

NICE support for commissioning for surgical site infection

October 2013

1 Introduction

Implementing the recommendations from NICE guidance and other NICE-accredited guidance is the best way to support improvements in the quality of care or services, in line with the statements and measures that comprise the NICE quality standards. This report:

- considers the resource impact of implementing the changes needed to achieve the quality standard at a local level
- identifies where potential cost savings can be made
- highlights the areas of care in the quality standard that have potential implications for commissioners
- directs commissioners and service providers to a package of support tools that can help them implement NICE guidance and redesign services.

NICE quality standards describe high-priority areas for quality improvement in a defined care or service area. Each standard consists of a prioritised set of specific, concise and measurable statements. The statements draw on existing guidance, which provides an underpinning, comprehensive set of recommendations, and are designed to support the measurement of improvement. For more information see [NICE quality standards](#).

NHS England's [CCG outcomes indicator set](#) is part of a systematic approach to promoting quality improvement. The outcomes indicator set provides Clinical Commissioning Groups (CCGs) and health and wellbeing boards with comparative information on the quality of health services commissioned by CCGs and the associated health outcomes. The set includes indicators

derived from NICE quality standards. By commissioning services in line with the quality standards, commissioners can contribute to improvements in health outcomes.

Commissioners can use the quality standards to improve services by including quality statements and measures in the service specification of the standard contract and establishing key performance indicators as part of tendering. They can also encourage improvements in provider performance by using quality standard measures in association with incentive payments (see [Commissioning for quality and innovation \[CQUIN\]: 2013/14 guidance](#)). NICE quality standards provide a baseline against which improvements can be measured and rewarded, enabling commissioners to address gaps in service provision, support best practice and encourage evidence-based care.

This report on the surgical site infection quality standard should be read alongside:

- [Surgical site infection](#). NICE quality standard 49 (2013).
- [Patient experience in adult NHS services](#). NICE quality standard 15 (2012).
- [Prevention and control of healthcare-associated infections](#). NICE public health guidance 36 (2011).
- [Surgical site infection](#). NICE clinical guideline 74 (2008).
- [Perioperative hypothermia \(inadvertent\)](#). NICE clinical guideline 65 (2008).
- Policy documents detailed in section 5.1.

2 Overview of surgical site infection

Surgical site infection is a type of healthcare-associated infection in which a wound becomes infected after a surgical procedure. It can cause significant morbidity and mortality if left untreated.

The [Health Protection Agency](#) which was absorbed into Public Health England (PHE) and is hereafter referred to as PHE states: ‘Surgical site infections are relatively rare. High standards of asepsis (procedures that reduce the risk of bacterial contamination e.g. sterile equipment) in operating theatres, and

appropriate use of antibiotics are key to minimising the risk of infection. However, they cannot always be prevented. The likelihood of a surgical site infection depends on a number of factors related to both the patient and the surgical procedure¹.

Superficial incisional infection is defined as a surgical site infection that occurs within 30 days of surgery¹, but expert opinion suggests that deep / organ space infections can present up to 1 year after an implant.

2.1 *Epidemiology of surgical site infection*

Surgical site infection accounts for about 16% of all healthcare-associated infections in England. The 2011 [English national point prevalence survey on healthcare-associated infections and antimicrobial use](#) identified the prevalence of healthcare-associated infections as 6.4%, a reduction from 8.2% in 2006. The 6 most commonly occurring healthcare-associated infections account for more than 80% of all healthcare-associated infections, with surgical site infection being the third most common (see table 1).

¹ Public Health England (2013) [Protocol for the surveillance of surgical site infection: surgical site infection surveillance service](#)

Table 1 Most commonly occurring healthcare-associated infections in England²

Healthcare-associated infection type	Percentage of all healthcare-associated infections
<i>Respiratory tract infections</i>	23%
<i>Urinary tract infections</i>	17%
<i>Surgical site infections</i>	16%
<i>Clinical sepsis</i>	10%
<i>Gastrointestinal infections</i>	9%
<i>Bloodstream infections</i>	7%

Trends in surgical site infection rate vary according to operative site. The PHE [Surveillance of surgical site infections in NHS hospitals in England 2011/12](#) report is a summary of data on surgical site infections collected by NHS hospitals and independent sector NHS treatment centres in England between April 2007 and March 2012. The report concluded that most hospitals had stable or decreasing rates of surgical site infection between 2008/09 and 2011/12, but stated that: ‘A significantly increasing trend in surgical site infection was found at a national level for patients undergoing knee prosthesis, large bowel and cholecystectomy surgery. Investigating the drivers behind these increases should be considered a priority.’ This clearly indicates there is scope for further reductions in the rate of surgical site infection. The same report revealed that nearly half of causative pathogens of surgical site infection in 2011/12 were *enterobacteriaceae* and meticillin-sensitive *Staphylococcus aureus* (MSSA) (see table 2 for further details).

² Source: Public Health England (2012) [English national point prevalence survey on healthcare-associated infections and antimicrobial use, 2011: preliminary data](#)

Table 2 Distribution of organisms reported as causing surgical site infections (inpatient and readmission), all surgical categories, NHS hospitals, England, 2011/2012³

Organism	%
<i>Enterobacteriaceae</i>	28.5
<i>S. aureus - MSSA</i>	19.9
<i>S. aureus - MRSA</i>	4.4
<i>Cogaulase negative staphylococci</i>	13.8
<i>Enterococcus spp</i>	8.3
<i>Pseudomonas spp</i>	7.0
<i>Other bacteria</i>	6.2
<i>Anaerobes</i>	6.1
<i>Streptococcus spp</i>	4.0
<i>Fungi</i>	1.5
<i>Acinetobacter spp</i>	0.4

PHE undertakes surveillance of surgical site infections annually. The survey covers 17 surgical categories, including mandatory orthopaedic data required by the Department of Health. Data for other surgical categories are submitted on a voluntary basis. This surveillance should help commissioners to understand surgical site infection rates for their local providers and prioritise areas for improvement.

3 Summary of commissioning and resource implications

Using the quality standard, together with the guidance on which it is based, should contribute to the improvements outlined in the [NHS Outcomes Framework 2013/14](#) and [Public Health Outcomes Framework for England 2013–2016](#) (see table 1 in the [quality standard](#)).

Surgical services are commissioned by both clinical commissioning groups (for services provided at local district general hospitals) and NHS England (for specialist surgical services, largely delivered at tertiary care centres).

³ Source: Public Health England (2012) [Surveillance of surgical site infections in NHS hospitals in England, 2011/2012](#)

While quality statements 1 to 6 impact directly on providers, statement 7 applies equally to commissioners and providers. Commissioners and providers need to work together on statement 7, which looks at the rate of surgical site infection and how effective surveillance is.

The cost and incidence of surgical site infection is the subject of much debate, with identification being a key issue. It has been suggested that PHE incidence figures may be understated because⁴:

- they are based on voluntarily submitted surveillance figures (with the exception of orthopaedics data)
- they assume that people with surgical site infections will present within 6 days (when in fact they may present up to 30 days later, with expert opinion suggesting deep / organ space infections can present up to 1 year after an implant)
- patients who have been discharged into the community may not return to hospital to have their surgical site infection treated and recorded.

Even if the numbers are understated, surgical site infection represents significant costs to the NHS, ranging from £2,100 to £10,500 per infection depending on the nature of the surgery. Expert opinion suggests that costs can be as high as £20,000 per surgical site infection for complex surgery and up to £14,000 for more general surgery.

It has been estimated that the cost to the NHS surgical site infections is around £700m a year⁵. Treatment of patients with surgical site infection also reduces the capacity to treat other patients, creating a further inefficiency.

Commissioners and providers need to work together to understand local surgical site infection rates, and trends in these across a range of surgical

⁴ Louise Frampton. Calculating the cost of surgical site infection. Microbiology update, The Biomedical scientist, December 2010

⁵ Under the Knife Report, 2011: Taking a zero tolerance approach to preventable surgical site infections in UK hospitals

sites. A starting point is the PHE [Surveillance of surgical site infections in NHS hospitals in England 2011/12](#) report.

Table 3 summarises the commissioning and resource implications for commissioners working towards achieving this quality standard.

Commissioners and providers may wish to work together to seek assurance that the quality statements are being achieved in line with the quality measures detailed in the quality standard. See section 4 for more detail on commissioning and resource implications.

Table 3 Potential commissioning and resource implications of achieving the quality standard for surgical site infection

Area of care	Commissioning implications	Estimated resource impact
Preoperative and intraoperative phases (statements 1–5)	<p>Commissioners should:</p> <ul style="list-style-type: none"> • understand surgical site infection rates for their local providers • ensure their providers have effective surveillance in place • agree priority areas for improvement, based on local rates of surgical site infection and identified needs. 	<p>Avoiding surgical site infection may:</p> <ul style="list-style-type: none"> • lead to savings from avoiding unnecessary treatment costs (typically around £2,100 per surgical site infection but up to £20,000 for complex surgery) • increase organisational productivity and capacity to treat other patients. <p>Investment in patient warming equipment may be required depending on local circumstances.</p>
Postoperative phase (statements 3 and 6)		<p>Using the appropriate antibiotic to treat surgical site infection may:</p> <ul style="list-style-type: none"> • reduce the length of hospital stay, giving an estimated saving of around £300 per day • increase organisational productivity and capacity to treat other patients.
Surveillance (statement 7)		<p>No significant costs anticipated unless further investment in surveillance teams or IT systems is needed.</p> <p>A high quality surveillance system may achieve the following:</p> <ul style="list-style-type: none"> • effective detection of surgical site infection • efficient use of resources and increased overall productivity • reduced organisational costs associated with surgical site infection.

4 Commissioning implications and resource impact

This section considers the commissioning implications and potential resource impact of implementing the recommendations to achieve the NICE quality standard for surgical site infection.

4.1 *Preoperative and intraoperative phases*

Quality statement 1: Personal preparation for surgery

People having surgery are advised not to remove hair from the surgical site and are advised to have (or are helped to have) a shower, bath or bed bath the day before or on the day of surgery.

Quality statement 2: Antibiotic prophylaxis

People having surgery that requires antibiotic prophylaxis receive this in accordance with the local antibiotic formulary.

Quality statement 3: Patient temperature

Adults having surgery under general or regional anaesthesia have normothermia maintained before, during (unless active cooling is part of the procedure) and after surgery.

Quality statement 4: Intraoperative staff practices

People having surgery are cared for by an operating team that minimises the transfer of microorganisms during the procedure by following best practice in hand hygiene and theatre wear, and by not moving in and out of the operating area unnecessarily.

Quality statement 5: Information and advice on wound care

People having surgery and their carers receive information and advice on wound and dressing care, including how to recognise problems with the

wound, and who to contact if they are concerned.

The resources needed to achieve quality statements 1–2 and 4–5 are not expected to be significant, but organisations should follow NICE and NICE-accredited guidance when undertaking surgical procedures. Commissioners should be clear in their service specifications and seek assurance from providers that their practice is in line with the quality standard and its underpinning guidance.

Providers will need to locally determine whether additional warming equipment is needed to achieve quality statement 3. Commissioners and providers may wish to refer to the costing tools for [NICE clinical guideline 65: Perioperative hypothermia \(inadvertent\)](#) and [medical technology guidance 7: Inditherm patient warming mattress for the prevention of inadvertent hypothermia](#) for indicative costs.

Achieving the preoperative and intraoperative quality statements may contribute to reducing the number of surgical site infections, resulting in potential savings in treatment costs ranging from £2,100 to £20,000 per surgical site infection (see section 3 for more details on estimated costs). It may also increase organisational productivity and capacity to treat other patients.

4.2 Postoperative phase

Quality statement 3: Patient temperature

Adults having surgery under general or regional anaesthesia have normothermia maintained before, during (unless active cooling is part of the procedure) and after surgery.

Quality statement 6: Treatment of surgical site infection

People with a surgical site infection are offered treatment with an antibiotic that covers the likely causative organisms and is selected based on local

resistance patterns and the results of microbiological tests.

Potential resource impact related to quality statement 3 is discussed in section 4.1.

Table 2 (see section 2.1) shows the overall distribution of organisms reported as causing surgical site infections (inpatient and readmission) for all surgical categories in NHS hospitals in England in 2011/2012. Targeting treatment of surgical site infection to these causative organisms will significantly improve treatment outcomes and reduce prolonged hospital stays.

The most common antimicrobials prescribed in the NHS hospitals included in the 2011 [English national point prevalence survey on healthcare-associated infections and antimicrobial use](#) are combinations of beta-lactam antibiotics and enzyme inhibitors⁶. Using the correct antibiotics will reduce the risk of adverse drug reactions and associated costs. The cost of antibiotics is very small compared with other associated hospitalisation costs. It is estimated that each patient with a surgical site infection will need an additional hospital stay. This costs on average around £300 per day. Achieving these quality statements will improve patient experience and outcomes, and may also increase organisational productivity and capacity to treat patients.

The 2013/2014 payment by results guidance states that providers should not be reimbursed for readmissions judged to have been avoidable. This includes readmissions relating to surgical site infection, and as a result the associated costs are borne by the provider and not the commissioner.

⁶ Public Health England (2012) [English national point prevalence survey on healthcare-associated infections and antimicrobial use](#), 2011: preliminary data

4.3 Surveillance

Quality statement 7: Surveillance

People having surgery are cared for by healthcare providers that monitor surgical site infection rates (including post-discharge infections) and provide feedback to relevant staff and stakeholders for continuous improvement through adjustment of clinical practice.

The effective surveillance of surgical site (including post-discharge) infection rates and feedback to relevant staff and stakeholders may help to improve the efficient use of resources. Effective surveillance of surgical site infection requires good clinical engagement particularly after discharge. It may also help to increase organisational productivity.

The PHE [Surveillance of surgical site infections in NHS hospitals in England 2011/12](#) report states that 197 hospitals from 152 NHS Trusts participated in surgical site infection surveillance together with 10 independent NHS treatment centres. For the mandatory orthopaedic surveillance, 186 NHS hospitals from 148 NHS Trusts participated together with 10 independent sector NHS treatment centres.

All hospitals participating in PHE surgical site infection surveillance are required to follow the surveillance protocol outlining the definitions for identifying cases and follow-up methods. Training is provided to hospital staff to facilitate compliance with the surveillance protocol. Each hospital collects data prospectively on all eligible patients in a self-selected surgical category over a 3-month period. A set of demographic and operation-related data are collected for each eligible procedure, along with details of any infection meeting the case definition, and submitted via a secure web-based data entry screen. Patients are followed up for 30 days following the operation when a procedure did not involve an implant and for 1 year for procedures with an

implant. Procedures performed solely by endoscopic or laparoscopic approaches are excluded from the surveillance.

The PHE [Surveillance of surgical site infections in NHS hospitals in England 2011/12](#) report demonstrates that the majority of trusts already participate in mandatory surgical site infection surveillance. However, additional investment in IT and surveillance teams may be needed to expand surveillance or where there are no systems in place that enable cases of surgical site infection to be identified after discharge from hospital. Potential costs of these additional resources would depend on local circumstances.

The challenge around surveillance is two-fold, with commissioners and providers needing to do the following:

Commissioners should:

- review SSI data and identify areas of improvement
- review rates of surgical site infection where local providers appear to be providing a less than optimum service
- agree with providers a programme of improvement in priority areas and the monitoring arrangements for such programmes
- consider using [Commissioning for quality and innovation \[CQUIN\]: 2013/14 guidance](#) to incentivise optimum performance.

Providers should:

- review areas of apparent poor performance as evidenced by high numbers of surgical site infections
- share data with the appropriate surgical teams (feeding back performance to each speciality area) and relevant hospital trust boards
- understand the impact of surgical site infection on their cost base
- agree with commissioners a programme of improvement in priority areas.

Organisations can refer to the [costing report](#) for Prevention and control of healthcare-associated infections (NICE public health guidance 36), which discusses some of the costs associated with surveillance.

5 Other useful resources

5.1 Policy documents

- Department of Health (2013) [United Kingdom 5 Year Antimicrobial Resistance Strategy 2013–2018](#)
- Public Health England (2013) [Protocol for the surveillance of surgical site infection: surgical site infection surveillance service](#)
- Department of Health Advisory Committee on Antimicrobial Resistance and Healthcare Associated Infection (ARHAI) (2011) [Antimicrobial stewardship 'Start smart – then focus': guidance for antimicrobial stewardship in hospitals \(England\)](#)
- Department of Health (2010) [The Health and Social Care Act 2008: code of practice on the prevention and control of infections and related guidance](#)
- Department of Health (2010) [Uniforms and workwear: guidance on uniform and workwear policies for NHS employers](#)
- Department of Health (2009) [MRSA screening – operational guidance 3](#)
- Department of Health (2008) [MRSA screening - operational guidance 2](#)
- Department of Health (2009) [National decontamination programme: theatre support pack.](#)

5.2 Useful resources

- Public Health England (2012) [English national point prevalence survey on healthcare-associated infection and antimicrobial use, 2011: preliminary data.](#)

5.3 NICE implementation support

- [Surgical site infection: audit support](#)
- [Surgical site infection: costing statement](#)
- [Surgical site infection: slide set](#)

- [PH36 Prevention and control of healthcare-associated infections: costing report](#)
- [PH36 Prevention and control of healthcare-associated infections: costing template\)](#)
- [PH36 Prevention and control of healthcare-associated infections: NICE and the PHE - learning and development resource for trust boards](#)
- [A learning from practice podcast to support the NICE/PHE Quality improvement guide: prevention and control of healthcare-associated infections \(HCAIs\) in secondary care.](#)

5.4 NICE pathways

- [Prevention and control of healthcare-associated infections](#)
- [Patient experience in adult NHS services](#)
- [Inadvertent perioperative hypothermia](#)

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