

American College of Surgeons/Physician Consortium for Performance Improvement

FOR CONSORTIUM VOTE

**Perioperative Care
Physician Performance Measurement Set**

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Perioperative Care Work Group 2

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Intended Audience and Patient Population:

Any physician caring for patients undergoing a surgical procedure.

Patients aged 18 years and older

These clinical performance measures are designed for individual quality improvement. Some of the measures may also be appropriate for accountability if appropriate sample sizes and implementation rules are achieved.

Draft Measures:

Measure #1: Timing of Prophylactic Antibiotics – Ordering Physician

Measure #2: Timing of Prophylactic Antibiotics – Administering Physician

Measure #3: Selection of Prophylactic Antibiotic -- First or Second Generation Cephalosporin

Measure #4: Discontinuation of Prophylactic Antibiotics (Non-Cardiac Procedures)

Measure #5: Discontinuation of Prophylactic Antibiotics (Cardiac Procedures)

Measure #6: Venous Thromboembolism (VTE) Prophylaxis

Perioperative Care 2
Measure #1: Timing of Prophylactic Antibiotics – Ordering Physician

This measure may be used as an accountability measure.

Data Elements	Clinical Performance Measure	Feedback
<p>Per Patient, Per Procedure Yes/No – Patient had an order for an antibiotic to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p> <p>Yes/No – Documentation of medical reason(s) for not ordering an antibiotic to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p> <p>Sources Electronic medical record</p> <p>Paper medical record</p> <p>Flowsheet</p> <p>Administrative claims data*</p> <p>* adequate data source only if new codes are developed specific to the intent of this measure</p>	<p>Numerator: Surgical patients who have an order for an antibiotic to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p> <p>Denominator: All surgical patients aged 18 years and older undergoing procedures with the indications for prophylactic parenteral antibiotics (list of procedures available)</p> <p>Denominator Exclusion: Documentation of medical reason(s) for not ordering an antibiotic to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p> <p>Measure: Percentage of surgical patients aged 18 years and older undergoing procedures with the indications for prophylactic parenteral antibiotics who have an order for an antibiotic to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p>	<p>Per Patient Whether or not the surgical patient aged 18 years and older undergoing a procedure with the indications for prophylactic parenteral antibiotics had an order for an antibiotic to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p> <p>Per Patient Population Percentage of surgical patients aged 18 years and older undergoing procedures with the indications for prophylactic parenteral antibiotics who have an order for an antibiotic to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p>
<p>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure:</p> <p>The anti-infective drug should ideally be given within 30 minutes to 1 hour before the initial incision to ensure its presence in an adequate concentration in the targeted tissues. For most procedures, scheduling administration at the time of induction of anesthesia ensures adequate concentrations during the period of potential contamination.</p> <p>Exceptions: cesarean procedures (after cross clamping of the umbilical cord); colonic procedures (starting 19 hours before the scheduled time of surgery). (ASHP)</p> <p>Infusion of the first antimicrobial dose should begin within 60 min before incision. However, when a fluoroquinolone or vancomycin is indicated, the infusion should begin within 120 min before incision to prevent antibiotic-associated reactions.</p> <p>Although research has demonstrated that administration of the antimicrobial at the time of anesthesia induction is safe and results in adequate serum and tissue drug levels at the time of incision, there was no consensus that the infusion must be completed before incision. (SIPGWW)</p>		
<p>Rationale for the measure:</p> <p>The appropriate timing of administration of prophylactic antibiotics has been demonstrated to reduce the incidence of surgical wound infections. Specifying the time of administration in the order is critical as available evidence suggests that the drug should be received within one hour before incision for maximum antimicrobial effect. Data elements required for the measure can be captured and the measure is actionable by the physician.</p>		

Numerator instruction: There must be documentation of order (written order, verbal order, or standing order/protocol) specifying that antibiotic is to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required) **OR** documentation that antibiotic has been given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required).

Perioperative Care 2
Measure #2: Timing of Prophylactic Antibiotics – Administering Physician

This measure may be used as an accountability measure.

Data Elements	Clinical Performance Measure	Feedback
<p>Per Patient, Per Procedure Yes/No – Administration of prophylactic antibiotic has been initiated for patient within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p> <p>Yes/No – Patient had an order for an antibiotic to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p> <p>Sources Electronic medical record Paper medical record Flowsheet Administrative claims data*</p> <p>* adequate data source only if new codes are developed specific to the intent of this measure</p>	<p>Numerator: Surgical patients for whom administration of a prophylactic antibiotic has been initiated within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p> <p>Denominator: All surgical patients aged 18 years and older who have an order for a parenteral antibiotic to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p> <p>Measure: Percentage of surgical patients aged 18 years and older who have an order for a parenteral antibiotic to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required) for whom administration of a prophylactic antibiotic has been initiated within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p>	<p>Per Patient Whether or not administration of prophylactic antibiotic was initiated within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required) for the surgical patient aged 18 years and older who had an order for a parenteral antibiotic to be given within one hour (if vancomycin, two hours) prior to the incision (or start of procedure when no incision is required)</p> <p>Per Patient Population Percentage of surgical patients aged 18 years and older who have an order for a parenteral antibiotic to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required) for whom administration of a prophylactic antibiotic has been initiated within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required)</p>
<p>The following clinical recommendation statements are quoted verbatim from the referenced clinical guidelines and represent the evidence base for the measure:</p>		
<p>The anti-infective drug should ideally be given within 30 minutes to 1 hour before the initial incision to ensure its presence in an adequate concentration in the targeted tissues. For most procedures, scheduling administration at the time of induction of anesthesia ensures adequate concentrations during the period of potential contamination. Exceptions: cesarean procedures (after cross clamping of the umbilical cord); colonic procedures (starting 19 hours before the scheduled time of surgery). (ASHP)</p> <p>Infusion of the first antimicrobial dose should begin within 60 min before incision. However, when a fluoroquinolone or vancomycin is indicated, the infusion should begin within 120 min before incision to prevent antibiotic-associated reactions. Although research has demonstrated that administration of the antimicrobial at the time of anesthesia induction is safe and results in adequate serum and tissue drug levels at the time of incision, there was no consensus that the infusion must be completed before incision. (SIPGWW)</p>		
<p>Rationale for the measure: The appropriate timing of administration of prophylactic antibiotics has been demonstrated to reduce the incidence of surgical wound infections. Available evidence suggests that although most surgical patients receive a prophylactic antibiotic, many do not receive the drug within one hour before incision as recommended. Data elements required for the measure can be captured and the measure is actionable by the physician.</p>		

Denominator instruction: There must be documentation of order (written order, verbal order, or standing order/protocol) specifying that antibiotic is to be given within one hour (if vancomycin, two hours) prior to the surgical incision (or start of procedure when no incision is required).

Perioperative Care 2
Measure #3: Selection of Prophylactic Antibiotic -- First OR Second Generation Cephalosporin

This measure may be used as an accountability measure.

Data Elements	Clinical Performance Measure	Feedback
<p>Per Patient, Per Procedure Yes/No – Patient had an order for cefazolin OR cefuroxime for antimicrobial prophylaxis</p> <p>Yes/No – Documentation of medical reason(s) for not ordering cefazolin OR cefuroxime for antimicrobial prophylaxis</p> <p>Yes/No – Documentation of system reason(s) for not ordering cefazolin OR cefuroxime for antimicrobial prophylaxis</p> <p>Sources Electronic medical record Paper medical record Flowsheet Administrative claims data*</p> <p>* adequate data source only if new codes are developed specific to the intent of this measure</p>	<p>Numerator: Surgical patients who had an order for cefazolin OR cefuroxime for antimicrobial prophylaxis</p> <p>Denominator: All surgical patients aged 18 years and older undergoing procedures with the indications for a first OR second generation cephalosporin prophylactic antibiotic (List of procedures available in measure specifications)</p> <p>Denominator Exclusion: Documentation of medical reason(s) for not ordering cefazolin OR cefuroxime for antimicrobial prophylaxis</p> <p>Measure: Percentage of surgical patients aged 18 years and older undergoing procedures with the indications for a first OR second generation cephalosporin prophylactic antibiotic who had an order for cefazolin OR cefuroxime for antimicrobial prophylaxis</p>	<p>Per Patient Whether or not the surgical patient aged 18 years and older undergoing a procedure with the indications for a first OR second generation cephalosporin had an order for cefazolin OR cefuroxime for antimicrobial prophylaxis</p> <p>Per Patient Population Percentage of patients surgical patients aged 18 years and older undergoing procedures with the indications for a first OR second generation cephalosporin prophylactic antibiotic who had an order for cefazolin OR cefuroxime for antimicrobial prophylaxis</p>
<p>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure: For most procedures, cefazolin should be the agent of choice because of its relatively long duration of action, its effectiveness against the organisms most commonly encountered in surgery, and its relatively low cost. (ASHP)</p> <p>In operations for which cephalosporins represent appropriate prophylaxis, alternative antimicrobials should be provided to those with a high likelihood of serious adverse reaction or allergy on the basis of patient history or diagnostic tests such as skin testing.</p> <p>The preferred antimicrobials for prophylaxis in patients undergoing hip or knee arthroplasty are cefazolin and cefuroxime . Vancomycin or clindamycin may be used in patients with serious allergy or adverse reactions to β-lactams.</p> <p>The recommended antimicrobials for cardiothoracic and vascular operations include cefazolin or cefuroxime. For patients with serious allergy or adverse reaction to β-lactams, vancomycin is appropriate, and clindamycin may be an acceptable alternative. (SIPGWW)</p>		
<p>Rationale for the measure: Current published evidence supports the use of either cefazolin, a first generation cephalosporin, or cefuroxime, a second generation cephalosporin, for many surgical procedures, in the absence of β-lactam allergy. An alternative antimicrobial regimen may be appropriate depending on the antimicrobial susceptibility pattern in an individual institution (potentially a medical reason for excluding patients treated at that institution from this measure.) Data elements required for the measure can be captured and the measure is actionable by the physician.</p>		

Numerator instruction: There must be documentation of order (written order, verbal order, or standing order/protocol) for cefazolin OR cefuroxime for antimicrobial prophylaxis OR documentation that cefazolin OR cefuroxime was *given*.

**Perioperative Care 2
Measure #4: Discontinuation of Prophylactic Antibiotics (Non-Cardiac Procedures)**

This measure may be used as an accountability measure.

Data Elements	Clinical Performance Measure	Feedback
<p>Per Patient, Per Procedure Yes/No – Discontinuation of prophylactic antibiotic was ordered within 24 hours</p> <p>Yes/No – Patient received a prophylactic antibiotic</p> <p>Start of procedure time</p> <p>End of procedure time</p> <p>Yes/No – Documentation of medical reason(s) for not discontinuing prophylactic antibiotics within 24 hours of surgical end time</p> <p>Sources Electronic medical record</p> <p>Paper medical record</p> <p>Flowsheet</p> <p>Administrative claims data*</p> <p>* adequate data source only if new codes are developed specific to the intent of this measure</p>	<p>Numerator: Non-cardiac surgical patients who have an order for discontinuation of prophylactic antibiotics within 24 hours of surgical end time</p> <p>Denominator: All non-cardiac surgical patients aged 18 years and older undergoing procedures with the indications for prophylactic antibiotics AND who received a prophylactic antibiotic</p> <p>(List of procedures available in measure specifications)</p> <p>Denominator Exclusion: Documentation of medical reason(s) for not discontinuing prophylactic antibiotics within 24 hours of surgical end time</p> <p>Measure: Percentage of non-cardiac surgical patients aged 18 years and older undergoing procedures with the indications for prophylactic antibiotics AND who received a prophylactic antibiotic, who have an order for discontinuation of prophylactic antibiotics within 24 hours of surgical end time</p>	<p>Per Patient</p> <p>Whether or not the non-cardiac surgical patient aged 18 years and older undergoing a procedure with the indications for prophylactic antibiotics AND who received a prophylactic antibiotic, has an order for discontinuation of prophylactic antibiotics within 24 hours of surgical end time</p> <p>Per Patient Population Percentage of non-cardiac surgical patients aged 18 years and older undergoing procedures with the indications for prophylactic antibiotics AND who received a prophylactic antibiotic, who have an order for discontinuation of prophylactic antibiotics within 24 hours of surgical end time</p>
<p>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure:</p> <p>At a minimum, antimicrobial coverage must be provided from the time of incision to closure of the incision. For most procedures, the duration of antimicrobial prophylaxis should be 24 hours or less, with the exception of cardiothoracic procedures (up to 72 hours' duration) and ophthalmic procedures (duration not clearly established). (ASHP)</p> <p>Prophylactic antimicrobials should be discontinued within 24 hours after the operation. (SIPGWW)</p>		
<p>Rationale for the measure: There is no evidence there is added benefit of prolonged prophylactic antibiotic use. Prolonged use may increase antibiotic resistant organisms. Data elements required for the measure can be captured and the measure is actionable by the physician.</p>		

Numerator instruction: There must be documentation of order (written order, verbal order, or standing order/protocol) specifying that prophylactic antibiotic is to be discontinued within 24 hours of surgical end time **OR** documentation that prophylactic antibiotic was discontinued within 24 hours of surgical end time.

Denominator instruction: Patients may be counted as having “received a prophylactic antibiotic” if the antibiotic was received within 4 hours prior to the surgical incision (or start of procedure when no incision is required) or intraoperatively.

Perioperative Care 2
Measure #5: Discontinuation of Prophylactic Antibiotics (Cardiac Procedures)

This measure may be used as an accountability measure.

Data Elements	Clinical Performance Measure	Feedback
<p>Per Patient, Per Procedure Yes/No – Discontinuation of prophylactic antibiotic was ordered within 48 hours</p> <p>Yes/No – Patient received a prophylactic antibiotic</p> <p>Start of procedure time</p> <p>End of procedure time</p> <p>Yes/No – Documentation of medical reason(s) for not discontinuing prophylactic antibiotics within 48 hours of surgical end time</p> <p>Sources Electronic medical record</p> <p>Paper medical record</p> <p>Flowsheet</p> <p>Administrative claims data*</p> <p>* adequate data source only if new codes are developed specific to the intent of this measure</p>	<p>Numerator: Cardiac surgical patients who have an order for discontinuation of prophylactic antibiotics within 48 hours of surgical end time</p> <p>Denominator: All cardiac surgical patients aged 18 years and older undergoing procedures with the indications for prophylactic antibiotics AND who received a prophylactic antibiotic</p> <p>(List of procedures available in measure specifications)</p> <p>Denominator Exclusion: Documentation of medical reason(s) for not discontinuing prophylactic antibiotics within 48 hours of surgical end time</p> <p>Measure: Percentage of cardiac surgical patients aged 18 years and older undergoing procedures with the indications for prophylactic antibiotics AND who received a prophylactic antibiotic, who have an order for discontinuation of prophylactic antibiotics within 48 hours of surgical end time</p>	<p>Per Patient Whether or not the cardiac surgical patient aged 18 years and older undergoing a procedure with the indications for prophylactic antibiotics AND who received prophylactic antibiotics, who has an order for discontinuation of prophylactic antibiotics within 48 hours of surgical end time</p> <p>Per Patient Population Percentage of cardiac surgical patients aged 18 years and older undergoing procedures with the indications for prophylactic antibiotics AND who received a prophylactic antibiotic, who have an order for discontinuation of prophylactic antibiotics within 48 hours of surgical end time</p>
<p>The following clinical recommendation statements are quoted <u>verbatim</u> from the referenced clinical guidelines and represent the evidence base for the measure:</p> <p>At a minimum, antimicrobial coverage must be provided from the time of incision to closure of the incision. For most procedures, the duration of antimicrobial prophylaxis should be 24 hours or less, with the exception of cardiothoracic procedures (up to 72 hours' duration) and ophthalmic procedures (duration not clearly established). (ASHP)</p> <p>There is evidence indicating that antibiotic prophylaxis of 48 hours duration is effective. There is some evidence that single-dose prophylaxis or 24-hour prophylaxis may be as effective as 48-hour prophylaxis, but additional studies are necessary before confirming the effectiveness of prophylaxis lasting less than 48 hours. There is no evidence that prophylaxis administered for longer than 48 hours is more effective than a 48-hour regimen. Optimal practice: Antibiotic prophylaxis is not continued for more than 48 hours postoperatively. (STS) (Class IIa, Level B)</p>		
<p>Rationale for the measure:</p> <p>There is no evidence there is added benefit of prolonged prophylactic antibiotic use. Prolonged use may increase antibiotic resistant organisms. Data elements required for the measure can be captured and the measure is actionable by the physician.</p>		

Numerator instruction: There must be documentation of order (written order, verbal order, or standing order/protocol) specifying that prophylactic antibiotic is to be discontinued within 48 hours of surgical end time **OR** documentation that prophylactic antibiotic was discontinued within 48 hours of surgical end time.

Denominator instruction: Patients may be counted as having “received a prophylactic antibiotic” if the antibiotic was received within 4 hours prior to the surgical incision (or start of procedure when no incision is required) or intraoperatively.

Perioperative Care 2
Measure #6: Venous Thromboembolism (VTE) Prophylaxis (when indicated in ALL patients)

This measure may be used as an accountability measure.

Data Elements	Clinical Performance Measure	Feedback
<p>Per Patient, Per Procedure Yes/No – Patient had an order for LMWH*, LDUH**, adjusted-dose warfarin, fondaparinux, or mechanical prophylaxis to be given within 24 hours prior to incision time or 24 hours after surgery end time</p> <p>*LMWH – low molecular weight heparin **LDUH – low-dose unfractionated heparin</p> <p>Surgery incision time</p> <p>Surgery end time</p> <p>Yes/ No – Documentation of medical reason(s) for patient not receiving LMWH, LDUH, adjusted-dose warfarin, fondaparinux, or mechanical prophylaxis within 24 hours prior to incision time or 24 hours after surgery end time</p> <p>Sources Electronic medical record</p> <p>Paper medical record</p> <p>Flowsheet</p> <p>Administrative claims data*</p> <p>* adequate data source only if new codes are developed specific to the intent of this measure</p>	<p>Numerator: Surgical patients who had an order for LMWH, LDUH, adjusted-dose warfarin, fondaparinux or mechanical prophylaxis to be given within 24 hours prior to incision time or within 24 hours after surgery end time</p> <p>Denominator: All surgical patients aged 18 years and older undergoing procedures for which VTE prophylaxis is indicated in all patients</p> <p>(List of procedures available in measure specifications)</p> <p>Denominator Exclusion: Documentation of medical reason(s) for patient not receiving LMWH, LDUH, adjusted-dose warfarin, fondaparinux or mechanical prophylaxis within 24 hours prior to incision time or within 24 hours after surgery end time</p> <p>Measure: Percentage of patients undergoing procedures for which VTE prophylaxis is indicated in all patients who had an order for LMWH, LDUH, adjusted-dose warfarin, fondaparinux or mechanical prophylaxis to be given within 24 hours prior to incision time or 24 hours after surgery end time</p>	<p>Per Patient Whether or not the surgical patient aged 18 years and older undergoing a procedure for which VTE prophylaxis is indicated in all patients had an order for LMWH, LDUH, adjusted-dose warfarin, fondaparinux, or mechanical prophylaxis to be given within 24 hours prior to incision time or within 24 hours after surgery end time</p> <p>Per Patient Population Percentage of surgical patients aged 18 years and older undergoing procedures for which VTE prophylaxis is indicated in all patients who had an order for LMWH, LDUH, adjusted-dose warfarin, fondaparinux, or mechanical prophylaxis to be given within 24 hours prior to incision time or within 24 hours after surgery end time</p>

The following clinical recommendation statements are quoted verbatim from the referenced clinical guidelines and represent the evidence base for the measure:

Recommend that mechanical methods of prophylaxis be used primarily in patients who are at high risk of bleeding (Grade 1C+) or as an adjunct to anticoagulant-based prophylaxis. (Grade 2A)

Recommend **against** the use of aspirin alone as prophylaxis against VTE for any patient group. (Grade 1A)

Recommend consideration of renal impairment when deciding on doses of LMWH, fondaparinux, the direct thrombin inhibitors, and other antithrombotic drugs that are cleared by the kidneys, particularly in elderly patients and those who are at high risk for bleeding. (Grade 1C+).

Moderate-risk general surgery patients are those patients undergoing a nonmajor procedure and are between the ages of 40 and 60 years or have additional risk factors, or **those patients who are undergoing major operations and are <40 years of age with no additional risk factors**. Recommend prophylaxis with LDUH, 5,000 U bid or LMWH \leq 3,400 U once daily (both Grade 1A).

Higher-risk general surgery patients are those undergoing nonmajor surgery and are >60 years of age or have additional risk factors, or **patients undergoing major surgery who are >40 years of age or have additional risk factors**. Recommend thromboprophylaxis with LDUH, 5,000 U tid or LMWH, >3,400 U daily (both Grade 1A).

Recommend that thromboprophylaxis be used in all major gynecologic surgery patients (Grade 1A).

For patients undergoing major, open urologic procedures, recommend routine prophylaxis with LDUH twice daily or three times daily (Grade 1A).

Patients undergoing major orthopedic surgery, which includes hip and knee arthroplasty and hip fracture repair, represent a group that is at particularly high risk for VTE, and routine thromboprophylaxis has been the standard of care for >15 years. Elective total hip replacement: routine use of LMWH, fondaparinux, or adjusted-dose VKA (all Grade 1A). Elective total knee arthroplasty: routine thromboprophylaxis using LMWH, fondaparinux, or adjusted-dose VKA (all Grade 1A). Hip fracture surgery: routine use of fondaparinux (Grade 1A), LMWH (Grade 1C+), adjusted-dose VKA (Grade 2B), or LDUH (Grade 1B).

For major orthopedic surgical procedures, recommend that a decision about the timing of the initiation of pharmacologic prophylaxis be based on the efficacy-to-bleeding tradeoffs for that particular agent (Grade 1A). For LMWH, there are only small differences between starting preoperatively or postoperatively, both options acceptable (Grade 1A).

Recommend that thromboprophylaxis be routinely used in patients undergoing major neurosurgery (Grade 1A). (ACCP)

Rationale for the measure:

This measure addresses VTE risk based on surgical procedure. VTE prophylaxis is appropriate for all patients undergoing these procedures regardless of individual *patient* thromboembolic risk factors.

Additional work is needed to determine if a physician-level measure for VTE prophylaxis can be developed to address individual patient thromboembolic risk factors, in addition to procedural risk, without creating data collection burden.

Duration of VTE prophylaxis is not specified in the measure due to varying guideline recommendations for different patient populations.

Data elements required for the measure can be captured and the measure is actionable by the physician.

Numerator instruction: There must be documentation of order (written order, verbal order, or standing order/protocol) for VTE prophylaxis **OR** documentation that VTE prophylaxis was given.

References

1. American Society of Health-System Pharmacists (ASHP). ASHP Therapeutic Guidelines on Antimicrobial Prophylaxis in Surgery. *Am J Health Syst Pharm* 1999; 56:1839-1888.
2. Bratzler DW, Houck PM for the Surgical Infection Prevention Guidelines Writers Workgroup (SIPGWW). *Clinical Infectious Diseases* 2004;38 (15 June): 1706-15.
3. Centers for Disease Control and Prevention (CDC). Guidelines for Prevention of Surgical Site Infection, 1999.
4. American College of Cardiology (ACC)/ American Heart Association (AHA). ACC/AHA Guideline Update for Perioperative Cardiovascular Evaluation for Noncardiac Surgery – Executive Summary. 2002.
5. Geerts WH, Pineo GF, Heit JA, Bergqvist D, Lassen MR, Colwell CW and Ray JG. Prevention of Venous Thromboembolism: The Seventh ACCP Conference on antithrombotic and thrombolytic therapy (ACCP). *Chest* 2004 Sep;126(3 Suppl):338S-400S.
6. American Society of Colon and Rectal Surgeons (ASCRS). Practice Parameters for the Prevention of Venous Thromboembolism. *Diseases of the Colon and Rectum* 2000; 43(8):1037-1047.
7. Institute for Clinical Systems Improvement (ICSI). Venous thromboembolism prophylaxis. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2005 Jun. 45 p.
8. Society of Thoracic Surgeons (STS). Antibiotic prophylaxis in cardiac surgery: Duration of prophylaxis. 2005. Available at www.sts.org.