CLINICAL PRACTICE GUIDELINE	HUNTER NEW ENGLAND NSW HEALTH

Surgical Antibiotic Prophylaxis

Document Registration Number: HNEH CPG 09_17

Sites where CPG applies	Acute Networks Hospitals Primary & Community Networks	
Target Clinical Audience	Surgeons and Pharmacists	
Applicability *NB: *Please be aware that young people between 16 and 18 years of age may have a number of other guideline, policy or legal requirements that should be adhered to but for the purposes of guideline development can be considered adult	Neonate – less than 29 days Children up to 16 years* Adult (18 years and over) All of the above	□ □ □ **X**
Summary	This document describes expert recommendations relating to surgical prophylaxis practice in facilities managed by Hunter New England Health Service.	
Keywords	Surgical prophylaxis, antibiotic stewardship, surgical wound infection, patient safety	
Replaces existing clinical practice guideline or policy?	Yes	
Registration Numbers of Superseded Documents	HNEH CPG 08_06	

Related documents (Policies, Australian Standards, Codes of Conduct, legislation etc)

- Therapeutic Guidelines: Antibiotic, Therapeutic Guidelines, Melbourne, Victoria 2006

Senior Clinician or Manager responsible for CPG	
Contact Person/Position Responsible	_____
Contact Details	_____ _____ _____
Review Due Date:	December 2012
Ratified by Expert Working Group/s	Area Quality Use of Medicines Committee Anti-infective Working Group
Date Authorised by HNE Health Clinical Quality and Patient Safety Committee	TBA
Trim Number	TBA

GUIDELINE

Correct management of surgical prophylaxis significantly reduces post-operative wound infection. This Clinical Practice Guideline is concordant with Therapeutic Guidelines: Antibiotic.

Check whether **preoperative *Staphylococus aureus* (MRSA) screening** was attended and determine whether patient requires vancomycin based on demonstration of MRSA carriage.

Administer antibiotic(s) as close as possible to time of commencement of operation (within maximum 1 hour from induction) to ensure adequate tissue drug levels.

Cefazolin dose for all adult patients, regardless of weight is now 2 grams IV.

Repeat the cefazolin dose intraoperatively if the procedure last more than 3 hrs. If vancomycin is used, a second intraoperative dose is not required.

Post-operative doses are not recommended unless specified.

Recommendations for **Trauma orthopaedic patients** and **Vascular Surgery** are also included.

A synopsis of this Clinical Practice Guideline is available as a **laminated ID-sized card** from your hospital pharmacy service.

Indicated regimens (single preoperative doses unless indicated)

Procedure	**First Line** *(See over for dosage)*	**Second Line** *(major betalactam allergy / MRSA See over for vancomycin indications)*
Abdominal surgery (colorectal, upper GIT/ biliary including laparoscopic surgery)	Cefazolin 2g IV (child 25mg/kg up to 2g) AND Metronidazole[1][2]	Vancomycin 25mg/kg up to 1.5g over 60-90 minutes AND Gentamicin 2mg/kg
Amputation of ischaemic lower limb[3]	Benzylpenicillin 1.2g iv at induction then 6-hourly for 24 hours	Metronidazole IV at induction & at 12 hrs OR Vancomycin at induction & at 12 hrs
Caesarian section (LSCS)[4]	Cefazolin	Vancomycin
Head, Neck and Thoracic surgery	Cefazolin	Vancomycin
Hysterectomy (abdominal or vaginal hysterectomy) or termination of pregnancy[5]	Cefazolin AND Metronidazole IV	Vancomycin AND Gentamicin 2mg/kg

[1]

[2] Omit metronidazole in the following low risk patients:
- upper GIT surgery: patient with normal gastric acidity and motility, no obstruction, no bleeding, no malignancy & no previous gastric surgery,
- biliary tract surgery: patient < 60 years, non-diabetic and for elective cholecystectomy with low risk of common bile duct exploration

[3] Provides cover against the small but important risk of clostridial infection.

[4] There is evidence now that antibiotics are beneficial for prophylaxis of wound sepsis as well as endometritis for all caesarean sections, elective or non-elective. For maximum effect prophylaxis should be given before operation, not after cord clamping.

[5] Prior to hysterectomy, screening for bacterial vaginosis (BV) and management there of reduces BV-associated cuff infection. Similarly for termination of pregnancy, screening for *Chlamydia trachomatis* and BV with appropriate treatment, prior to the procedure reduces infectious complications.

Procedure	**First Line** *(See over for dosage)*	**Second Line** *(major betalactam allergy / MRSA See over for vancomycin indications)*
Neurosurgery[6] (prolonged procedure anticipated, re-explorations and microsurgery or the insertion of prosthetic materials)	Cefazolin	Vancomycin
Orthopaedics: Elective surgery (non-trauma)[7]	Cefazolin	Vancomycin
Vascular surgery[8]	Cefazolin 2g 8-hourly iv at induction then 8-hourly for 48 hours	Vancomycin 25mg/kg up to 1.5g at induction over 60-90min and then 1g 12-hrly for 3 doses AND Gentamicin 5 mg/kg iv at induction + on the following day
Orthopaedics **Non-elective (trauma)**	Cefazolin 2g 8-hrly iv (child 25mg/kg up to 2g 8-hrly)	Vancomycin 1g 12-hrly iv (child 25mg/kg up to 1g 12-hrly)

If a fracture is debrided, fixed, and closed within less than 6 hours then no extra prophylaxis is required. All other cases, i.e. most real cases, have early "established infections" although they are not actually apparent. What we are giving is not really prophylaxis but presumptive therapy. A type 1 fracture as a 2% risk of infection whereas a type IIIC fracture as more than 50% risk of infection.

Note that presence of an external fixature is not considered to represent an 'open wound'.

Gustillo type	**Size of fracture wound**	**Duration of antibiotic treatment**
I	<1 cm	24 hours after wound closure or 2 days if wound still open
II	1 – 3 cm	24 hours after wound closure or 3 days if wound still open
III	> 3 cm	24 hours after wound closure or 5 days if wound still open
IIIA	Bone coverable	
IIIB	Bone not coverable	
IIIC	Arterial injury, bone not coverable	
Other multi-trauma cases Including brain injury, base of skull fracture and CSF pressure monitored case.		24 hours (3 doses)

[6] Prophylaxis for the insertion of shunts, ventricular drains or pressure monitors remains unproven and is not recommended.

[7] Prophylaxis is given for prosthetic joint and other procedures involving insertion of prosthetic/foreign material. Arthroscopy does not require antibiotic prophylaxis. **NB. If joint infection is suspected prior to surgery and diagnostic specimens are required, delay administration in hip prostheses until after tissue samples taken. In knee operations, administer prophylaxis at the time of tourniquet removal.**

[8] Brachial or carotid procedures with no prosthetic material and varicose vein surgery – no prophylaxis required.

Antibiotic doses and notes

Cefazolin	2g IV (child 25mg/kg up to 2g)
Cephalothin	Cephalothin is no longer recommended for prophylaxis in view of its inferior pharmacokinetics for this purpose.
Gentamicin	Dose as indicated above. Dose according to actual body weight up to maximum of 360mg. ***Avoid gentamicin if significant pre-existing conductive hearing or vestibular problem (including past history of Merniere's disease).***
Metronidazole	500mg iv infusion. over 15-30 min ending at induction (child 12.5mg/kg up to 500mg).
Vancomycin	25mg/kg (based on **actual** body weight) up to 1.5g over 60-90 minutes, with infusion ending at the time of induction ***(maximum rec. infusion rate 1g/60 min).*** To coordinate this, vancomycin infusion should begin when the patient is called for theatre. If gentamicin also indicated, this can be given at the time of induction

Indications for vancomycin (glycopeptide) prophylaxis

Vancomycin or sometimes another glycopeptide antibiotic should replace the cephalosporin or penicillin component of the regimen in the following circumstances:

- Patients with a history of an immediate hypersensitivity reaction to penicillin or cephalosporin antibiotics (urticaria, angioedema, bronchospasm or anaphylaxis within 1 hour of drug administration)
- Preoperative patients infected or colonised with an MRSA strain (hospital-acquired or community-associated) currently or in the past, unless patient has been documented preoperatively as 'MRSA cleared' by Infection Control. Patients who have been in hospital for a prolonged period prior to surgery should be screened for MRSA (nose, perineum, wound(s), urine if IDC) prior to surgery and a vancomycin-containing regimen given if they are found to be MRSA positive.
- Patients undergoing prosthetic cardiac valve, joint or vascular surgery where the procedure is a re-operation (return to theatre or revision).
- Vascular surgery patients undergoing infrainguinal incision with insertion of prosthetic material

ID-Sized Card (available from Hospital Pharmacies) or from Paula.doherty@hnehealth.nsw.gov.au .

Surgical Prophylaxis

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Initial doses must be given close to induction (within 1 hour).
MRSA colonised or β-lactam allergy;use vancomycin regimen*.
Post-operative doses not recommended unless specified.

Operation	First line agent	Second line
Caesar(LSCS) Head, Neck, Thoracic Neurosurgery Orthopaedics	**cefazolin** 2 grams IV (child 25mg/kg up to 2g) Repeat dose intra-operatively if procedure lasts more than 3 hours	**vancomycin** 25mg/kg up to 1.5g (rec. max 1g/hr) ending infusion at induction. Repeat dose unnecessary unless surgery > 6 hrs.
Hysterectomy or Termination Abdominal Sx (omit metronid. in low risk pts)	**cefazolin** as above **AND** **metronidazole** 500mg IV by infusion 15-30 mins (child 12.5mg/kg up to 500mg)	**gentamicin** 2mg/kg **AND** **vancomycin** IV-dose as above
Amputation (ischaemic limb)	**benzylpenicillin** 1.2 g IV 6hrly for 24 hrs	**metronidazole** 500mg IV and repeat at 12 hrs
Vascular surgery (infrarenal); *also see full CPG*	**Cefazolin** 2g 8-hourly iv at induction then 8-hrly for 48hrs	**Vancomycin*** iv for 48 hrs **AND** **Gentamicin** 5 mg/kg iv 48hrs (2doses)

*Full vancomycin instructions, see HNE Surgical Prophylaxis Clinical Practice Guideline (Intranet).

Trauma orthopaedics and multi-trauma

Prophylaxis (overleaf) is given for prosthetic joint and other procedures involving insertion of prosthetic/foreign material. Arthroscopy does not require antibiotic prophylaxis.

Compound Fractures: If a fracture is debrided and closed within 6 hrs of injury, then no post-operative doses are required. ***Note that presence of an external fixature is not considered to represent an 'open wound'.***

In other circumstances, use modified **Gustillo classification scheme** for duration of presumptive treatment (below).
Use **cefazolin** 2 grams iv 8-hrly unless indication for vancomycin is present– dose this 1g 12-hrly iv (adult dose).

Type	Size of fracture wound	Duration of antibiotic course
I	< 1cm	**Infection risk= 2%** 24 hrs after wound closure or 2 days if wound still open
II	1-3 cm	24 hrs after wound closure or 3 days if wound still open
III	> 3 cm	**Infection risk > 50%**
IIIA	Bone coverable	24 hrs after wound closure or 5 days if wound still open
IIIB	Bone not coverable	
IIIC	+ arterial injury	
Other multi-trauma cases including brain injury, base of skull fracture and CSF pressure monitored case.		24 hours

Expires Dec 2011

IMPLEMENTATION PLAN

Area Antimicrobial Working Party is responsible for overall implementation.

HNE Surgical Stream (via Director, Prof Deane) will disseminate the guideline to all units, including anaesthetic services.

ID sized card guide to be issued to JMOs, Surgical Registrars, Orthopods and Anaesthetists.

Weekly intensive care rounds at all Area sites assess all trauma and neurosurgical cases to ensure that prophylaxis does not extend past 24 hours.

Intensivists apply these criteria regularly as required to truncate prolonged prophylaxis.

Educational efforts to JMOs (Orientation sessions by Pharmacy and ID), Specialists, VMOs and GPs (Infection Matters Newsletter) will be completed.

EVALUATION PLAN

Annual Surgical Prophylaxis audits by Pharmacy to assess peri operative timeliness, correct agent and correct dose. Reports are tabled back to DTC meetings.

Timeout procedure includes assessment of surgical prophylaxis completion.

CONSULATION WITH KEY STAKEHOLDERS

List of key stakeholder consulted including name and title

- Infectious Diseases and Immunology
- HAPS Microbiology
- Area Quality Use of Medicines Committee
- Anti-infective Working Group
- HNE Surgical Stream
- Heads of Vascular Surgery, Trauma Surgery and Neurosurgery at JHH

REFERENCES

Therapeutic Guidelines: Antibiotic, Edition 13 and Edition 14 (in press).