NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE

QUALITY STANDARDS PROGRAMME

Quality standard topic: Surgical site infection

Output: Briefing paper

Introduction

This briefing paper presents a structured evidence review to help determine the suitability of recommendations from the key development sources listed below, to be developed into a NICE quality standard. The draft quality statements and measures presented in this paper are based on published recommendations from these key development sources:

Prevention and control of healthcare-associated infections (2011; NICE accredited). NICE public health guidance 36. Available from http://guidance.nice.org.uk/PH36.

Surgical site infection: Prevention and treatment of surgical site infection. NICE clinical guideline 74 (2008; NICE accredited). Available from www.nice.org.uk/CG85.

Management of inadvertent perioperative hypothermia in adults (2008; NICE accredited). Available from www.nice.org.uk/CG65 .

Structure of the briefing paper

The body of the paper presents supporting evidence for the draft quality standard reviewed against the three dimensions of quality: clinical effectiveness, patient experience and safety. Information is also provided on available cost-effectiveness evidence and current clinical practice for the proposed standard. Where possible, evidence from the clinical guideline is presented. When this is not available, other evidence sources have been used.

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1 Preoperative phase – patient preparation

1.1 NICE CG74 Recommendation 1.2.2 , 1.2.3 (key priorities for implementation), 1.2.1 and 1.2.4

1.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	1.2.2 Do not use hair removal routinely to reduce the risk of surgical site infection. 1.2.3 If hair has to be removed, use electric clippers with a single-use head on the day of surgery. Do not use razors for hair removal, because they increase the risk of surgical site infection. 1.2.1 Advise patients to shower or have a bath (or help patients to shower, bath or bed bath) using soap, either the day before, or on the day of, surgery. 1.2.4 Give patients specific theatre wear that is appropriate for the procedure and clinical setting, and that provides easy access to the operative site and areas for placing devices, such as intravenous cannulas. Consider also the patient's comfort and dignity.
Proposed quality statement	People who are about to have surgery are offered preoperative advice and assistance on personal preparation for surgery.
Draft quality measure	**Structure:** a) Evidence of local arrangements to ensure people who are about to have surgery are offered preoperative advice and assistance on personal preparation for surgery. b) Evidence of local arrangements to ensure that people who are about to have surgery do not have their hair removed routinely to reduce the risk of surgical site infection. **Process:** a) Proportion of people who are about to have surgery who are advised or assisted to have a bath using soap, either the day before, or on the day of, surgery. Numerator – The number of people in the denominator who have a bath using soap no earlier than 24 hours prior to surgery. Denominator – The number of people who are about to have surgery. b) Proportion of people who require hair removal for surgery who have their hair removed using electric clippers with a single-use head on the day of surgery Numerator – The number of people in the denominator who have their hair removed using electric clippers with a single-use head on the day of surgery

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	Denominator – The number of people having surgery who require hair removal c) Proportion of people having surgery who receive specified theatre wear Numerator – The number of people in the denominator who receive specified theatre wear. Denominator – The number of people having surgery

1.1.2 Clinical and cost-effectiveness evidence

1.2.2 Do not use hair removal routinely to reduce the risk of surgical site infection.

1.2.3 If hair has to be removed, use electric clippers with a single-use head on the day of surgery. Do not use razors for hair removal, because they increase the risk of surgical site infection.

CG74 finds that there is no evidence that hair removal in general influences the incidence of SSI, but it might be appropriate in some clinical circumstances. However, if hair has to be removed, there is evidence that shaving using razors increases the risk of SSI.

There is evidence from the literature that the use of razors to remove patients' hair prior to surgery is not cost-effective.

There is insufficient evidence on whether the timing of hair removal affects the risk of SSI but the GDG (guideline development group) for CG74 consensus was that where hair removal is required it should be undertaken as close to the time of surgery as possible, but clipping on the day of surgery may be preferable. Electric clippers with single-use disposable heads are the most cost-effective method of hair removal.

When considering the most cost-effective form of hair removal, evidence from a decision-analytic model taken from CG74 showed that the use of electric clippers for preoperative hair removal was cost-effective when compared with no hair removal, shaving using razors, or depilatory cream. The use of electric clippers was not only found to generate more quality-adjusted life years (QALYs) but was also found to be less expensive than these two interventions.

1.2.1 Advise patients to shower or have a bath (or help patients to shower, bath or bed bath) using soap, either the day before, or on the day of, surgery.

CG74 found one study which demonstrated a significant reduction in SSI associated with a chlorhexidine preoperative shower compared with no showering or a partial body wash, and, in one study, whole-body showering with chlorhexidine was compared with a partial wash. In a separate meta-

analysis, chlorhexidine was demonstrated to be no more effective than bar soap or detergent in the prevention of SSI and one RCT found it not to be a cost-effective intervention.

Therefore, while there is evidence to support the efficacy of preoperative showering as a measure to reduce the rate of SSI, there is evidence of no difference of effect on SSI rate between chlorhexidine as a cleansing agent and plain detergent or soap. In addition, chlorhexidine has been found not to be cost-effective.

None of the studies provided evidence to indicate whether the number and timing of preoperative showers affected the rate of SSI but the GDG view was that showering should take place as close to or on the day of surgery.

There is evidence to indicate that preoperative showering with a chlorhexidine detergent is not a cost-effective intervention to prevent SSIs when compared with preoperative showering with a detergent or bar soap

1.2.4 Give patients specific theatre wear that is appropriate for the procedure and clinical setting, and that provides easy access to the operative site and areas for placing devices, such as intravenous cannulas. Consider also the patient's comfort and dignity.

CG74 found that there is no evidence concerning patient theatre attire but operating department clothing should maintain the dignity and comfort of the patient and allow easy access to the operative site as well as other areas for placement of intravenous cannulas, catheters and epidurals, etc. Operative wear may also be preferred when the patient's own clothes may be at risk of contamination from blood, body and washout fluids.

1.1.3 Patient experience

Appropriate patient advice and assistance will help to maintain the dignity and comfort of the patient.

1.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National Commissioning Board) identifies the following priority area relating to patient safety:

The National Reporting and Learning System (NRLS) reports indicate that there are issues around the consistency of information given to patients pre

operatively around skin preparation (cleaning and shaving the surgical site) This is particularly evident for Day Case Surgery.

In addition, CG74 found evidence that preoperative shaving increases the risk of surgical site infection.

1.1.5 Current practice

Please see section 1.1.4 for current practice in relation to patient safety - no additional current practice information is presented.

1.1.6 Current indicators

No current indicators are presented.

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2 Preoperative phase – staff preparation

2.1 NICE CG74 Recommendation 1.2.16

2.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	1.2.6 Staff wearing non-sterile theatre wear should keep their movements in and out of the operating area to a minimum.
Proposed quality statement	People having surgery are operated on by staff who keep their movements in and out of the operating area to a minimum [when wearing non-sterile theatre wear]
Draft quality measure	**Structure:** Evidence of local arrangements to ensure people having surgery are operated on by staff who keep their movements in and out of the operating area to a minimum [when wearing non-sterile theatre wear] **Process:** The proportion of people having surgery who are operated on by staff who keep their movements in and out of the operating area to a minimum [when wearing non-sterile theatre wear] Numerator – The number of people in the denominator who are operated on by staff who keep their movements in and out of the operating area to a minimum [when wearing non-sterile theatre wear] Denominator – The number of people having surgery.

2.1.2 Clinical and cost-effectiveness evidence

CG74 states that it is good practice to discard all used theatre wear prior to leaving the operating area to prevent healthcare workers, patients and visitors being exposed to the risk of contamination. However, there is no evidence that this practice has any effect on the incidence of SSI.

CG74 GDG consensus was that staff should not leave the operating theatre suite wearing non-sterile theatre wear as this is important in the maintenance of theatre discipline and may therefore contribute to minimising the risk of SSI.

2.1.3 Patient experience

No patient experience information is presented.

2.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National

Commissioning Board) identifies the following priority area relating to patient safety:

Nil specific from NRLS although there are reports that suggest inadequate hand preparation of the surgical team.

2.1.5 Current practice

No current practice information is presented.

2.1.6 Current indicators

No current indicators are presented.

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3 Preoperative phase – antibiotic prophylaxis

3.1 NICE CG74 Recommendation 1.2.11, 1.2.12, 1.2.13 1.2.14 (hey priorities for implementation), 1.2.15, 1.2.16 and 1.2.17

3.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	1.2.11 Give antibiotic prophylaxis to patients before: • clean surgery involving the placement of a prosthesis or implant • clean-contaminated surgery • contaminated surgery. 1.2.12 Do not use antibiotic prophylaxis routinely for clean non-prosthetic uncomplicated surgery. 1.2.13 Use the local antibiotic formulary and always consider potential adverse effects when choosing specific antibiotics for prophylaxis. 1.2.14 Consider giving a single dose of antibiotic prophylaxis intravenously on starting anaesthesia. However, give prophylaxis earlier for operations in which a tourniquet is used. 1.2.15 Before giving antibiotic prophylaxis, consider the timing and pharmacokinetics (for example, the serum half-life) and necessary infusion time of the antibiotic. Give a repeat dose of antibiotic prophylaxis when the operation is longer than the half-life of the antibiotic given. 1.2.16 Give antibiotic treatment (in addition to prophylaxis) to patients having surgery on a dirty or infected wound. 1.2.17 Inform patients before the operation, whenever possible, if they will need antibiotic prophylaxis, and afterwards if they have been given antibiotics during their operation.
Proposed quality statement	People having clean surgery involving the placement of a prosthesis or implant, clean-contaminated surgery, or contaminated surgery are offered antibiotic prophylaxis before surgery.
Draft quality measure	**Structure:** Evidence of local arrangements to ensure people having clean surgery involving the placement of a prosthesis or implant, clean-contaminated surgery, or contaminated surgery are offered antibiotic prophylaxis before surgery. **Process:** The proportion of people having clean surgery involving the placement of a prosthesis or implant, clean-contaminated surgery, or contaminated surgery who receive antibiotic prophylaxis before surgery. Numerator – The number of people in the denominator receive antibiotic prophylaxis before surgery Denominator – The number of people having clean surgery involving the placement of a prosthesis or implant, clean-

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	contaminated surgery, or contaminated surgery.

3.1.2 Clinical and cost-effectiveness evidence

CG74 finds that many of the included studies used antibiotics that are not in current use and some were used for prolonged periods but comparable studies using modern antibiotics could not now be conducted ethically with the use of a placebo. In certain types of surgery (for example, orthopaedic prosthetic surgery) the GDG felt that even in the absence of adequate studies antibiotic prophylaxis would be appropriate.

The guideline states that antibiotics are inexpensive and are likely to be cost-effective compared with no antibiotic prophylaxis if they prevent SSI as the cost of treating an SSI is approximately £3,500.

The guideline finds there is evidence that a single dose at the time of operation is effective.

Where antibiotic prophylaxis is administered, a repeat dose is only indicated when there is excessive blood loss or if surgery is unexpectedly prolonged.

If there is significant unexpected contamination encountered during an operation or existing infection then prophylaxis should be converted into a treatment regime.

The risk of adverse events, C. difficile diarrhoea, resistance and drug hypersensitivity must be considered. The GDG for CG74 felt that the lack of evidence on the effectiveness of prophylaxis in the following procedures is insufficient reason to withhold antibiotic prophylaxis:

- breast reconstruction with/without implants
- abdominal hysterectomy (clean-contaminated)
- elective caesarean section
- uncomplicated appendicectomy in children.

In some of these groups (abdominal hysterectomy, elective caesarean section and appendicitis in children), unforeseen infection or contamination may be encountered that would make antibiotic prophylaxis appropriate. In breast reconstruction the presence of an implant may increase the risk of infection.

3.1.3 Patient experience

No patient experience information is presented.

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3.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National Commissioning Board) identifies the following priority area relating to patient safety:

NRLS suggests that there are issues with omitted/delayed doses of antibiotics both prophylactically and as treatment.

3.1.5 Current practice

A National Audit Office[1] (NAO) report states that "The increase in antimicrobial resistance among these pathogens is causing increasing concern because they account for a significant proportion of bloodstream infections and are difficult to treat (NAO, 2009, p.33). It also states that "Data on hospital prescribing is still not robust and the expected electronic prescribing system is still not in place. The lack of data limits hospital trusts' and others ability to monitor whether antibiotics are being used effectively"

The NAO report also recommends prudent antibiotic prescribing. It states that drug resistant infections are more common in hospitals where high levels of antibiotic use encourage organisms to develop resistance, and where close concentrations of people with increased susceptibility allow infections to spread. Inappropriate use of antibiotics is a key factor. Controlled and appropriate prescribing of antibiotics within trusts is therefore an essential part of any infection prevention strategy.

The NAO report states that trusts are improving compliance with good practice on antimicrobial prescribing by developing trust wide policies, and default prescriptions for antibiotics. Over 90 per cent of trusts are actively engaging their pharmacists to reinforce prescribing policy.

In a survey of doctors in the NAO report, 85 per cent agreed that they know and follow the prescribing guidance for their area. Nearly a third of trusts do not have an effective system for reviewing prescriptions of antimicrobials after a defined period.

3.1.6 Current indicators

No current indicators are presented.

[1] National Audit Office (2009) 'Reducing Healthcare Associated Infections in Hospitals in England'.

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4 Preoperative phase – screening for Staphylococcus aureus

4.1 NICE CG74 Recommendation 1.2.7

4.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	1.2.7 Do not use nasal decontamination with topical antimicrobial agents aimed at eliminating Staphylococcus aureus routinely to reduce the risk of surgical site infection.
Proposed quality statement	People having surgery are offered targeted screening for Staphylococcus aureus *Or* People having surgery [who are at risk of surgical site infection] are offered topical antimicrobial agents aimed at eliminating Staphylococcus aureus.
Draft quality measure	**Structure:** Evidence of local arrangements to ensure people having surgery are offered targeted screening for Staphylococcus aureus **Process:** The proportion of people having surgery who receive targeted screening for Staphylococcus aureus Numerator – The number of people in the denominator who receive targeted screening for Staphylococcus aureus Denominator – The number of people having surgery [and who have morbidities which make them susceptible to Staphylococcus aureus – then define this in definitions?] **Outcome:** Rates of Staphylococcus aureus surgical site infection

4.1.2 Clinical and cost-effectiveness evidence

CG74 finds that Mupirocin or chlorhexidine nasal decontamination does not reduce the overall rate of SSI. Nevertheless, in S. aureus carriers, there was a non-statistically significant reduction in SSIs caused by S. aureus when mupirocin was used.

An economic model suggested that there was considerable uncertainty about the cost-effectiveness of treating all patients with mupirocin nasal ointment to prevent SSI caused by S. aureus, and CG74 GDG consensus was that it should not be recommended, especially as the potential harm of increased antibiotic resistance had not been factored into the model.

4.1.3 Patient experience

No patient experience information is presented.

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4.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National Commissioning Board) identifies no priority areas relating to patient safety, although the reports suggest that specific information about patients infection status are not communicated in a timely way or at all.

4.1.5 Current practice

A report by the Health Protection Agency[2] (HPA) found that overall, MRSA as a cause of SSI represented 6% of total SSIs (inpatient cases alone or when combined with readmission cases). In terms of inpatient and readmission cases, this represents a decrease compared with the corresponding estimate for 2008/09. For inpatient detected cases, this also represents a decrease compared with estimates published in previous years. This could be partly explained by the impact of various national policies directed at controlling MRSA infection in hospitals, in particular pre-admission MRSA screening

A report by the National Audit Office[1] found that the evidence for the cost effectiveness of screening is mixed.

4.1.6 Current indicators

No current indicators are presented.

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[2] Health Protection Agency (2011) 'Surveillance of Surgical Site Infections in NHS hospitals in England'

5 Interoperative phase – decontamination

5.1 NICE CG74 Recommendations 1.3.7 (key priority for implementation), 1.3.1, 1.3.2, 1.3.8, 1.3.14, 1.3.15, 1.3.16

5.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	1.3.7 Prepare the skin at the surgical site immediately before incision using an antiseptic (aqueous or alcohol-based) preparation: povidone-iodine or chlorhexidine are most suitable. 1.3.1 The operating team should wash their hands prior to the first operation on the list using an aqueous antiseptic surgical solution, with a single-use brush or pick for the nails, and ensure that hands and nails are visibly clean. 1.3.2 Before subsequent operations, hands should be washed using either an alcoholic hand rub or an antiseptic surgical solution. If hands are soiled then they should be washed again with an antiseptic surgical solution. 1.3.8 If diathermy is to be used, ensure that antiseptic skin preparations are dried by evaporation and pooling of alcohol-based preparations is avoided. 1.3.14 Do not use wound irrigation to reduce the risk of surgical site infection. 1.3.15 Do not use intracavity lavage to reduce the risk of surgical site infection. 1.3.16 Do not use intraoperative skin re-disinfection or topical cefotaxime in abdominal surgery to reduce the risk of surgical site infection.
Proposed quality statement	*Either a high level statement such as;* People having surgery are operated on by clinicians who follow decontamination procedures *Or high level statement with one key point chosen* People having surgery are operated on by clinicians who follow decontamination procedures, including preparation of the surgical site using an antiseptic based preparation *Or choose the most important and split into individual statements e.g. 1.3.7 (the only KPI)* People having surgery receive preparation of the surgical site using an antiseptic based preparation immediately before incision.
Draft quality measure	**Structure:** Evidence of local arrangements to ensure people having surgery are operated on by clinicians who follow decontamination procedures, including preparation of the

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	surgical site using an antiseptic based preparation. . **Process:** The proportion of people having surgery who receive preparation of the surgical site using an antiseptic based preparation immediately before incision. Numerator – The number of people in the denominator who receive preparation of the surgical site using an antiseptic based preparation immediately before incision. Denominator – The number of people having surgery. **Outcome:** Rates of SSI?

5.1.2 Clinical and cost-effectiveness evidence

1.3.7 Prepare the skin at the surgical site immediately before incision using an antiseptic (aqueous or alcohol-based) preparation: povidone-iodine or chlorhexidine are most suitable.

1.3.8 If diathermy is to be used, ensure that antiseptic skin preparations are dried by evaporation and pooling of alcohol-based preparations is avoided.

CG74 found only one study of poor quality which addressed whether any skin preparation should be used prior to the skin incision and this was in an outpatient setting and showed no difference in the incidence of SSI. Most of the other comparisons involved small sample sizes from which interpretations cannot be made. However, the GDG considered skin preparation to have a clear theoretical basis and to be an important part of surgical discipline.

The GDG highlighted the need for safe theatre practice when using alcoholic antiseptic skin preparations prior to incision with diathermy.

There is no evidence of difference between chlorhexidine and povidone-iodine (either aqueous or alcohol-based preparation) and the costs are similar.

1.3.1 The operating team should wash their hands prior to the first operation on the list using an aqueous antiseptic surgical solution, with a single-use brush or pick for the nails, and ensure that hands and nails are visibly clean.

1.3.2 Before subsequent operations, hands should be washed using either an alcoholic hand rub or an antiseptic surgical solution. If hands are soiled then they should be washed again with an antiseptic surgical solution.

CG74 outlined a concern that the evidence for this recommendation is derived from only one RCT in clean and clean-contaminated surgery. It is difficult to extrapolate these results to all types of surgical procedures. Hand cleaning with alcohol rub or gel is less effective against the spores of C. difficile and therefore initial washing should be with an antiseptic surgical scrub solution using an alcoholic hand rub in between cases. In addition, gel can leave

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residual material on the hands. However, if the hands are contaminated, a full surgical scrub should be employed.

No evidence was identified in CG74 concerning the use of brushes or picks. However the GDG felt that if either was to be used during the surgical scrub procedure, they should be single-use. The economic analysis from this RCT may not have direct relevance to UK practice but suggests that the rubbing technique may be cheaper.

1.3.14 Do not use wound irrigation to reduce the risk of surgical site infection.

Evidence in CG74 from small surgery-specific studies up to 20–30 years old suggest that intraoperative subcutaneous wound irrigation with povidone-iodine or with saline under pressure reduces the incidence of SSI. Although this was considered to be an adjunct to antibiotic prophylaxis in contaminated surgery, current practice has improved to make this approach unnecessary for the prevention of SSI.

The single study that suggests that wound irrigation with saline under pressure reduces the incidence of SSI shows promise and should be researched further.

Although wound irrigation with povidone-iodine may reduce SSI, povidone-iodine is only licensed for use on intact skin.

1.3.15 Do not use intracavity lavage to reduce the risk of surgical site infection.

CG74 finds no evidence that intracavity lavage with antibiotics, other than a single small study of tetracycline lavage after contaminated surgery, reduces the incidence of SSI. There is some evidence that postoperative lavage of the perineal space with povidone-iodine reduces SSI.

Routine tetracycline intracavity lavage to reduce the risk of SSI should not be used with the advent of rational effective antibiotic prophylaxis.

A single poorly reported RCT suggests that use of pulsed saline lavage may reduce SSI incidence following orthopaedic surgery compared with washout with saline in a jug or syringe. However, this finding is specific to hemiarthroplasty surgery and is not generalisable to other types of surgery.

Improvements in current practice might have made wound and intracavity lavage unnecessary for the prevention of SSI.

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1.3.16 Do not use intraoperative skin re-disinfection or topical cefotaxime in abdominal surgery to reduce the risk of surgical site infection

CG74 found some evidence that spraying povidone-iodine into wounds, after colorectal surgery or surgery for perforated or gangrenous appendix in adults (both classified as contaminated surgery), prior to incisional closure, reduces the incidence of SSI. Although this interpretation is based on three studies that are underpowered, show some heterogeneity and do not reflect current clinical practice, the GDG for CG74 considered this to be of clinical relevance based on the meta-analysis. However, re-disinfection of the skin adjacent to the wound using alcoholic iodine solution has no effect.

As povidone-iodine is rapidly inactivated by exposure to blood, the GDG felt that there was a need for further research on the use of other antiseptics. In addition, povidone-iodine is only licensed for use on intact skin.

The insertion of a gentamicin-collagen implant into sternal wounds prior to closure after cardiac surgery appears to reduce the incidence of SSI, based on a meta-analysis of two studies from a single centre. However, there were concerns about the potential adverse effects of topical antibiotics on microbial resistance. The GDG for CG74 would prefer to see these results replicated in other centres and the long-term effects on microbial resistance should be evaluated.

The instillation of cefotaxime into wounds prior to closure appears to have no effect on SSI incidence after surgery for peritonitis.

5.1.3 Patient experience

No patient experience information is presented.

5.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National Commissioning Board) identifies the following priority area relating to patient safety:

NRLS reports suggest that there are particular problems with the preparation of the surgical site prior to surgery using an alcohol based antiseptic skin preparation. There is evidence to suggest that these solutions are not used appropriately, are allowed to pool or soak the surgical drapes and can cause skin burns or surgical fires when used in conjunction with diathermy.

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5.1.5 Current practice

CG74 states that improvements in current practice might have made wound and intracavity lavage unnecessary for the prevention of SSI.

The NAO[1] report points out the findings of an analysis into the National Observational Study to Evaluate the Cleanyourhands (NOSEC) campaign. This evaluation carried out surveys over the course of the campaign to measure performance against four criteria.

The main findings were:

- alcohol hand rub is at the point of care in nearly all wards in 96 per cent of trusts (83 to 90 per cent in earlier surveys);
- posters are available in all wards in 97 per cent of Trusts (75 to 89 per cent in earlier surveys);
- only 36 per cent of trusts believe the campaign has encouraged patients to ask healthcare workers if they have cleaned their hands (as in earlier surveys); and
- regular audit and feedback of hand hygiene compliance occurs in 91 per cent of trusts having risen gradually from 48 per cent.

The NAO[1] found that overall combined alcohol hand rub and soap procurement has tripled from 20 to 60ml per patient per day. Alcohol hand rub use was strongly associated with reductions in MRSA bloodstream infections. It is not effective for C. difficile which requires soap and water.

5.1.6 Current indicators

No current indicators are presented.

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6 Intraoperative phase – physical barriers

6.1 NICE CG74 Recommendation 1.3.3, 1.3.4, 1.3.5, 1.3.6, 1.3.17

6.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	1.3.3 Do not use non-iodophor-impregnated incise drapes routinely for surgery as they may increase the risk of surgical site infection. 1.3.4 If an incise drape is required, use an iodophor-impregnated drape unless the patient has an iodine allergy. 1.3.5 The operating team should wear sterile gowns in the operating theatre during the operation. 1.3.6 Consider wearing two pairs of sterile gloves when there is a high risk of glove perforation and the consequences of contamination may be serious. 1.3.17 Cover surgical incisions with an appropriate interactive dressing at the end of the operation
Proposed quality statement	People having surgery are protected from the risks of surgical site infection by physical barriers including sterile gowns in the operating theatre.
Draft quality measure	**Structure:** Evidence of local arrangements to ensure people having surgery are protected from the risks of surgical site infection by physical barriers including sterile gowns in the operating theatre. **Process:** a) The proportion of people having surgery who are operated on by a team who use sterile gowns in the operating theatre Numerator – The number of people in the denominator who are operated on by a team who use sterile gowns in the operating theatre Denominator – The number of people having surgery b) The proportion of people having surgery who are operated on by a team who cover surgical incisions with an appropriate interactive dressing at the end of the operation. Numerator – The number of people in denominator who are operated on by a team who cover surgical incisions with an appropriate interactive dressing at the end of the operation. Denominator – The number of people having surgery.

6.1.2 Clinical and cost-effectiveness evidence

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1.3.3 Do not use non-iodophor-impregnated incise drapes routinely for surgery as they may increase the risk of surgical site infection.

1.3.4 If an incise drape is required, use an iodophor-impregnated drape unless the patient has an iodine allergy.

CG74 found that although the use of non-iodophor-impregnated incise drapes is routine in some operations (such as prosthetic joint or graft surgery), they may marginally increase the risk of SSI. The GDG recognised that adhesive drapes may have a role in maintaining the integrity of the operative site/field.

1.3.5 The operating team should wear sterile gowns in the operating theatre during the operation.

CG74 states that it is good practice to use sterile gowns in the operating area to prevent healthcare workers and patients from being exposed to the risk of contamination. However, there is no evidence that this practice has any effect on the incidence of SSI. The GDG consensus was that the operating team should wear sterile gowns in the operating theatre as this is important in the maintenance of theatre discipline, and may therefore contribute to minimising the risk of SSI.

1.3.6 Consider wearing two pairs of sterile gloves when there is a high risk of glove perforation and the consequences of contamination may be serious.

CG74 found no available evidence that double-gloving reduces the risk of SSI or that glove perforation increases the risk of SSI. However, the GDG recognised current practice for double-gloving in certain circumstances when the risk of glove perforation and its consequences for contamination of the operative field (in prosthetic surgery for example) is high.

1.3.17 Cover surgical incisions with an appropriate interactive dressing at the end of the operation

CG74 found no robust evidence to support the use of a dressing in the immediate postoperative period for the prevention of SSI. However, it is generally accepted good clinical practice to cover the wound with an appropriate interactive dressing for a period of 48 hours unless otherwise clinically indicated, for example, if there is excess wound leakage or haemorrhage.

There is no robust evidence to support the use of one dressing over another. However, in the majority of clinical situations a semi-permeable film membrane with or without an absorbent island is preferable.

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The GDG consensus was that the use of gauze as a primary dressing should be avoided because of its association with pain and disruption of healing tissues at the time of dressing change.

6.1.3 Patient experience

CG74 GDG consensus was that the use of gauze as a primary dressing should be avoided because of its association with pain and disruption of healing tissues at the time of dressing change.

6.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National Commissioning Board) identifies no priority areas relating to patient safety, although there is evidence within the reports that there are issues of appropriate decontamination of equipment, particularly with reference to VCJD

6.1.5 Current practice

No current practice information is presented.

6.1.6 Current indicators

No current indicators are presented.

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7 Postoperative period – postoperative wound care

7.1 NICE CG74 Recommendation 1.4.8 [key priority for implementation], 1.4.1, 1.4.2, 1.4.3, 1.4.4, 1.4.5, 1.4.6, 1.4.7, 1.4.10, 1.4.11

7.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	1.4.8 Refer to a tissue viability nurse (or another healthcare professional with tissue viability expertise) for advice on appropriate dressings for the management of surgical wounds that are healing by secondary intention. 1.4.1 Use an aseptic non-touch technique for changing or removing surgical wound dressings. 1.4.2 Use sterile saline for wound cleansing up to 48 hours after surgery. 1.4.3 Advise patients that they may shower safely 48 hours after surgery. 1.4.4 Use tap water for wound cleansing after 48 hours if the surgical wound has separated or has been surgically opened to drain pus. 1.4.5 Do not use topical antimicrobial agents for surgical wounds that are healing by primary intention to reduce the risk of surgical site infection. 1.4.6 Do not use Eusol and gauze, or moist cotton gauze or mercuric antiseptic solutions to manage surgical wounds that are healing by secondary intention. 1.4.7 Use an appropriate interactive dressing to manage surgical wounds that are healing by secondary intention. 1.4.10 Do not use Eusol and gauze, or dextranomer or enzymatic treatments for debridement in the management of surgical site infection. The following recommendation has been taken unchanged from 'Guidance on the use of debriding agents and specialist wound care clinics for difficult to heal surgical wounds' (NICE technology appraisal 24). 1.4.11 Although there is no direct evidence to support the provision of specialist wound care services for managing difficult to heal surgical wounds, a structured approach to care (including preoperative assessments to identify individuals with potential wound healing problems) is required in order to improve overall management of surgical wounds. To support this, enhanced education of healthcare workers, patients and carers, and sharing of clinical expertise will be required.
Proposed quality statement	People who have had surgery are offered advice and assistance with dressing and cleansing their surgical wound

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Draft quality measure	**Structure:** Evidence of local arrangements to ensure people who have had surgery are offered advice and assistance with dressing and cleansing their surgical wound. **Process:** a) The proportion of people who have had surgery who are referred to a tissue viability nurse (or another healthcare professional with tissue viability expertise) for advice on appropriate dressings for the management of surgical wounds that are healing by secondary intention. Numerator – The number of people in the denominator who are referred to a tissue viability nurse (or another healthcare professional with tissue viability expertise) for advice on appropriate dressings for the management of surgical wounds that are healing by secondary intention. Denominator – The number of people who have had surgery whose wounds are healing by secondary intention. b) The proportion of people who have had surgery and who have surgical wound dressings who have their surgical wound dressings changed or removed using an aseptic non-touch technique Numerator – The number of people in the denominator who have their surgical wound dressings changed or removed using an aseptic non-touch technique. Denominator – The number of people who have had surgery and who have surgical wound dressing. c) The proportion of people who have had surgery who receive sterile saline for wound cleansing up to 48 hours after surgery Numerator – The number of people in the denominator who receive sterile saline up to 48 hours after surgery Denominator – The number of people who have had surgery and who are having their surgical wound cleansed d) The number of people who have had surgery who are advised they may shower safely 48 hours after surgery Numerator – The number of people in the denominator who are advised they may shower safely 48 hours after surgery Denomintor – The number of people who have had surgery e) The proportion of people who have had surgery who receive tap water for wound cleansing after 48 hours if the surgical wound has separated are has been surgically opened to drain pus Numerator – The number of people in the denominator who receive tap water for cleansing Denomintor – The number of people who have had surgery and whose surgical wound has been separated or surgically opened to drain pus

7.1.2 Clinical and cost-effectiveness evidence

1.4.1 Use an aseptic non-touch technique for changing or removing surgical wound dressings.

CG74 finds that there is no high-quality evidence available that supports a change to the current clinical practice of using an aseptic non-touch technique. However, the GDG agreed that aseptic nontouch techniques for removing or changing surgical wound dressings can minimise the risk of contaminating the site with additional microorganisms

1.4.2 Use sterile saline for wound cleansing up to 48 hours after surgery.

1.4.3 Advise patients that they may shower safely 48 hours after surgery.

1.4.4 Use tap water for wound cleansing after 48 hours if the surgical wound has separated or has been surgically opened to drain pus.

There appeared to be no obvious difference between showering and not showering in terms of the incidence of SSI.

CG74 GDG consensus was that only sterile cleansing solutions should be applied in the immediate postoperative period. However, where a surgical incision has separated or has been surgically opened to drain pus, several days after surgery, then the use of tap water may be considered for wound cleansing.

There is no evidence to show that postoperative showering during the hospital stay affects the rate of SSI. Therefore, patients can choose to shower safely according to local protocols.

1.4.5 Do not use topical antimicrobial agents for surgical wounds that are healing by primary intention to reduce the risk of surgical site infection.

CG74 finds there is insufficient evidence from one underpowered study to show any benefit of using topically applied chloramphenicol to prevent SSI.

1.4.6 Do not use Eusol and gauze, or moist cotton gauze or mercuric antiseptic solutions to manage surgical wounds that are healing by secondary intention.

1.4.7 Use an appropriate interactive dressing to manage surgical wounds that are healing by secondary intention.

1.4.8 Refer to a tissue viability nurse (or another healthcare professional with tissue viability expertise) for advice on appropriate dressings for the management of surgical wounds that are healing by secondary intention.

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1.4.10 Do not use Eusol and gauze, or dextranomer or enzymatic treatments for debridement in the management of surgical site infection.

Many of the trials identified in CG74 are old and the materials used do not reflect the underlying principles of modern wound management and debridement techniques, and are no longer routinely used.

1.4.11 Although there is no direct evidence to support the provision of specialist wound care services for managing difficult to heal surgical wounds, a structured approach to care (including preoperative assessments to identify individuals with potential wound healing problems) is required in order to improve overall management of surgical wounds. To support this, enhanced education of healthcare workers, patients and carers, and sharing of clinical expertise will be required

The recommendation has been taken unchanged from NICE Technology Appraisal 24, 'Guidance on the use of debriding agents and specialist wound care clinics for difficult to heal surgical wounds'. The decision was made by the developers of CG74 not to update the evidence review relating to specialist wound care services in NICE Technology Appraisal 24. This was on the grounds that it was of limited relevance to the revised scope of the guideline and was therefore not prioritised for review.

7.1.3 Patient experience

No patient experience information is presented.

7.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National Commissioning Board) identifies the following priority area relating to patient safety:

NRLS suggests that there are specific problems around the inspection and monitoring of wounds, inadequate supplies of dressings and lack of tissue viability input when required.

7.1.5 Current practice

No current practice information is presented.

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7.1.6 Current indicators

No current indicators are presented.

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8 Postoperative period –treatment of infections

8.1 NICE CG74 Recommendation 1.4.9

8.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	1.4.9 When surgical site infection is suspected (i.e. cellulitis), either de novo or because of treatment failure, give the patient an antibiotic that covers the likely causative organisms. Consider local resistance patterns and the results of microbiological tests in choosing an antibiotic.
Proposed quality statement	People who have had surgery and who are suspected of having surgical site infection are offered an antibiotic that covers the likely causative organisms
Draft quality measure	**Structure:** Evidence of local arrangements to ensure people who have had surgery and who are suspected of having surgical site infection are offered an antibiotic that covers the likely causative organisms **Process:** The proportion of people who have had surgery and who are suspected of having surgical site infection who receive an antibiotic that covers the likely causative organisms Numerator – The number of people in the denominator who receive an antibiotic that covers the likely causative organisms Denominator – The number of people who have had surgery and who are suspected of having surgical site infection **Outcome:** Rates of successful SSI treatment?

8.1.2 Clinical and cost-effectiveness evidence

As no systematic searches were conducted for this section of the guideline, the GDG's recommendations are based on its consensus view reflecting good practice in the antibiotic treatment of SSIs.

8.1.3 Patient experience

No patient experience information is presented.

8.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National Commissioning Board) identifies the following priority area relating to patient safety:

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NRLS suggests that there are issues with omitted/ delayed doses of antibiotics both prophylactically and as treatment.

8.1.5 Current practice

No current practice information is presented.

8.1.6 Current indicators

No current indicators are presented.

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9 Perioperative care – Maintaining patient homestasis

9.1 NICE CG65 (whole guideline), NICE CG74 recommendations 1.3.10, 1.3.11, 1.3.12, 1.3.13

9.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	1.1.1 Patients (and their families and carers) should be informed that: • staying warm before surgery will lower the risk of postoperative complications • the hospital environment may be colder than their own home • they should bring additional clothing, such as a dressing gown, a vest, warm clothing and slippers, to help them keep comfortably warm • they should tell staff if they feel cold at any time during their hospital stay. 1.1.2 When using any temperature recording or warming device, healthcare professionals should: • be trained in their use • maintain them in accordance with manufacturers' and suppliers' instructions comply with local infection control policies. 1.1.3 When using any device to measure patient temperature, healthcare professionals should: be aware of, and carry out, any adjustments that need to be made in order to obtain an estimate of core temperature from that recorded at the site of measurement be aware of any such adjustments that are made automatically by the device used. 1.2.1 Each patient should be assessed for their risk of inadvertent perioperative hypothermia and potential adverse consequences before transfer to the theatre suite. Patients should be managed as higher risk (see section 1.3.7) if any two of the following apply: • ASA grade II to V (the higher the grade, the greater the risk) • preoperative temperature below 36.0°C (and preoperative warming is not possible because of clinical urgency) • undergoing combined general and regional anaesthesia • undergoing major or intermediate surgery

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	• at risk of cardiovascular complications. 1.2.2 Healthcare professionals should ensure that patients are kept comfortably warm while waiting for surgery by giving them at least one cotton sheet plus two blankets, or a duvet. 1.2.3 Special care should be taken to keep patients comfortably warm when they are given premedication (for example, nefopam, tramadol, midazolam or opioids). 1.2.4 The patient's temperature should be measured and documented in the hour before they leave the ward or emergency department. 1.2.5 If the patient's temperature is below 36.0°C: o forced air warming should be started preoperatively on the ward or in the emergency department (unless there is a need to expedite surgery because of clinical urgency, for example bleeding or critical limb ischaemia) o forced air warming should be maintained throughout the intraoperative phase. 1.2.6 The patient's temperature should be 36.0°C or above before they are transferred from the ward or emergency department (unless there is a need to expedite surgery because of clinical urgency, for example bleeding or critical limb ischaemia). 1.2.7 On transfer to the theatre suite: • the patient should be kept comfortably warm • the patient should be encouraged to walk to theatre where appropriate. 1.3.1 The patient's temperature should be measured and documented before induction of anaesthesia and then every 30 minutes until the end of surgery. 1.3.2 Standard critical incident reporting should be considered for any patient arriving at the theatre suite with a temperature below 36.0°C. Induction of anaesthesia should not begin unless the patient's temperature is 36.0°C or above (unless there is a need to expedite surgery because of clinical urgency, for example bleeding or critical limb ischaemia). 1.3.3 Induction of anaesthesia should not begin unless the patient’s temperature is 36.0°C or above (unless there is a need to expedite surgery because of clinical urgency, for example bleeding or critical limb ischaemia). 1.3.4 In the theatre suite: • the ambient temperature should be at least 21°C while the patient is exposed • once forced air warming is established, the ambient temperature may be reduced to allow better working conditions. • using equipment to cool the surgical team should also be considered. 1.3.5 The patient should be adequately covered throughout the intraoperative phase to conserve heat, and exposed only

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	during surgical preparation. 1.3.6 Intravenous fluids (500 ml or more) and blood products should be warmed to 37°C using a fluid warming device. 1.3.7 Patients who are at higher risk of inadvertent perioperative hypothermia (see section 1.2.1) and who are having anaesthesia for less than 30 minutes should be warmed intraoperatively from induction of anaesthesia using a forced air warming device. 1.3.8 All patients who are having anaesthesia for longer than 30 minutes should be warmed intraoperatively from induction of anaesthesia using a forced air warming device. 1.3.9 The temperature setting on forced air warming devices should be set at maximum and then adjusted to maintain a patient temperature of at least 36.5°C. 1.3.10 All irrigation fluids used intraoperatively should be warmed in a thermostatically controlled cabinet to a temperature of 38-40°C. 1.4.1 The patient's temperature should be measured and documented on admission to the recovery room and then every 15 minutes. • Ward transfer should not be arranged unless the patient's temperature is 36.0°C or above. • If the patient's temperature is below 36.0°C, they should be actively warmed using forced air warming until they are discharged from the recovery room or until they are comfortably warm. 1.4.2 Patients should be kept comfortably warm when back on the ward. • Their temperature should be measured and documented on arrival at the ward. • Their temperature should then be measured and documented as part of routine 4-hourly observations. • They should be provided with at least one cotton sheet plus two blankets, or a duvet (see section 1.2.2). 1.4.3 If the patient's temperature falls below 36.0°C while on the ward: • they should be warmed using forced air warming until they are comfortably warm • their temperature should be measured and documented at least every 30 minutes during warming. CG74 1.3.10 Maintain patient temperature in line with 'Inadvertent perioperative hypothermia' (NICE clinical guideline 65). 1.3.11 Maintain optimal oxygenation during surgery. In particular, give patients sufficient oxygen during major surgery and in the recovery period to ensure that a haemoglobin saturation of more than 95% is maintained.

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	1.3.12 Maintain adequate perfusion during surgery. 1.3.13 Do not give insulin routinely to patients who do not have diabetes to optimise blood glucose postoperatively as a means of reducing the risk of surgical site infection.
Proposed quality statement	People having surgery are offered care which maintains patient homeostasis *Or 2 or 3 separate statements:* People having surgery have their oxygenation optimally maintained during surgery and in the recovery period to ensure a haemoglobin saturation of more than 95% is maintained *AND* People having surgery have their perfusion adequately maintained during surgery *AND* People having surgery should have a safe temperature recorded and maintained before and during surgery.
Draft quality measure	**Structure:** Evidence of local arrangements to ensure people having surgery are offered care which maintains patient homeostasis **Process:** a) The proportion of people having surgery who receive sufficient oxygen during major surgery [and in the recovery period]to ensure that a haemoglobin saturation of no more than 95% is maintained. Numerator – The number of people in the denominator receive sufficient oxygen during major surgery [and in the recovery period]to ensure that a haemoglobin saturation of no more than 95% is maintained Denominator – The number of people having [major?] surgery b) The proportion of people having surgery who maintain adequate perfusion during surgery Numerator – The number of people in the denominator who maintain adequate perfusion during surgery Denominator – The number of people having surgery c) The proportion of people having surgery who have their temperature recorded and maintained at a safe level [throughout the perioperative period?] Numerator – The number of people in the denominator who have their temperature recorded and maintained at a safe level [throughout the perioperative period?] Denominator – The number of people having surgery

9.1.2 Clinical and cost-effectiveness evidence

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1.3.10 Maintain patient temperature in line with 'Inadvertent perioperative hypothermia' (NICE clinical guideline 65).

No clinical and cost effectiveness evidence is presented as this recommendation is based on all recommendations in CG65.

1.3.11 Maintain optimal oxygenation during surgery. In particular, give patients sufficient oxygen during major surgery and in the recovery period to ensure that a haemoglobin saturation of more than 95% is maintained.

CG74 found there is concern over trial methodology and whether a fraction of inspired oxygen (FiO2) of 80% can be achieved in the recovery room. It is normal practice to ensure that oxygenation in the recovery room is optimal (sufficient to provide more than 95% haemoglobin saturation). Giving an FiO2 of more than 40% may not offer any further benefit. Patients with chronic obstructive pulmonary disease (COPD) might well be put at a disadvantage by an FiO2 above 40%.

1.3.12 Maintain adequate perfusion during surgery.

The GDG for CG74 recognised the importance of good hydration of the patient during the perioperative period. However, the administration of supplemental fluids once a good haemodynamic balance is maintained has not been proven to reduce the incidence of SSI.

1.3.13 Do not give insulin routinely to patients who do not have diabetes to optimise blood glucose postoperatively as a means of reducing the risk of surgical site infection.

Raised blood glucose can often occur after major surgery. However, CG74 found limited evidence to recommend the routine use of insulin infusion in patients who do not have diabetes to control blood sugar in an accepted normal postoperative range. There are two underpowered RCTs, only one of which shows a statistically significant risk for SSI after raised postoperative blood glucose.

9.1.3 Patient experience

No patient experience information is presented.

9.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National

Commissioning Board) identifies the following priority area relating to patient safety:

NRLS reports suggest that there are issues with maintaining patient's normothermia perioperatively and in the immediate post-operative phase.

9.1.5 Current practice

As stated in the patient safety section above, NRLS reports suggest that there are issues with maintaining patient's normothermia perioperatively and in the immediate post-operative phase.

A study by Wong (2011)[3] aimed to assess the incidence of inadvertent hypothermia amongst patients admitted to a general ICU. A retrospective analysis was conducted on all patients admitted to the ICU from January to June 2010. Out of 573 patients admitted, 186 had at least one incident of inadvertent hypothermia. Overall incidence of inadvertent hypothermia was 32.4%. Only 18.8% of hypothermic patients had documented use of a warming device.

9.1.6 Current indicators

No current indicators are presented.

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[3] Wong, A (2011) Inadvertant hypothermia in a general adult intensive care unit: An audit of NICE guidelines in over 500 patients 24th European Society of Intensive Care Medicine Annual Congress, 37 (ppS256), 2011.

10 Patient information

10.1 NICE CG74 Recommendations 1.1.1 (key priority for implementation), 1.1.2, 1.1.3 and 1.1.4

10.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	1.1.1 Offer patients and carers clear, consistent information and advice throughout all stages of their care. This should include the risks of surgical site infections, what is being done to reduce them and how they are managed. 1.1.2 Offer patients and carers information and advice on how to care for their wound after discharge. 1.1.3 Offer patients and carers information and advice about how to recognise a surgical site infection and who to contact if they are concerned. Use an integrated care pathway for healthcare-associated infections to help communicate this information to both patients and all those involved in their care after discharge. 1.1.4 Always inform patients after their operation if they have been given antibiotics.
Proposed quality statement	People having surgery and their carers are offered clear, consistent information throughout all stages of their care on the risks of surgical site infection, what is being done to reduce them and how they are being managed.
Draft quality measure	**Structure:** Evidence of local arrangements to ensure people having surgery and their carers are offered clear, consistent information throughout all stages of their care on the risks of surgical site infection, what is being done to reduce them and how they are being managed **Process:** The proportion of people having surgery or their carers who receive clear, consistent information throughout all stages of their care on the risks of surgical site infection, what is being done to reduce them and how they are being managed Numerator – The number of people in the denominator receive clear, consistent information throughout all stages of their care on the risks of surgical site infection, what is being done to reduce them and how they are being managed Denominator – The number of people having surgery or their carers

10.1.2 Clinical and cost-effectiveness evidence

CG74 found there is insufficient evidence about the specific information that should be given and how this should be provided for patients and carers to reduce their risk of SSI. Even if there is evidence from an RCT suggesting that

educating patients on the recognition of SSI might lead to more false positive SSI diagnoses, the GDG consensus was that it is preferable to deal with an overestimation of cases than with missing ones. The GDG considered that, as a minimum, patients and carers should be provided with information and advice about the risk of SSI associated with their particular type of procedure.

10.1.3 Patient experience

No patient experience information is presented.

10.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National Commissioning Board) identifies no priority areas relating to patient safety.

10.1.5 Current practice

There is a patient experience quality standard, which is designed to cover patient experience issues such as patient information.

10.1.6 Current indicators

No current indicators are presented.

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11 Environmental factors – Operating room facilities

11.1 NICE PH36 Quality improvement statement 10

11.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	QIS10 Trusts consider infection prevention and control when procuring, commissioning, planning, designing and completing new and refurbished hospital services and facilities (and during subsequent routine maintenance).
Proposed quality statement	People having surgery [in hospital?] are offered care in hospitals which are built and maintained in such a way as to minimise the risk of infection.
Draft quality measure	**Structure:** Evidence of local arrangements to ensure people having surgery [in hospital?] are offered care in hospitals which are built and maintained in such a way as to minimise the risk of infection. *The following are measures from PH36:* 1. Evidence of local arrangements for involving infection prevention and control teams in the planning, design, commissioning, completion and maintenance of services and facilities used by the trust. 2. Evidence of local procedures to ensure infection prevention and control is considered during the commissioning and handover of facilities. 3. Evidence of local procedures to ensure infection prevention and control is considered during the selection, commissioning and installation of equipment. 4. Evidence of local arrangements (for example, a standard operating procedure) for involving the infection prevention and control team (or other appropriate expertise) in the development of estates policy 5. Evidence of a planning process that 'designs out' potential infection risks and focuses on effective infection prevention. 6. Evidence of local arrangements to ensure estate management is considered and integrated into routine practice to reduce infection risk. 7. Evidence that estates and clinical staff, including temporary staff and subcontractors, receive annual training in infection prevention and control. This should include an assessment of their relevant competencies. 8. Evidence of mechanisms for consideration of current national estates policy and whether or not it should be incorporated into local practice

11.1.2 Clinical and cost-effectiveness evidence

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This statement is based on technical and procedural notes produced by the Department of Health.

11.1.3 Patient experience

No patient experience information is presented.

11.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National Commissioning Board) identifies no priority areas relating to patient safety, although there are reports that suggest an inadequate operating room environment, particularly regarding effective ventilation at times.

11.1.5 Current practice

No current practice information is presented.

11.1.6 Current indicators

No specific indicators but CCG Outcomes Indicator set the NHS Outcomes Framework looks at:

Reducing the incidence of avoidable harm

- Incidence of healthcare associated infection: MRSA (NHS OF 5.2.i)
- Incidence of healthcare associated infection: C difficile (NHS OF 5.2.ii).

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12 Organisational level infection control

12.1 NICE PH36 quality improvement statement (QIS) 1, 2, 3, 4, 5, 6, 7, 8, 9, 11

12.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	QIS1: Trust boards demonstrate leadership in infection prevention and control to ensure a culture of continuous quality improvement and to minimise risk to patients. QIS2: Trusts use information from a range of sources to inform and drive continuous quality improvement to minimise risk from infection QIS3: Trusts have a surveillance system in place to routinely gather data and to carry out mandatory monitoring of HCAIs and other infections of local relevance to inform the local response to HCAIs. QIS4: Trusts prioritise the need for a skilled, knowledgable and healthy workforce that delivers continuous quality improvement to minimise the risk from infections. This includes support staff, volunteers, agency/locum staff and those employed by contractors QIS5 Trusts ensure standards of environmental cleanliness are maintained and improved beyond current national guidance. QIS6 Trusts work proactively in multi-agency collaborations with other local health and social care providers to reduce risk from infection QIS7 Trusts ensure there is clear communication with all staff, patients and carers throughout the care pathway about HCAIs, infection risks and how to prevent HCAIs, to reduce harm from infection QIS8 Trusts have a multi-agency patient admission, discharge and transfer policy which gives clear, relevant guidance to local health and social care providers on the critical steps to take to minimise harm from infection QIS9 Trusts use input from local patient and public experience for continuous quality improvement to minimise harm from HCAIs. QIS11 Trusts regularly review evidence-based assessments of new technology and other innovations to minimise harm from HCAIs and antimicrobial resistance (AMR).
Proposed quality statement	People undergoing surgical treatment are offered care in hospitals which take responsibility and are accountable for continuous quality improvement in relation to infection prevention and control, from board to ward level.
Draft quality	**Structure:**

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measure	*All taken from PH36:* a) Evidence of local arrangements to ensure that people undergoing surgical treatment are offered care in hospitals which take responsibility and are accountable for continuous quality improvement in relation to infection prevention and control, from board to ward level. b) Evidence of local arrangements to ensure that the board is up-to-date with, and has a working knowledge and understanding of, infection prevention and control. c) Evidence of local arrangements to ensure that the board has an agreed set of key performance indicators for infection prevention and control which includes compliance with antibiotic prescribing policy. d) Evidence of local arrangements to ensure that agreed key performance indicators are used by the board to monitor the trust's infection prevention and control performance. e) Evidence of local arrangements to ensure that the trust's aims and objectives for infection prevention and control are included in the board's 'Balanced score card'. f) Evidence of local arrangements to ensure that a board member has been assigned to lead on infection prevention and control. g) Evidence of local arrangements to ensure that a board-approved infection prevention and control accountability framework exists. This includes evidence of specific responsibilities allocated to staff working in, or coming into contact with, clinical areas (reflected in their job descriptions and appraisals). h) Evidence of local arrangements to ensure that a mechanism is in place to report regularly to board meetings on important infection risks and the control measures that have been implemented. i) Evidence of local arrangements to ensure that the board has agreed an annual improvement programme on infection prevention and control which is linked to the business planning cycle and has identified actions and resources. j) Evidence of local arrangements to ensure that the trust promotes a 'self-governance' culture for infection prevention and control. This includes evidence that all staff, from board to ward, are accountable and take ownership and responsibility for continuous quality improvement. k) Evidence of local arrangements to ensure that the board is assured that monitoring mechanisms are in place in each clinical area, and that each area is accountable for compliance with relevant aspects of the code of practice. l) Evidence of local arrangements to ensure regular communication from the chief executive on the trust's expectation of patients, visitors and staff in relation to infection prevention and control. m) Evidence of local arrangements to ensure that the director

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	of infection prevention and control is involved in contract negotiations with commissioners on the key performance indicators for infection prevention and control. n) Evidence of local arrangements to ensure that the board demonstrates to patients, the public, staff and itself that it is making continuous progress towards meeting all relevant statements in this guide.

12.1.2 Clinical and cost-effectiveness evidence

These quality improvement statements are taken from PH36 and are based on the following sources:

- Department of Health (2010) The Health and Social Care Act 2008: Code of practice for health and adult social care on the prevention and control of infections and related guidance.
- Department of Health (2008) Board to ward: How to embed a culture of HCAI prevention in acute trusts.
- National Audit Office (2000) The management and control of hospital acquired infection in acute NHS trusts in England. London: National Audit Office.
- National Audit Office (2004) Improving patient care by reducing the risk of hospital acquired infection: a progress report. London: National Audit Office
- Department of Health (2006) The Health Act 2006: code of practice for the prevention and control of healthcare associated infections. London: Department of Health.
- National Audit Office (2009) Reducing healthcare associated infections in hospitals in England.

12.1.3 Patient experience

No patient experience information is presented.

12.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National Commissioning Board) identifies no priority areas relating to patient safety.

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12.1.5 Current practice

The Department of Health have a range of policies and measures designed to reduce rates of infection.

For example, mandatory surveillance for meticillin-resistant Staphylococcus aureus (MRSA) was introduced in 2001. In 2004, a target was introduced to reduce MRSA bloodstream infections by 50% by 2008 in all NHS acute and foundation trusts. With the introduction of the Health Act in 2006, for the first time it became a legal requirement to have systems in place to minimise the risk of HCAIs.

The National Audit Office report on reducing HCAIs[1] identified four systemic issues that still needed to be tackled locally and nationally to reduce infection rates. It highlighted the need: for a culture of continuous improvement for a whole-system approach, with clear structures, roles and responsibilities to ensure staff compliance with good infection control practice to monitor and record hospital prescriptions and the use of antibiotics.

12.1.6 Current indicators

No specific indicators but CCG Outcomes Indicator set the NHS Outcomes Framework looks at:

Reducing the incidence of avoidable harm

- Incidence of healthcare associated infection: MRSA (NHS OF 5.2.i)
- Incidence of healthcare associated infection: C difficile (NHS OF 5.2.ii).

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13 Patient surveillance – Surveillance of surgical site infection

13.1 NICE PH36 Recommendation quality improvement statement 3

13.1.1 Relevant NICE clinical guideline recommendations and proposed quality statement

Guideline recommendations	QIS3Trusts have a surveillance system in place to routinely gather data and to carry out mandatory monitoring of HCAIs and other infections of local relevance to inform the local response to HCAIs.
Proposed quality statement	People having surgery [in hospital?] can expect the trust to monitor infection levels across all service areas and use this information to adjust practice, where necessary.
Draft quality measure	**Structure:** Evidence of local arrangements to ensure hospital trusts monitor infection levels across all service areas and use this information to adjust practice, where necessary. PH36: 1. Evidence of an adequately resourced surveillance system with specific, locally defined objectives and priorities for preventing and managing HCAIs. The system should be able to detect organisms and infections and promptly register any abnormal trends. 2. Evidence of clearly defined responsibilities for the recording, analysis, interpretation and communication of surveillance outputs. 3. Evidence of arrangements for regular review of the surveillance programme to ensure it supports the trust's quality improvement targets for infection prevention. 4. Evidence of fit-for-purpose IT systems to support surveillance activity. This includes evidence of validation processes that ensure data accuracy and resources that can analyse and interpret surveillance data in meaningful ways. 5. Evidence of surveillance systems that allow data from multiple sources to be combined in real time (epidemiological, clinical, microbiological, surgical and pharmacy). 6. Evidence that surveillance systems capture surgical-site and post-discharge infections. 7. Evidence that trusts share relevant surveillance outputs and data with other local health and social care organisations to improve their infection prevention and control. 8. Evidence that systems are in place for timely recognition of incidents in different spaces (for example, wards, clinical teams, clinical areas, the whole trust).This includes evidence of

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	regular time-series analyses of data. 9. Evidence that the trust reports all outbreaks, serious untoward incidents (SUIs) and any other significant HCAI-related risk and incident to the local health protection unit. 10. Evidence that surveillance data in key areas is regularly compared with other local and national data and, where appropriate, is available at clinical unit level. 11. Evidence of a process for surveillance outputs to feed into accountability frameworks, inform audit priorities and be used to set objectives for quality improvement programmes in relation to HCAI prevention. 12. Evidence of surveillance outputs being analysed alongside comparative data to ensure continual improvement. 13. Evidence of surveillance outputs being fed back to relevant staff and stakeholders, including patients, in an appropriate format to support preventive action. 14. Evidence that the trust has developed, and regularly reviews, a hospital-wide incident plan to investigate and manage major infection outbreaks and HCAI incidents. This includes evidence that high-level managerial and clinical mechanisms are in place for coordinating, communication (including with other agencies) and deploying adequate resources.

13.1.2 Clinical and cost-effectiveness evidence

This quality improvement statement is based on several sources including:

- Department of Health (2010) The Health and Social Care Act 2008: Code of practice for health and adult social care on the prevention and control of infections and related guidance.
- Department of Health (2008) Board to ward: How to embed a culture of HCAI prevention in acute trusts.
- National Audit Office (2000) The management and control of hospital acquired infection in acute NHS trusts in England. London: National Audit Office.
- National Audit Office (2004) Improving patient care by reducing the risk of hospital acquired infection: a progress report. London: National Audit Office
- Department of Health (2006) The Health Act 2006: code of practice for the prevention and control of healthcare associated infections. London: Department of Health.

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- National Audit Office (2009) Reducing healthcare associated infections in hospitals in England.

13.1.3 Patient experience

No patient experience information is presented.

13.1.4 Patient safety

A patient safety incident is any unintended or unexpected incident which could have or did lead to harm for one or more patients receiving NHS care (see Appendix A). A comprehensive analysis of recent reported incidents (please see full accompanying report from the patient safety function of the National Commissioning Board) identifies no priority areas relating to patient safety.

13.1.5 Current practice

A report by the Care Quality Commission[4] states that 84% of trusts confirmed that clinical teams received analyses of mandatory surveillance data. However, the frequency of this varied, with a third saying that information was only disseminated when required for a specific purpose. Only 25% of respondents said that all surveillance data was held on a bespoke infection control IT system, a further 14% held the mandatory data only, and 61% had no bespoke system.

Seventy-two per cent of trusts in the report stated that they had a wider planned surveillance programme that also recorded infections not included within the mandatory scheme. Many trusts (88%) stated the availability of resources had been a factor in determining the development of their surveillance programme.

13.1.6 Current indicators

CCG Outcomes Indicator set the NHS Outcomes Framework looks at:

Reducing the incidence of avoidable harm

- Incidence of healthcare associated infection: MRSA (NHS OF 5.2.i)
- Incidence of healthcare associated infection: C difficile (NHS OF 5.2.ii).

Other indicators include:

- VSA03 – Incidence of C.difficile
- PS39 – Incidence of MRSA bacetreamia

[4] Healthcare commission (2007) 'Healthcare associated infection: what else can the NHS do?'

- HC21 – Surgical site infections – orthopaedic
- Health and Social Care Act (2008) Criteria 1 and 5
- Care Quality Commission Core Standard C1a

14 Appendix A: Definition of patient safety

The patient safety function of the National Commissioning Board defines patient safety in the following terms:

Every day more than a million people are treated safely and successfully in the NHS, but the evidence tells us that in complex healthcare systems things will and do go wrong, no matter how dedicated and professional the staff. When things go wrong, patients are at risk of harm, and the effects are widespread and often devastating for patients, their families and the staff involved. Safety incidents also incur costs through litigation and extra treatment, and in 2009/10 the NHSLA paid out approximately £827, 000,000 in litigation costs and damages. These incidents are often caused by poor system design rather than the error of individuals i.e. 'they are an accident waiting to happen'.

In short patient safety could be summarised as 'The identification and reduction of risk and harm associated with the care provided to patients 'or 'Preventing patients from being harmed by their treatment'. Examples of this might be 'operating on or removing the wrong organ, ten times the dose of an opioid, giving a colonoscopy to the wrong patient with the same name as someone else in the waiting room etc.' These risks are unlikely to be identified through clinical trials or traditional evidence bases and so other evidence sources, such as the National Reporting and Learning System, need to be analysed to highlight the risks and improve system development. This does not however give an accurate picture of prevalence in that way that methods such as casenote review may do.

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