Guidance on preventing surgical site infection

In this article...

- Overview of surgical site infection
- Development of a toolkit to improve infection prevention
- Results of a pilot test of the toolkit

Infections associated with healthcare are a major risk to patients, and their prevention is recognised as a key component of care quality and patient safety. Attention has been focused on measures to reduce bloodstream infections caused by pathogens such as meticillin-resistant Staphylococcus aureus. However, there has been less consideration of other serious and more common healthcare-associated infections (HCAI) such as surgical site infection (SSI).

SSI is the third most common cause of HCAI after pneumonia and urinary tract infection, accounting for 16% of all such infections (Health Protection Agency, 2012). However, among surgical patients it is the most common HCAI, affecting at least 5% (Smyth et al, 2008). Since SSIs are unlikely to become apparent until at least four or five days after surgery – several months in the case of implant surgery – the risk is difficult to measure accurately, as many infections occur after patients have been discharged from hospital. While patients with severe SSIs may be readmitted, many others might be treated in the community (Public Health England, 2015; 2014). In such cases, the health professionals involved in an operative procedure remain unaware the patient has developed an SSI and cannot connect the quality of infection control practice in the peri-operative period with SSIs.

Although national regulations in UK countries require hospitals to conduct surveillance of SSIs for major orthopaedic procedures, surveillance of other categories of surgical procedures is limited (Public Health England, 2015; Health Protection Scotland, 2012; NHS Wales, 2011). The significant morbidity and mortality that result from SSIs are also poorly recognised; they double the length of post-operative stay, incurring additional costs and reducing the availability of beds for other patients (Coello et al, 2005; Jenks et al, 2014). Coello et al (2005) also found that patients who developed deep or organ/space SSIs had an increased risk of death; the risk more than doubled for hip prosthesis surgery and increased seven times for vascular surgery. Other studies have illustrated the long-term impact of SSIs on patients’ health. Whitehouse et al (2002) found that SSIs after orthopaedic surgery quadruple the costs of care and decrease patients’ quality of life.

A range of evidence-based guidance on preventing or reducing the risk of SSI is available, including guidelines on preventing SSI and inadvertent hypothermia (National Institute for Health and Care Excellence, 2003a; 2013b; 2008); on theatre practice and air handling systems...
The OneTogether Partnership
Multi-organisational collaborations focused on quality improvement have been shown to be effective in improving patient outcomes through the dissemination of evidence-based practices (Nadeem et al, 2013). OneTogether represents such a collaboration involving professional organisations with an interest in SSI prevention: the Association for Perioperative Practice (AfPP), the Infection Prevention Society, College of Operating Department Practitioners and the Royal College of Nursing. Initiated in 2012, the partnership aims to promote and support the adoption of best practice to prevent SSI across the surgical patient pathway.

OneTogether secured support from 3M, which provides technical expertise and financial support for producing educational material and holding educational meetings to disseminate material to clinical practitioners; a memorandum of understanding ensures that outputs are free from commercial influence or endorsement, are jointly owned by the partners and freely available.

Application of current guidance
In 2013, OneTogether held a workshop attended by 84 theatre nurses, infection prevention specialists and operating department practitioners from 75 NHS and private hospitals in England. Delegates discussed how infection prevention guidance in relation to surgery is applied in practice and explored the challenges affecting compliance (Leaper et al, 2015).

They reported problems in translating evidence-based guidance into everyday practice and poor compliance with best practice, especially for peri-operative warming, skin preparation and management of the surgical environment. An absence of local policies, knowledge and training in relation to guidance was considered a key factor. Lack of leadership to drive implementation of guidance, poorly defined responsibilities and lack of ownership of good practice across the multidisciplinary team were also identified as particular barriers (Wilson et al, 2015).

### TABLE 1. AREAS OF CARE COVERED BY THE ONETOGETHER TOOLKIT

<table>
<thead>
<tr>
<th>AREA OF CARE</th>
<th>STANDARD</th>
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<tbody>
<tr>
<td>1. Skin preparation</td>
<td></td>
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<tr>
<td>1.1 Patient washing</td>
<td>NICE recommends that patients should shower or have a bath (or be assisted to shower, bath or bed bath) using soap, either the day before, or on the day of surgery</td>
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<tr>
<td>1.2 Hair removal</td>
<td>NICE recommends that razors should not be used for hair removal because they increase the risk of SSI. If hair must be removed, clippers with disposable heads are recommended</td>
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<td>1.3 Skin disinfection</td>
<td>NICE recommends that the skin should be disinfected immediately prior to the incision with chlorhexidine or providence-iodine (alcoholic or aqueous)</td>
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<td>1.4 Preventing skin recolonisation</td>
<td>NICE recommends that if an incise drape is used, this should be iodophore-impregnated unless the patient has an iodine allergy</td>
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<tr>
<td>2. Prophylactic antibiotics</td>
<td>Antibiotics are given as indicated to minimise the risk of infection and reduce the emergence of antibiotic resistance</td>
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<tr>
<td>3. Patient warming</td>
<td></td>
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<tr>
<td>3.1 Warming intravenous and irrigation fluids</td>
<td>Intravenous fluids (500ml or more) and blood products should be warmed to 37°C using a fluid warming device following manufacturers’ instructions. All irrigation fluids used intra-operatively should be warmed in a thermostatically controlled cabinet to 38–40°C.</td>
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<tr>
<td>3.2 Pre-operative warming</td>
<td>NICE recommends patients’ temperature should be 36°C or above before they are transferred to the operating department, unless there is a need to expedite surgery. Patients should be assessed for risk of peri-operative hypothermia and potential adverse consequences before transfer</td>
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<tr>
<td>3.3 Intra-operative warming</td>
<td>NICE recommends patients’ temperature should be 36°C or above before induction of anaesthesia, unless there is a need to expedite surgery. All patients having anaesthesia for longer than 30 minutes should be warmed from induction using forced-air warming. Patients at increased risk of peri-operative hypothermia and having anaesthesia for less than 30 minutes, should be warmed from induction using forced-air warming.</td>
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<tr>
<td>3.4 Post-operative warming</td>
<td>The postoperative period is defined as 24 hours after patients enter the recovery area. Patients’ temperature should be monitored and documented every 15 minutes in recovery; they should not be transferred to the ward until their temperature is 36°C or above</td>
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<tr>
<td>4. Maintaining asepsis</td>
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<tr>
<td>4.1 Surgical practice</td>
<td>The principles of aseptic technique must be adhered to by staff involved in the surgical procedure</td>
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<tr>
<td>4.2 Instrument management</td>
<td>All instrumentation should be suitably decontaminated and sterilised prior to surgical use</td>
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<td>5. Surgical environment</td>
<td>The risk of airborne contamination entering the operative site must be minimised</td>
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<tr>
<td>6. Wound management</td>
<td>NICE recommends that surgical incisions should be covered with an appropriate interactive dressing at the end of the operation</td>
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<td>7. Surveillance of surgical site infection</td>
<td>SSIs are monitored using a standardised surveillance methodology to provide feedback to the surgical team about the quality of infection prevention in the operating theatre, and to provide patients with accurate information about the risk of SSI associated with the operation</td>
</tr>
</tbody>
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These findings demonstrated the need for a closer working relationship between infection control and operating department staff to identify problems with compliance with best practice, develop local policy and translate it into systems that define responsibilities for all multidisciplinary team members.

Developing an assessment toolkit

To support this aim the partnership has developed the OneTogether Assessment Toolkit for infection prevention practice, which provides a structured framework for assessing compliance throughout the pre, intra and post-operative stages of the surgical pathway. The standards included in the toolkit are derived from national evidence-based guidelines or expert recommendations from professional bodies (PHE, 2014; AAPP, 2016; 2014; HPS, 2012; NICE 2008a; 2008b; Department of Health, 2007). Table 1 illustrates the seven fundamental standards of care covered by the assessment tool. These are also summarised in a poster designed to support the toolkit and enhance theatre practitioners’ knowledge about guidance on preventing SSI; the poster is available for download at joinonetogether.com/resources. Assessment should be conducted together by theatre, and infection prevention and control practitioners and include practice in operating theatres, surgical wards and pre-admission clinics. It should be conducted separately for different surgical specialties as the practices in the operating theatre and along the surgical pathway may differ. Several periods of data capture may be needed to gather a complete picture of compliance across all seven areas of care.

The toolkit defines a set of specific criteria required to meet the expected standard of care within each area and asks reviewers to consider for each criterion whether the standard is both ‘defined’ (clearly described in a local policy), and ‘applied’ (consistently performed). Information on the application of standards can be gathered through observing practice and questioning relevant staff. The toolkit then allocates scores to give a percentage capture using the assessment toolkit.

Pilot of the toolkit

The toolkit was pilot tested by seven hospitals in 15 theatres; this demonstrated overall 62% compliance with all the areas of practice, although this varied between hospitals and specialties. Participants found the toolkit easy to use and valuable for identifying gaps in infection prevention practice. Recommendations for improvements to the toolkit and guidance on its use were incorporated into the final version, which is available online as a PDF and Excel spreadsheet for recording scores available at joinonetogether.com/resources. You can also find more information at Bit.ly/IPSOneTogether and Bit.ly/AFFPPOneTogether.

Conclusion

Assuring best practice in the prevention of SSIs is made more difficult because the patient pathway crosses physical and cultural boundaries, and infection control teams may perceive the operating theatre to be an impenetrable and complex environment. In addition, the absence of data on SSI rates means the imperative of addressing infection prevention practice may not be obvious to theatre staff.

The OneTogether Assessment Toolkit provides a structured framework against which to measure compliance with evidence-based practice and use the results to identify where improvements are required. Such actions are essential to ensuring the quality and safety of care is delivered to all patients undergoing surgical procedures and ensuring that their risk of developing SSI is minimised.

References

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National Institute for Health and Care Excellence (2015a) Quality standard: Surgical site infection. nice.org.uk/gs49


Woodhead K et al (2002) Behaviours and rituals in the operating theatre: a report from the Hospital Infection Society Working Group on infection control in the operating theatres. Journal of Hospital Infection; 51

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