. You can use the materials in the AHRQ Toolkit to Promote Safe Surgery, such as the Surgical Complication Prevention guide, to guide your team through the quality improvement intervention design process.

# Note: This tool should be used by your team in conjunction with published guidelines and manufacturers’ labeling of drug products. The tool provides examples and is not meant to substitute for those sources. Any practice described in this document must be applied by health care practitioners in accordance with professional judgement and standards of care in regard to the unique circumstances that may apply in each situation they encounter.

# The findings and recommendations in this document are those of the authors, who are responsible for its content, and do not necessarily represent the views of AHRQ. No statement in this document should be construed as an official position of AHRQ or of the U.S. Department of Health and Human Services.

# Instructions for Completion of Version 1 Data Table

Use the Antibiotic Audit Tool Data Table–Version 1 when using a cefotetan OR ciprofloxacin and metronidazole antibiotic regimen.

Questions 1-3: Document the patient’s name, medical record number, and operation date (postoperative day 0).

Question 4: Indicate whether colorectal surgery was performed.

Question 5: Indicate if an appropriate antibiotic was administered based on the procedure type (example: cefotetan OR ciprofloxacin and metronidazole).

Question 6: Indicate if the patient has an allergy to cephalosporins.

If the patient does not have an allergy to cephalosporins, proceed to question 8 in data table.

Question 7: Document if the patient was given both ciprofloxacin and metronidazole due to a cephalosporin allergy.

Question 8: Indicate if the correct antibiotic dose was administered based on prophylactic dosing guidelines.

Question 9: If the antibiotic dose was incorrect, indicate where the defect occurred in the administration of the antibiotic (for example, not enough of the antibiotic stored in the operating room or available for use, etc.).

Question 10: List the name and dose of each prophylactic antibiotic administered perioperatively. (Leave the Antibiotic 2 subsection blank if only one antibiotic was used throughout the case.)

Then, document the *infusion stop time* of each antibiotic dose given. The first antibiotic infusion stop time should be listed next to Time (1). If the antibiotic was redosed, the antibiotic infusion stop time of the redosing should be listed next to Time (2), etc.

Question 11: Document the anesthesia stop time.

Question 12: Document if cefotetan was used as prophylaxis during the case. If it was not used in the case, proceed to question 17 in the data table.

Question 13: Document if the blood loss during the case exceeded 1,500 cc.

Question 14: Determine if the length of time between first antibiotic infusion stop time and anesthesia stop time exceeded 6 hours.

Question 15: If case blood loss exceeded 1,500 cc AND/OR the length of time between first antibiotic infusion stop time and anesthesia stop time exceeded 6 hours, assess if cefotetan was redosed during the case.

Question 16: If cefotetan was redosed, determine and document if the difference in time between the first cefotetan infusion stop and the second cefotetan infusion stop time was less than 6 hours.

Question 17: Document the time of the surgical incision.

Question 18: Assess if the first antibiotic was given prior to the incision time. Compare the antibiotic infusion stop time to the surgical incision time; the antibiotic infusion stop time should be less than 60 minutes prior to incision time.

# Antibiotic Audit Tool Data Table–Version 1

Use this data table when using a cefotetan OR ciprofloxacin and metronidazole antibiotic regimen.\*

| **QUESTION** | **DATA** |
| --- | --- |
| 1. Patient name |  |
| 1. Medical record number |  |
| 1. Date of operation |  |
| 1. Procedure type: Colorectal | Yes □ No □ |
| 1. Was the correct antibiotic used, based on the procedure (example: cefotetan OR ciprofloxacin and metronidazole)? | Yes □ No □ |
| 1. Was the patient allergic to cephalosporins?   If NO, skip to question 8 | Yes □ No □ |
| 1. If the patient was cephalosporin allergic, were both ciprofloxacin and metronidazole given? | Yes □ No □ |
| 1. Was the correct prophylactic antibiotic dose administered?   (see guideline for details)\*   * Cefotetan 2 gm OR * Ciprofloxacin 400 mg AND metronidazole 500 mg | Yes □ No □ |
| 1. If you answered NO to question 8, what was the defect? |  |
| 1. Antibiotic infusion *stop* time | **Antibiotic 1**  Name:  Dose:  Time (1):  Time (2):  Time (3):  **Antibiotic 2**  Name:  Dose:  Time (1):  Time (2):  Time (3): |
| 1. Anesthesia stop time |  |
| 1. Was cefotetan used as antibiotic prophylaxis?   If NO, skip to question 16 | Yes □ No □ |
| 1. Was blood loss during the case > 1,500 cc? | Yes □ No □ |
| 1. Was the length of time between first antibiotic infusion stop and anesthesia stop ≥ 6 hours? | Yes □ No □ |
| 1. If YES to question 13 AND/OR 14, was cefotetan redosed? | Yes □ No □ |
| 1. If YES, was redosing given < 6 hours after the first dose of cefotetan? | Yes □ No □ |
| 1. Time of surgical incision |  |
| 1. Was the first antibiotic infusion completed < 60 minutes BEFORE incision? | Yes □ No □ |

\*Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health-Syst Pharm. 2013;70:195-283.

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# Instructions for Completion of the Version 2 Data Table

Use the Antibiotic Audit Tool Data Table–Version 2 when using a cefotetan OR clindamycin and gentamicin antibiotic regimen.

Questions 1-3: Document the patient’s name, medical record number, and operation date (postoperative day 0).

Question 4: Indicate whether colorectal surgery was performed.

Question 5: Indicate if an appropriate antibiotic was administered based on the procedure type (example: cefotetan OR clindamycin and gentamicin).

Question 6: Indicate if the patient has an allergy to cephalosporins.

If the patient does not have an allergy to cephalosporins, proceed to question 9 in data table.

Question 7: Document the patient’s weight in kilograms.

Question 8: Document if the patient was given clindamycin and gentamicin due to a cephalosporin allergy.

If gentamicin is given, document the dose administered to the patient.

Determine the recommended weight based dosing of gentamicin based on 5 mg/kg for the patient. If the patient weighs more than 100 kg, use the ***Dosing Body Weight table***, provided in this document, to determine the recommended dose of gentamicin.

Use the formula DBW = IBW + 0.4(ABW – IBW), where DBW is dosing body weight, IBW is ideal body weight, and ABW is actual body weight.

Question 9: List the name and dose of each prophylactic antibiotic administered perioperatively. (Leave the Antibiotic 2 subsection blank if only one antibiotic was used throughout the case.)

Then, document the *infusion stop time* of each antibiotic dose given. The first antibiotic infusion stop time should be listed next to Time (1). If the antibiotic was redosed, the antibiotic infusion stop time of the redosing should be listed next to Time (2), etc.

Question 10: Indicate if the correct antibiotic dose was administered based on prophylactic dosing guidelines.

If gentamicin was administered, refer to instructions for question 8 to assess if correct gentamicin dosing was done. For gentamicin, the actual dose administered and the recommended dose administered should be within 50 mg of one another.

If the antibiotic dose was incorrect, indicate where the defect occurred in the administration of the antibiotic (i.e., not dosed according to weight, morbidly obese but did not use DBW, etc.)

Question 11: Document the anesthesia stop time.

Question 12: Document if clindamycin or cefotetan were used as prophylaxis during the case. If neither was used in the case, proceed to question 16 in the data table.

Question 13: Document if the blood loss during the case exceeded 1,500 cc.

If blood loss exceeded 1,500 cc, then indicate if cefotetan was used during the case.

If cefotetan was used during the case, document if it was redosed.

Question 14: Determine the length of time between first antibiotic infusion stop time and anesthesia stop time. Document if the length of time between the first antibiotic infusion stop time and anesthesia stop time exceeds 6 hours.

Question 15: Assess if the antibiotics clindamycin or cefotetan were redosed during the case.

If the antibiotics were redosed, determine and document if the difference in time between the first antibiotic infusion stop and the second antibiotic infusion stop time was less than 6 hours.

Question 16: Document the time of the surgical incision.

Question 17: Assess if the first antibiotic was given prior to the incision time. Compare the antibiotic infusion stop time with the surgical incision time; the antibiotic infusion stop time should be less than 60 minutes prior to incision time.

# Antibiotic Audit Tool Data Table–Version 2

Use the Version 2 Data Table when using a cefotetan OR clindamycin and gentamicin antibiotic regimen.\*

| **QUESTION** | **DATA** |
| --- | --- |
| 1. Patient name |  |
| 1. Medical record number |  |
| 1. Date of operation |  |
| 1. Procedure type: Colorectal | Yes □ No □ |
| 1. Was correct antibiotic used, based on the procedure? | Yes □ No □ |
| 1. Was patient allergic to cephalosporins?   If NO, skip to question 9 | Yes □ No □ |
| 1. Weight (kg) |  |
| 1. If clindamycin and gentamicin were used, was correct dose of gentamicin given? (see guideline for details)\*   Gentamicin dosage**:** 5 mg/kg (rounded to nearest 50 mg) based on weight from question 7  If patient weighs more than 100 kg, consider using the Dosing Body Weight table below for the recommended dose. | Yes □ No □  Recommended Dose: \_\_\_\_\_\_\_\_  Actual Dose: \_\_\_\_\_\_\_\_ |
| 1. Antibiotic infusion stop time | **Antibiotic 1**  Name:  Dose:  Time (1):  Time (2):  Time (3):  **Antibiotic 2**  Name:  Dose:  Time (1):  Time (2):  Time (3): |
| 1. Was the correct dose administered?   If NO, what was the reason? | Yes □ No □ |
| 1. Anesthesia stop time |  |
| 1. Was clindamycin or cefotetan used as antibiotic prophylaxis?   If NO, skip to question 16 | Yes □ No □ |
| 1. Was blood loss during the case > 1,500 cc?  * If YES, was cefotetan used in the case? * If YES, was cefotetan redosed during the case? | Yes □ No □  Yes □ No □  Yes □ No □ |
| 1. What was the length of time between first antibiotic infusion stop and anesthesia stop?  * Was the length of time ≥ 6 hours? If YES, clindamycin and cefotetan should have been redosed. | Time: \_\_\_\_\_\_\_  Yes □ No □ |
| 1. Was redosing of clindamycin or cefotetan given during the case?  * If YES, was redosing given within < 6 hours of first dose of the antibiotic? | Yes □ No □  Yes □ No □ |
| 1. Time of surgical incision |  |
| 1. Was the first antibiotic infusion completed < 60 minutes BEFORE incision? | Yes □ No □ |

\*Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health-Syst Pharm. 2013;70:195-283.

# Dosing Body Weight Table

Use this table for Question 8: If patient is morbidly obese (>100 kg), consider calculating dosing body weight.

| **PARAMETER** | **DATA** |
| --- | --- |
| 1. Patient height in inches |  |
| 1. Actual body weight (ABW) in kg |  |
| 1. Ideal body weight (IBW)   Female = 2.3 x (height in inches – 60) + 45.5  Male = 2.3 x (height in inches – 60) +50 | Calculated IBW = \_\_\_\_\_\_ |
| 1. Dosing body weight (DBW)\*   Calculate:  DBW = IBW + 0.4 x (ABW – IBW)  Use ABW and IBW from Numbers 1 and 2 above. | Calculated DBW = \_\_\_\_\_\_ |
| 1. Gentamicin dose (5 mg/kg) based on DBW | Recommended dose: \_\_\_\_\_\_ |

\*Bratzler DW, Dellinger EP, Olsen KM, et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health-Syst Pharm. 2013;70:195-283.

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