

Saving Lives: reducing infection, delivering clean and safe care

High Impact Intervention No 4

Care bundle to prevent surgical site infection



Aim

To reduce the incidence of surgical site infection

Context

The Health Act 2006 Code of Practice¹ states that NHS organisations must audit key policies and procedures for infection prevention. This high impact intervention helps trusts achieve this aim by providing a focus on elements of the care process and a method for measuring the implementation of policies and procedures.

A national prevalence study of infections in hospitals in 2006 showed that surgical site infections made up 14.5% of the total number of infections.²

The Department of Health (DH) document *Winning ways* published in 2003,³ noted that the National Nosocomial Infection Surveillance System had indicated that despite publication of guidelines, surgical infection rates had remained static over the period 1997–2001. Since then, the Surgical Site Infection Surveillance Service has reported that, between 1997 and 2005, 12% of hospitals in the scheme achieved statistically significant reductions in surgical site infections.⁴

In the USA the Hospital Infection Control Practices Advisory Committee⁵ produced guidelines for the prevention of surgical site infection in 1999. The National Institute for Clinical Excellence is developing surgical site infection guidelines for publication in 2007.

Specific recommendations for MRSA screening and prophylaxis and control have been published by a working party of the British Society for Antimicrobial Chemotherapy, the Hospital Infection Society and the Infection Control Nurses Association.^{6,7} The DH has published a summary of best practice for MRSA screening.⁸ A paper referring to orthopaedic patients describes how MRSA infection rates were reduced by close attention to details of the clinical process as well as 'ring-fencing' of beds.⁹

Several publications contain advice on the administration of perioperative prophylactic antimicrobials. The Scottish Intercollegiate Guidelines Network (SIGN) produced a guideline in 2000¹⁰ and the Health Technology Assessment programme has also published advice.^{11,12} The American National Surgical Infection Prevention Project and its successor, the Surgical Care Improvement Project, have recommended that prophylactic antimicrobials should be administered within 60 minutes prior to the skin incision.^{13,14}

Glucose control and temperature regulation in patients during the perioperative period have also been shown to contribute to the prevention of surgical site infection.^{15–17}

Why use the care bundle?

This care bundle is based on EPIC guidelines, expert advice and other national infection prevention and control guidance. It should support implementation of local and national policy. The purpose is to act as a way of improving and measuring the implementation of key elements of care.

The risk of infection reduces when all elements within the clinical process are performed every time and for every patient. The risk of infection increases when one or more elements of a procedure are excluded or not performed.

Elements of the care process

There are two sets of actions outlined below as good practice; these are concerned with:

- a** preoperative actions
- b** perioperative actions.

Preoperative actions

MRSA screening

- All patients undergoing implant, cardiothoracic, orthopaedic and neurosurgical procedures
- Other patients according to local Trust policy, eg vascular procedures.

MRSA decontamination

- A recommended technique for MRSA decolonisation is available from the Hospital Infection Society website.⁶

Perioperative actions

Hair removal

- Use a clipper with a disposable head.
- Shaving with a razor is not recommended.⁵

Prophylactic antimicrobial

- Appropriate antimicrobial administered within 60 minutes prior to incision.^{13,14}

Normothermia

- Maintaining a body temperature above 36°C in the perioperative period has been shown to reduce infection rates.^{16,17}

Glucose control

- Maintaining a glucose level <11mmol/l has been shown to reduce wound infection in diabetic patients.¹⁵

Using the bundle to ensure all elements of care are performed

Checking compliance with the elements in the care process will show the elements which were or were not performed. The tools on the CD will help you to:

- 1 identify when all elements have been performed
- 2 see where individual elements of care have not been performed
- 3 enable you to focus your improvement effort on those elements which are not being consistently performed

Using the compliance tool

- 1 Each time a care element is performed, insert a tick in the relevant column. If the action is not performed leave it blank.
- 2 Do this for each action, ensuring you tick it only when an element of care is performed correctly.
- 3 Calculate the totals and compliance levels by totalling the columns and using the tools provided (on the CD or at www.clean-safe-care.nhs.uk).
- 4 Your goal is to perform every element of care every time it is needed. The "All elements performed" column should be ticked when every care element is given correctly. This should total to 100% compliance when all care elements have been given correctly on every occasion.
- 5 Where elements have not been performed overall compliance will be less than 100%. This provides immediate feedback for users of the tool on those elements missed, and actions can then be taken to improve on compliance levels.
- 6 The percentage compliance figures for individual care elements show you where you need to focus effort to improve overall compliance.
- 7 The number of times when all elements are performed should be the same as the number of observations you perform. For example if you monitor the care process 10 times, then there should be 10 occasions when all elements were performed.

When the calculation is completed, the calculator tools on the CD (or at www.clean-safe-care.nhs.uk) will automatically show compliance graphs and run-charts for each element of care and for overall compliance with each high impact intervention. This will show you visually where to focus your improvement efforts to achieve full compliance.

Example

Care elements Observation	Care element 1	Care element 2	Care element 3	Care element 4	All elements performed
1	✓		✓	✓	
2	✓	✓		✓	
3	✓	✓	✓	✓	✓
4	✓	✓	✓	✓	
5	✓	✓	✓	✓	✓
Total number of times an individual element was performed	5	4	4	4	2
% when element of care was given	100%	80%	80%	80%	40%

This example shows that while most care elements were performed on only two occasions were ALL elements performed correctly. Overall compliance with all elements was only 40% and as a result the risk of infection was significantly increased.

Best practice guides

The American Healthcare Infection Control Practices Advisory Committee guidelines⁵

The SIGN publication number 45¹⁰

Recommended resources

Many guidelines and papers are available in the National Resource for Infection Control at www.nric.org.uk

The NHS infection control e-learning package is available at www.infectioncontrol.nhs.uk

The American Agency for Healthcare Research and Quality report *Making health care safer: a critical analysis of patient safety practices*¹⁸

References

1. Department of Health. The Health Act 2006 – Code of practice for the prevention and control of healthcare associated infections. London: Department of Health. 2006. Available at www.dh.gov.uk/assetRoot/04/13/93/37/04139337.pdf (accessed 28 February 2007)
2. Smyth ETM. Healthcare acquired infection prevalence survey 2006. Presented at 6th international conference of the Hospital Infection Society, Amsterdam. 2006. Preliminary data available in the Hospital Infection Society: The third prevalence survey of healthcare associated infections in acute hospitals. 2006. Available at www.his.org.uk (accessed 18 April 2007)
3. Department of Health. Winning ways: working together to reduce healthcare associated infection in England. London: Department of Health. 2003. Available at www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/Browsable/DH_4095070 (accessed 28 February 2007)
4. Health Protection Agency. Surveillance of surgical site infection in England: October 1997–September 2005. London: Health Protection Agency. 2006. Available at www.hpa.org.uk/infections/topics_az/surgical_site_infection/all_97_05_SSI.pdf (accessed 28 February 2007)
5. Mangram AJ, Horan TC, Pearson ML et al. Guideline for prevention of surgical site infection, 1999. Infection Control and Hospital Epidemiology. 1999, 20:247–278. Available at www.cdc.gov/ncidod/dhqp/pdf/guidelines/SSI.pdf (accessed 28 February 2007)
6. Coia JE, Duckworth GJ, Edwards DI, Farrington M et al. Joint Working Party of British Society for Antimicrobial Chemotherapy, Hospital Infection Society and Infection Control Nurses Association. Guidelines for the control and prevention of methicillin-resistant *Staphylococcus aureus* (MRSA) in healthcare facilities. Journal of Hospital Infection 2006, 63S:S1–S44. Available at www.his.org.uk/_db/_documents/MRSA_Guidelines_PDF.pdf (accessed 28 March 2007)
7. Gemmell CG, Edwards DI, Fraise AP et al. for Joint Working Party of British Society for Antimicrobial Chemotherapy, Hospital Infection Society and Infection Control Nurses Association. Guidelines for the prophylaxis and treatment of methicillin-resistant *Staphylococcus aureus* (MRSA) infections in the UK. Journal of Antimicrobial Chemotherapy 2006, 57:589–608. Available at jac.oxfordjournals.org/cgi/reprint/dkl017v1 (accessed 28 February 2007)
8. Department of Health. Screening for methicillin resistant *Staphylococcus aureus* (MRSA) colonisation. London: Department of Health. 2007. Available at www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_063188
9. Biant LC, Teare EL, Williams WW, Tuite JD. Eradication of methicillin resistant *Staphylococcus aureus* (MRSA) by ‘ring fencing’ of elective orthopaedic beds. BMJ 2004, 329:149–51
10. Scottish Intercollegiate Guidelines Network. Antibiotic prophylaxis in surgery: a national clinical guideline. SIGN publication number 45. 2000. Available at: www.sign.ac.uk/guidelines/fulltext/45/index.html (accessed 28 February 2007)
11. Song F, Glenny AM. Antimicrobial prophylaxis in colorectal surgery: a systematic review of randomised controlled trials. Health Technology Assessment 1998, 2(7). Available at www.hta.nhsweb.nhs.uk/fullmono/mon207.pdf (accessed 28 February 2007)
12. Song F, Glenny AM. Antimicrobial prophylaxis in total hip replacement: a systematic review. Health Technology Assessment 1999, 3(21). Available at www.hta.nhsweb.nhs.uk/fullmono/mon321.pdf (accessed 28 February 2007)
13. Bratzler D, Houck PM et al. Antimicrobial prophylaxis for surgery: an advisory statement from the National Surgical Infection Prevention Project. Clinical Infectious Diseases 2004,38:1706–15
14. Bratzler DW, Hunt DR. The surgical infection prevention and surgical care improvement projects: national initiatives to improve outcomes for patients having surgery. Clinical Infectious Diseases 2006, 43:322–330
15. Furnary AP, Zerr KJ, Grunkemeier GL, Starr A. Continuous intravenous insulin infusion reduces the incidence of deep sternal wound infection in diabetic patients after cardiac surgical procedures. Annals of Thoracic Surgery 1999. 67:352–362.
16. Kurz A, Sessler DI, Lenhardt R. Perioperative normothermia to reduce the incidence of surgical-wound infection and shorten hospitalization. New England Journal of Medicine 1996, 334:1209–15
17. Melling AC, Ali B, Scott EM, Leaper DJ. The effects of preoperative warming on the incidence of wound infection after clean surgery: a randomised controlled trial. Lancet 2001, 358:882–886
18. Agency for Healthcare Research and Quality. Making health care safer: a critical analysis of patient safety practices. Evidence Report/Technology Assessment No. 43. Rockville: Agency for Healthcare Research and Quality. 2001. Available at www.ahrq.gov/clinic/ptsafety/pdf/ptsafety.pdf (accessed 28 February 2007)

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