Antibiotic therapy

QUM domains: 
Appropriate choice 
Safe and effective use

2.1 Percentage of patients undergoing specified surgical procedures that receive an appropriate prophylactic antibiotic regimen

Purpose
This indicator addresses the effectiveness of processes for preventing hospital-acquired infections.

Background and evidence
Surgical site infections have been reported to be the second most common type of adverse event occurring in hospitalised patients,¹ and have been estimated to cost up to $268 million per year.² Surgical site infections are recognised to be an area for concern internationally, occurring in up to 5% of patients undergoing clean surgery,³ dependent on complexity of surgery, patient risk and surgical skills.⁴ Internationally surgical site infections have been shown to compose up to 20% of all healthcare associated infections.³ The use of antibiotics in preventing surgical site infection has been consistently demonstrated, yet gaps in the use of prophylactic surgical antibiotics continue to occur in Australia and internationally.⁵⁻⁸ Inappropriate antibiotic use ranges from 30% to 90%, especially with respect to timing and duration of antibiotic therapy.⁹

Key definitions

Specified surgical procedures refers to the procedure types identified in the latest version of the Therapeutic Guidelines: Antibiotic⁸ as requiring antibiotic prophylaxis. See Table 1.

An appropriate prophylactic antibiotic regimen refers to:
• Correct antibiotic choice: includes correct medication choice, route of administration and dosing schedule
• Correct timing: generally the antibiotic should be administered up to 60 minutes prior to skin incision and as a single dose. A second dose may be necessary: if there is a delay in starting the operation; if a short acting antibiotic is used (e.g. cephalothin, cephazolin, dicloxacillin or flucloxacillin) and the operation is prolonged (longer than 3 hours); or in other circumstances specified in guidelines
• Correct duration: Antibiotic prophylaxis is ceased within 24 hours of completion of surgery except where postoperative use is specifically recommended (e.g. cardiac and vascular surgery or amputation of an ischaemic lower limb).

All of these criteria must be reached in order for the antibiotic regimen to be deemed appropriate.

The current version of the Therapeutic Guidelines: Antibiotic should be used as a basis to guide clinical practice.⁹ However, practice may be audited against a more restrictive local guideline if desired.
Table 1: Specified surgical procedures requiring prophylactic antibiotics

<table>
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<tr>
<th>Surgical area</th>
<th>Specified surgical procedures</th>
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| Abdominal surgery            | Colorectal surgery  
Appendicectomy  
Upper gastrointestinal tract or biliary surgery, including laparoscopic surgery  
Endoscopic procedures that may result in bacteraemia  
Hernia repair with prosthetic material |
| Cardiac surgery              | Valve replacement  
Coronary artery bypass graft  
Cardiac transplantation  
Insertion of a permanent pacemaker |
| Head, neck and thoracic surgery | Procedures involving an incision through oral, nasal, pharyngeal or oesophageal mucosa, stapedectomy or similar operations, or the insertion of prosthetic material |
| Neurosurgery                 | Prolonged craniotomy or re-explorations and microsurgery  
Insertion of prosthetic material |
| Obstetrics and gynaecology   | Hysterectomy and termination of pregnancy  
Caesarean section |
| Orthopaedic surgery          | Prosthetic large joint replacement, other orthopaedic procedures involving insertion of prosthetic or transplant material, and internal fixation of fractures of large bones |
| Urology                      | Prostatectomy  
Transrectal prostatic biopsy |
| Vascular surgery             | Arterial reconstructive surgery involving the abdominal aorta and/or the lower limb, particularly if a groin incision is involved or with the implantation of foreign material |
| Other                        | Lower limb amputation |

Data collection for local use

Please refer to the section Using the National Quality Use of Medicines Indicators for Australian Hospitals for guidance on sample selection, sample size, measurement frequency and other considerations.

Inclusion criteria: Adult, paediatric and neonatal patients undergoing a specified surgical procedure.

Exclusion criteria: Nil.

Recommended data sources: Medical records, medication charts and intra-operative medication administration records.

The data collection tool for QUM Indicator 2.1 assists data collection and indicator calculation.

Data collection for inter-hospital comparison

This indicator may be suitable for inter-hospital comparison. In this case, definitions, sampling methods and guidelines for audit and reporting need to be agreed in advance in consultation with the coordinating agency.
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Indicator calculation
Numerator = Number of patients undergoing specified surgical procedures that receive an appropriate prophylactic antibiotic regimen
Denominator = Number of patients who had a specified surgical procedure in sample

Calculate the indicator separately for each procedure type

Limitations and interpretation
The list of specified surgical procedures in Table 1 is not exhaustive. If desired, other procedures requiring prophylactic antibiotics can be audited using this methodology.

For individual patients there may be clinical reasons why a different antibiotic regimen was chosen. Determining such circumstances retrospectively is complicated and may require clinical judgement. Since this is likely to apply for only a small number of patients, these instances are not accounted for. Where there is concern about results, it may be appropriate to look more closely at these details.

This indicator does not examine situations where antibiotics were given unnecessarily in procedures that typically do not require antibiotic prophylaxis. Such use may contribute to emergence of multi-resistant organisms and should not be neglected.3,10

Further information
Medication Safety Self Assessment for Australian Hospitals11 (MSSA) can help identify potential strategies for improvement with this and other indicators. The MSSA encourages development of robust systems for safe prescribing, dispensing, administration and monitoring of medicines. The MSSA is available at www.cec.health.nsw.gov.au

This indicator can be used to assist hospitals in meeting the National Safety and Quality Health Service Standard 1 [items 1.2.1, 1.2.2, 1.5.2, 1.6.1, 1.6.2, 1.7.2], Standard 3 [items 3.1.1, 3.1.2, 3.4.1, 3.4.2, 3.4.3, 3.14.1, 3.14.3, 3.14.4] and Standard 4 [items 4.2.1, 4.2.2, 4.5.1, 4.5.2].12

References
9. eTG complete [Internet]. Melbourne: Therapeutic Guidelines Limited; 2013 June.