



How-to-guide Pediatric supplement Surgical Site Infection

Pediatric Affinity Group



Working in concert with the following leadership hospitals: Arkansas Children's Hospital, Cincinnati Children's Hospital Medical Center, Johns Hopkins Children's Center, Children's Hospitals and Clinics of Minnesota, Children's Hospital of Philadelphia, Lucile Packard Children's Hospital at Stanford, UMass Memorial Health Care, and Mayo Clinic.

Summary of Evidence:

The Centers for Disease Control (CDC) issued Guideline for Prevention of Surgical Site Infection in 1999 and the Centers for Medicare and Medicaid Services (CMS) issued an updated literature review in January 2005 as a part of the Surgical Care Improvement Project. (Document can be accessed at www.medqic.org/scip). The recommendations focus primarily on the correct selection and timing of antibiotic prophylaxis and make less well supported recommendations related to hair removal, hyperoxygenation and normothermia. Most of the recommendations are based on studies focused on adult care. However, as stated in the CDC guidelines, “In general, all SSI prevention measures effective in adult surgical care are indicated in pediatric surgical care.” (footnote) Recommendations do not vary based on age group in pediatrics, although the specific antibiotic and surgical prep recommendations may have specific restrictions.

Recommendations from Adult 100K Lives Campaign:

- 1.) Antimicrobial prophylaxis (CDC recommendations rate evidence as IA)
 - a. Prophylactic antibiotic administered consistent with national guidelines
 - b. Given intravenously within 0 – 60 minutes prior to surgical incision
 - c. Redosed during the procedure based on recommended criteria
 - d. Administration is continued no longer than 24 hours post operatively when indicated
- 2.) Hair removal (CDC recommendations rate evidence as 1A)
 - a. Do not remove hair preoperatively unless the hair at or around the incision site will interfere with the operation.
 - b. If hair is removed, remove immediately before the operation, preferably with electric clippers
- 3.) Glucose control (CDC recommendations rate evidence as IB)
 - a. Adequately control serum blood glucose levels in all diabetic patients and particularly avoid perioperative hyperglycemia.
- 4.) Normothermia (Not included in CDC recommendations)
 - a. Monitor patient’s core body temperature
 - b. Increase the ambient temperature of the operating room
 - c. Use warming blankets
 - d. Use warmed IV fluids

Antibiotic implementation in Pediatrics:

- 1) Because of the individualized dosing issues in pediatrics ordering and preparation of the medication in advance using preprinted orders or standing protocols are essential. Build a process that delivers the patient and their specific medication to the operating room together.
- 2) Establish consensus regarding which procedures require preoperative prophylaxis in the hospital based on guidelines. Anesthesia providers must be actively engaged as administration of the medication will be their responsibility. Consider developing an incentive program to reward performance.
- 3) Assure operating room drug stocks include the most commonly used antibiotics to serve as a backup system when the drug is not prepared in advance.
- 4) Include review of antibiotic administration in the surgical “time out” prior to initiating any operative procedure.
- 5) Use visible reminders that are consistent regardless of where the patient originates from – Same Day Surgery, ED or In-patient.

- 6) Develop an abbreviated, visible antibiotic summary when the patient comes from inpatient or ED to quickly give the Anesthesiologist knowledge of previous therapy and the timing of the last dose.
- 7) Develop Redosing Guidelines to assist in compliance with recommended redosing during the procedure. Post on Anesthesia carts for quick reference during the procedure. Use these to guide decisions regarding dosing prior to incision for patients on current antibiotic therapy
- 8) Post compliance rates for staff involved in the process in a visible location and timely, ie next day preferred.
- 9) Post outcome data (Infection Rates) for staff in a timely manner

Hair removal in Pediatrics:

- 1) Because of the age of the population, this is less of an issue in Pediatrics. Adult recommendations should be followed as appropriate for the developmental age of the child.

Glucose control in Pediatrics:

- 1) Literature in adults is limited to patients undergoing major cardiac surgery

Normothermia in Pediatrics:

- 1) Literature in adults is limited to patients having colorectal surgery

Other areas to consider:

- 1) Antiseptic used for preoperative skin preparation and standardization of practice
- 2) Preoperative antiseptic showering the night before and/or the day of the procedure
- 3) Review infection trends by clinical service and evaluate practices specific to the clinical services with higher infection rates for areas of improvement based on the CDC guidelines

Tools:

- 1) Standardized order set – attachment A
- 2) Redosing guidelines – attachment B
- 3) Visible reminders – Bracelet, antibiotic sticker – attachment C

Important References:

- 1) Surgical Care Improvement Project. Literature Review, January 2005 Update. Available at:<http://www.medqic.org/scip>
- 2) Mangram AJ, Horan TC, Pearson ML, et al. Guidelines for Prevention of Surgical Site Infections, 1999. *Infect Control Hosp Epidemiol* 1999; Vol.20 No.4: 247 – 278.
- 3) No author listed. Treatment Guidelines from the Medical Letter. Antimicrobial Prophylaxis in Surgery. *Medical Lett Drugs Ther* 2004; (20) 27 – 32
- 4) ASHP Therapeutic Guidelines on Antimicrobial Prophylaxis in Surgery. *ASHP Guidelines*. ASHP Commission on Therapeutics. *Clin Pharm* 1992; 11 (6): 483 – 513
- 5) Edwards PS, Lipp A, Holmes A. Preoperative skin antiseptics for preventing surgical wound infections after clean surgery. *Cochrane Database Syst Rev* 30 June 2004:AB003949.

- 6) Bhattacharyya N, Kosloske A. Postoperative Wound Infection in Pediatric Surgical Patients: A Study of 676 Infants and Children. *J Pediatr Surg* 25:125 – 129, 1990
- 7) Horwitz JR, Chwals WJ, Doski JJ, et al. Pediatric Wound Infections; A Prospective Multicenter Study. *Ann Surg* 227: 553 – 558, 1998



PHYSICIAN'S ORDER FORM

Patient addressograph/ label may be used here

Patient name: _____

MR#: _____

Date of birth: _____

All orders must be written in the metric system and include date, time, physician's signature and pager/phone number. Use ball point pen.

Date _____ Time _____ Weight _____ KG Height _____ CM _____ M²

Allergies: No Drug/Contrast Allergy No Food Allergy No Product/Latex Allergy Unable to Obtain Allergy Information

Specifics: _____

Surgical Prophylaxis Antibiotic Orders

Date of surgery: _____ CCHMC Base OP Mason

The following table serves as a **guideline** for dosing antibiotics for the prevention of surgical site infections. **A single dose of antibiotics given 0 – 60 minutes prior to incision, is considered sufficient for most procedures.** Repeat doses are indicated for procedures lasting more than 4 hours or those with significant blood loss. Post-operative prophylactic dosing has not been shown to be of clear benefit. The dosages listed here are NOT necessarily those that would be used for routine therapeutic administration.

- Ampicillin 50 mg/kg/dose/IV repeat intraoperatively in 3 hours Max 2000 mg
- Cefazolin 40 mg/kg/dose/IV repeat intraoperatively in 3 hours Max 2000 mg
- Cefoxitin 40 mg/kg/dose/IV repeat intraoperatively in 3 hours Max 2000 mg
- Cefotaxime 50 mg/kg/dose/IV repeat intraoperatively in 3 hours Max 2000 mg
- Clindamycin 10 mg/kg/dose/IV repeat intraoperatively in 3 hours Max 900 mg
- Gentamicin* 2.5 mg/kg/dose/IV repeat intraoperatively in 6 hours Max 100 mg
- Vancomycin* 15 mg/kg/dose/IV repeat intraoperatively in 6 hours Max 1000 mg
(begin 1 hr prior to incision)
- Other: _____ mg/kg/dose repeat intraoperatively in _____ hours

** If renal impairment, call pharmacy for appropriate dose and frequency*

Ordering Clinician (Printed name): _____

Ordering Clinician (Signature/Credentials): _____

Ordering Clinician Pager: _____ Phone: _____

FAX to 636-3955 when scheduling a patient at CCHMC Base
FAX to 636-5709 when scheduling a patient at OP Mason

Confirmation – Form Faxed by: _____ (Time/date): _____



ANTIBIOTIC PROPHYLAXIS IN SURGERY

Redosing Guidelines

A single dose of antibiotics, timed to achieve adequate tissue levels before incision, is considered sufficient for most procedures. Repeat doses are indicated for procedures lasting more than 4 hours or those with significant blood loss. The re-dosing intervals listed are based on normal renal **and/or hepatic** function and therefore should be adjusted for patients with renal **or hepatic** dysfunction. Repeat dosing is generally recommended in 1-2 half-lives for agents that are rapidly cleared. *Treatment Guidelines from the Med Letter 2(20) April 2004.*

The following table serves as a **guideline** for dosing antibiotics for the prevention of surgical site infections at CCHMC:

Drug	Dose 0-60 min Prior to incision*	Repeat for procedures > 4 hrs	Maximum single dose
Ampicillin	50 mg/kg	in 3 hrs	2000 mg
Cefazolin	40 mg/kg	in 3 hrs	2000 mg
Cefotaxime	50 mg/kg	in 3 hrs	2000 mg
Cefoxitin	40 mg/kg	in 3 hrs	2000 mg
Clindamycin	10 mg/kg	in 3 hrs	900 mg
Gentamicin	2.5 mg/kg	in 6 hrs	100 mg
Metronidazole	10 mg/kg	in 6 hrs	1000 mg
Vancomycin	15 mg/kg (begin 1 hr prior to incision)	in 6 hrs	1000 mg

*The dosages listed here are NOT necessarily those that would be used for routine therapeutic administration. Consult the formulary when ordering post-operative, therapeutic antibiotics.

PREOPERATIVE ANTIBIOTIC INFORMATION

Patient Name: _____ Date: _____

Check all that apply: Time: _____

Pre-op Antibiotic ordered on call for OR

Pre-op Antibiotic taped to front of chart

Patient **NOT** on scheduled antibiotics for treatment

Patient **ON** scheduled antibiotics for treatment

List antibiotic and last dosage given in the past 6 hours

Antibiotic name & dosage	Time of last dose	Time Next Dose Due	Check if dose taped to chart

