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: Antibiotic[9] 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[9]

Surgical area	Specified surgical procedures
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.

Indicator calculation

$$\frac{\text{Numerator}}{\text{Denominator}} \times 100\%$$

Calculate the indicator separately for each procedure type

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

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.[9,10]

Further information

Medication Safety Self Assessment for Australian Hospitals[11] (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

1. Safer Systems Saving Lives - Preventing Surgical Site Infections Toolkit. Version 4. Department of Human Services, Victoria, 2005.

2. National Strategy to Address Health Care Associated Infections: Fourth Report to the Australian Health Ministers Conference. Australian Council for Safety and Quality in Health Care, 2003.

3. NICE Clinical Guideline 74. Surgical Site Infection. National Institute for Health and Clinical Excellence, 2008.

4. Spelman D. Hospital-acquired infections. Med J Aust 2002; 176: 286-291.

5. Bratzler D, Houck P, Richards C, et al. Use of antimicrobial prophylaxis for major surgery: baseline results from the national surgical infection project. Arch Surg 2005; 140: 174-182.

6. Bennett NJ, Bull AL, Dunt DR, et al. Surgical antibiotic prophylaxis in smaller hospitals. ANZ J Surg 2006; 76: 676-678.

7. McGrath DR, Leong DC, Gibberd R, et al. Surgeon and hospital volume and the management of colorectal cancer patients in Australia. ANZ J Surg 2005; 75: 901-910.

8. Bratzler D, Dellinger P, Olsen K et al. Clinical practice guidelines for antimicrobial prophylaxis in surgery. Am J Health Syst Pharm 2013; 70: 195-283.

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

10. Australian Medicines Handbook. Australian Medicines Handbook Pty Ltd, 2012.

11. Medication Safety Self Assessment for Australian Hospitals. Institute for Safe Medication Practices USA (Adapted for Australian use by NSW Therapeutic Advisory Group and the Clinical Excellence Commission), 2007.

12. Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards. Sydney, ACSQHC, 2012.