NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Centre for Clinical Practice – Surveillance Programme

Clinical guideline
CG74: Prevention and treatment of surgical site infection

Publication date
October 2008

Previous review dates
3 year review: 2011

Surveillance report for GE
September 2014

Surveillance recommendation
GE is asked to consider the proposal to not update the clinical guideline CG74: Prevention and treatment of surgical site infection at this time. GE are asked to note that this ‘no to update’ proposal will not be consulted on.

Key findings

<table>
<thead>
<tr>
<th>Potential impact on guidance</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence identified from Evidence Update</td>
<td>✔️</td>
<td></td>
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<tr>
<td>Evidence identified from literature search</td>
<td></td>
<td>✔️</td>
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<tr>
<td>Feedback from Guideline Development Group</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td>Anti-discrimination and equalities considerations</td>
<td></td>
<td>✔️</td>
</tr>
<tr>
<td><strong>No update</strong></td>
<td>CGUT update</td>
<td>Standard update</td>
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<tr>
<td>✔️</td>
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</table>
NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE  
Centre for Clinical Practice – Surveillance Programme  
Surveillance review of CG74: Prevention and treatment of surgical site infection

Background information

Guideline issue date: October 2008  
3 year review: 2011 (no update)  
6 year review: 2014

NCC: Women's and Children's Health

Main conclusions from previous surveillance review

1. CG74 was previously reviewed for update in 2011 where no new evidence was identified which would change the direction of guideline recommendations. The review recommendation was that the guideline should not be considered for an update.

Outcome of six year surveillance review

2. The Evidence Update on CG74: Surgical site infection (June 2013) was used as a source of evidence for this surveillance review and considered new evidence from 13 April 2011 to 8 January 2013. New evidence that would impact on the guideline recommendations was identified in one area (antimicrobial-coated sutures) of the Evidence Update. However, further research is required into antibacterial versus non-antibacterial sutures in a range of surgical situations with the use of topical or systemic antibiotics as co-interventions before they can be recommended for inclusion in the guideline.
3. A literature search for systematic reviews was carried out between 8 January 2013 (the end of the search period for the Evidence Update) and 13 May 2014 and relevant abstracts were assessed.

4. No new evidence was identified through the literature search which would invalidate the guidance recommendations.

5. Clinical feedback on the guideline was obtained from six members of the Guideline Development Group (GDG) through a questionnaire. The majority of the GDG felt that CG74: Surgical site infection does not require an update and that there is no evidence that would change the current guideline recommendations.

6. All evidence from the previous surveillance review, the Evidence Update and the six year surveillance review was examined cumulatively and it was decided to not update this guideline. Whilst the evidence on antimicrobial-coated sutures is acknowledged, the evidence for benefit across a range of surgical situations is still unclear. Furthermore, ongoing UK based trials in this area have been identified that may potentially impact on the next surveillance review.

**Ongoing research**

7. Hip and knee replacement patients (n=2547) have been recruited into a large UK based RCT ([ISRCTN17807356](https://www.isrctn.com/) which is comparing standard versus triclosan coated sutures for closure of the surgical site wound. Another ongoing UK trial is being conducted in primary total hip and knee replacement patients (n=420) ([ISRCTN21430045](https://www.isrctn.com/)) comparing polyglactin 910 sutures with triclosan to conventional sutures (coated polyglactin 910). This study is due to be completed by August 2015. These studies are likely to provide better evidence on the effectiveness of antimicrobial sutures for wound closure.

**Anti-discrimination and equalities considerations**

8. None identified.

**Implications for other NICE programmes**

9. A Quality Standard for surgical site infection (QS49) was issued in October 2013.

10. A no to update decision is unlikely to impact on any of the Quality Statements within the Quality Standard.
**Conclusion**
11. Through the six year surveillance review of CG74: Surgical site infection no new evidence was identified which may potentially change the direction of current guideline recommendations. The proposal is not to update the guideline at this time.

**Surveillance recommendation**
12. GE are asked to consider the following proposal to not update the clinical guideline CG74: Surgical site infection at this time.

13. GE are asked to note that this ‘no to update’ proposal will not be consulted on.

Mark Baker – Centre Director  
Sarah Willett – Associate Director  
Louise Hartley – Technical Analyst

Centre for Clinical Practice  
September 2014
## Appendix 1 Decision matrix

<table>
<thead>
<tr>
<th>Conclusions of previous reviews</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
<th>Clinical feedback from the GDG</th>
<th>Conclusion of this 6-year surveillance review (July 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>74-01: When, how and what information should be provided for patients for the prevention of surgical site infection?</td>
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<tr>
<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
<td>One GDG member stated that current studies were examining value of care bundles. Details for these studies were not provided.</td>
<td>No relevant evidence identified</td>
</tr>
<tr>
<td>None identified</td>
<td></td>
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<tr>
<td>3-Year Review (2011)</td>
<td>No new evidence identified</td>
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<tr>
<td>None identified</td>
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<tr>
<td>74-02: What is the clinical effectiveness of preoperative showering to reduce surgical site infection?</td>
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<tr>
<td>Evidence Update (2013)</td>
<td>One meta-analysis (Chlebicki et al. 2013) including 16 studies was identified which examined whole-body preoperative bathing with chlorhexidine versus placebo or no bath for prevention of SSI (Chlebicki et al. 2013). It found that chlorhexidine bathing did not significantly reduce overall incidence of SSI when compared to placebo, soap, or no shower or bath.</td>
<td>One GDG member stated that there had been further RCTs looking at skin preparation. Another GDG member stated that there was now new evidence on skin preparation agents. Details for these studies were not provided.</td>
<td>The new evidence is unlikely to impact on the guideline recommendations as the evidence is inconclusive. The guideline advises patients to shower or have a bath (or help patients to shower, bath or bed bath) using soap, either on the day before, or on the day of, surgery.</td>
</tr>
<tr>
<td>An updated Cochrane review (Webster and Osborne 2012) was identified that compared preoperative showering and bathing with any antiseptic to a placebo, soap or no washing. No additional studies were identified for this update and authors concluded that chlorhexidine was no more beneficial than placebo, soap or no washing for surgical site infection (SSI).</td>
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</tbody>
</table>
Conclusions of previous reviews

Another systematic review (Kamel et al 2012) looked at preoperative showering in 3 RCTs and 4 cohort studies. The results for the effect on SSI were inconclusive and conclusions on the most effective antiseptic could not be made.

The evidence update concluded that the evidence for the benefits of preoperative washing and the evidence on the types of antiseptic wash to be used are inconclusive. Therefore it does not impact on the guideline.

3-Year Review (2011)

A Cochrane review (Webster and Osborne 2007) was identified that examined bathing or showering with antiseptics for preventing SSIs. Seven trials (n=10,157) were included and the antiseptic in all trials was 4% chlorhexidine gluconate. Overall, it was
<table>
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<tbody>
<tr>
<td>found that bathing with chlorhexidine compared to placebo or no pre-surgical washing did not significantly reduce SSI.</td>
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</table>

**74-03: What is the contribution to clinical effectiveness of the timing and number of preoperative washing for the prevention of surgical site infection?**

**Evidence Update (2013)**

A systematic review (Jakobsson et al. 2011) was identified that examined the effects of the number of antiseptic showers and type of antiseptic on SSI. It included both randomised and non-randomised clinical trials in any healthcare setting. Ten studies were identified that examined the effect of 1, 2 or 3 or more showers. No definitive conclusions could be drawn about the optimal number of preoperative showers.

**3-Year Review (2011)**

None identified

No systematic reviews were identified that examined the effectiveness and timing of preoperative washing. However, two systematic reviews that looked at postoperative bathing were identified.

The first systematic review (Toon et al. 2013) was a Cochrane review which looked at early postoperative bathing or showering compared to delayed postoperative bathing or showering in patients with closed surgical wounds. This found no statistically significant difference in the proportion of patients who

None identified

The new evidence is unlikely to impact upon the guideline recommendation which states: 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. This is because the available evidence is inconclusive. No new evidence was found in the current review about preoperative showering.
<table>
<thead>
<tr>
<th>Conclusions of previous reviews</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
<th>Clinical feedback from the GDG</th>
<th>Conclusion of this 6-year surveillance review (July 2014)</th>
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<td></td>
<td>developed SSIs between the two groups. The second systematic review (Dayton et al. 2013) examined the incidence of infection when patients had been allowed to wet their surgical incision site by showering or bathing before suture removal. It included nine studies and 2150 patients. The review found that the incidence of infection did not increase when allowing patients to shower or bathe as a part of their normal daily hygiene before suture removal when compared to those who were instructed to keep the site dry until suture removal.</td>
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</table>

74-04: Are preoperative showers with antiseptics cost-effective?

| Evidence Update (2013) | None identified | No new evidence identified | None identified | No relevant evidence identified |
### Conclusions of previous reviews

<table>
<thead>
<tr>
<th>Clinical feedback from the GDG</th>
<th>Conclusion of this 6-year surveillance review (July 2014)</th>
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<tbody>
<tr>
<td>None identified</td>
<td>None identified</td>
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</tbody>
</table>

### 74-05: What is the clinical effectiveness of preoperative hair removal from the operative site to reduce surgical site infection?

<table>
<thead>
<tr>
<th>Evidence Update (2013)</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
<th>Clinical feedback from the GDG</th>
<th>Conclusion of this 6-year surveillance review (July 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Cochrane review (Tanner et al 2011) was identified that examined preoperative hair removal versus no hair removal. Fourteen RCTs and quasi-RCTs were identified. It was found that there was no significant difference in SSIs when shaving (body or scalp hair) and clipping (scalp hair) were compared to no hair removal. However, shaving led to significantly more SSIs when compared to clipping. The evidence update suggested that this was consistent with current recommendations. 3-Year Review (2011) An RCT (Celik and Kara 2007) was identified in which 789 spinal surgery</td>
<td>No new evidence identified</td>
<td>None identified</td>
<td>The evidence found is supportive of the current guideline recommendation which states that hair removal should not be routinely used to reduce the risk of SSI.</td>
</tr>
</tbody>
</table>

No new evidence identified

None identified

The evidence found is supportive of the current guideline recommendation which states that hair removal should not be routinely used to reduce the risk of SSI.
<table>
<thead>
<tr>
<th>Conclusions of previous reviews</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
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</tr>
</thead>
<tbody>
<tr>
<td>patients were randomised to either saving before operation or no presurgical shaving. Postoperative infection developed in 4 patients in the shaved group and only 1 patient in the non-shaved group.</td>
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<tr>
<td><strong>74-06: Does the timing of preoperative hair removal affect the rate of surgical site infection?</strong></td>
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<tr>
<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
<td>None identified</td>
<td>No relevant evidence identified</td>
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<td>None identified</td>
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<tr>
<td><strong>3-Year Review (2011)</strong></td>
<td>No new evidence identified</td>
<td>None identified</td>
<td>No relevant evidence identified</td>
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<td>None identified</td>
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<tr>
<td><strong>74-07: What is the cost-effective method of hair removal?</strong></td>
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<tr>
<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
<td>None identified</td>
<td>No relevant evidence identified</td>
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<tr>
<td>None identified</td>
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<tr>
<td><strong>3-Year Review (2011)</strong></td>
<td>No new evidence identified</td>
<td>None identified</td>
<td>No relevant evidence identified</td>
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<td>None identified</td>
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<tr>
<td><strong>74-08: Does patient theatre attire affect the incidence of surgical site infection?</strong></td>
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<tr>
<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
<td>Clinical feedback from the GDG</td>
<td>Conclusion of this 6-year surveillance review (July 2014)</td>
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<tr>
<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
<td>None identified</td>
<td>No relevant evidence identified</td>
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<td>None identified</td>
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<tr>
<td>3-Year Review (2011)</td>
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<tr>
<td>None identified</td>
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<tr>
<td><strong>74-09: What is the clinical effectiveness of theatre staff wearing non-sterile theatre wear (scrub suits, masks, hats, overshoes) for the prevention of surgical site infection?</strong></td>
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<tr>
<td>Evidence Update (2013)</td>
<td>One Cochrane review was identified (Lipp and Edwards 2014). This assessed whether disposable surgical face masks worn by the surgical team during clean surgery prevented postoperative surgical wound infection. They found that there was no statistically significant difference in infection rates between the masked and unmasked group in any of the included trials.</td>
<td>One GDG member stated that there was new evidence about operating room practice to prevent SSI. However, management of the operating theatre environment and environmental factors are outside of the scope of this guideline.</td>
<td>The new evidence is unlikely to impact. The current guideline recommendation states that all staff should wear non-sterile theatre wear in all areas where operations are undertaken.</td>
</tr>
<tr>
<td>A Cochrane review (Lipp and Edwards 2012) was identified which examined whether surgical face masks could prevent SSI. Three RCTs and quasi-RCTs (n=2113) that compared infection rates with and without disposable face masks during clean surgery were included. All three trials showed the wearing of masks to have no significant effect on postoperative surgical wound infection when compared to no masks.</td>
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<tr>
<td>The evidence update concluded that this evidence is unlikely to affect CG74</td>
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</tbody>
</table>
### Conclusions of previous reviews

Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?

Clinical feedback from the GDG

Conclusion of this 6-year surveillance review (July 2014)

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**Conclusions of previous reviews**

- **3-Year Review (2011)**
  - An RCT (Webster et al. 2010) assessed the impact of non-scrubbed operating room staff not wearing surgical face masks on SSI. The study involved operating lists being randomised to either masks or no masks and patients being followed up for six weeks. Overall, it was found that SSI rates did not increase when a face mask was not worn.

**74-10: Does staff exiting and re-entering the operating room affect the incidence of surgical site infection?**

<table>
<thead>
<tr>
<th>Evidence Update (2013)</th>
<th>No new evidence identified</th>
<th>One GDG member stated that there was new evidence about operating room practice to prevent SSI. However, no further details were provided. Another GDG member stated that there was new evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>None identified</td>
<td></td>
<td>No evidence on this question was identified. The evidence provided by the GDG could not be included since the management of the operating theatre environment and environmental factors are outside the scope of this guideline.</td>
</tr>
</tbody>
</table>

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as it is insufficient and more research is needed.

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**Clinical feedback from the GDG**

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**Conclusion of this 6-year surveillance review (July 2014)**

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<table>
<thead>
<tr>
<th>Conclusions of previous reviews</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
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<td>that ultraclean air does not decrease SSI risk and stated that conventional theatres are cheaper to install and run compared to ultraclean ones. One GDG member stated that the movement of staff in/out of the theatre is not covered by the guideline but creates ongoing uncertainty and variation. Furthermore they thought that the application of this guideline to obstetric theatres should be made clearer as the risk of SSI after caesarean section is very high.</td>
<td>However, this guideline covers all patients undergoing all surgical procedures including those in obstetric theatres. Furthermore the movement of staff in/out of the operating theatre is covered in the guideline but no RCTs or systematic reviews on this topic have yet been identified. The current recommendation which states: staff wearing non-sterile theatre wear should keep their movements in and out of the operating area to a minimum is based on GDG consensus.</td>
</tr>
</tbody>
</table>

74-11: Does patient nasal decontamination to eliminate Staphylococcus aureus affect the rate of surgical site infection?

<p>| Evidence Update (2013) | A systematic review of 17 studies (Schweizer et al. 2013) assessing nasal decolonization or glycopeptide prophylaxis, or both. | None identified | The new evidence is unlikely to impact on the guideline recommendation which states that nasal decontamination with topical... |</p>
<table>
<thead>
<tr>
<th>Conclusions of previous reviews</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
<th>Clinical feedback from the GDG</th>
<th>Conclusion of this 6-year surveillance review (July 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Year Review (2011) None identified (2011)</td>
<td>for preventing Gram positive surgical site infections compared with standard care was identified. This found that nasal decolonisation had a significantly protective effect against SSIs associated with Staphylococcus aureus. In addition, a bundle including decolonisation and glycopeptide prophylaxis for only patients colonized with MRSA was also found to be protective against SSIs with Gram positive bacteria.</td>
<td>antimicrobial agents aimed at eliminating <em>Staphylococcus aureus</em> should not be routinely used to reduce SSI risk.</td>
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<tr>
<td>74-12: What is the contribution to clinical effectiveness of the timing of nasal decontamination for the prevention of surgical site infection?</td>
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<tr>
<td>Evidence Update (2013) None identified</td>
<td>No new evidence identified</td>
<td>None identified</td>
<td>No relevant evidence identified</td>
</tr>
<tr>
<td>3-Year Review (2011) None identified</td>
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<tr>
<td>74-13: What is the cost-effectiveness of mupirocin nasal ointment for the prevention of surgical site infection caused by Staphylococcus aureus?</td>
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<tr>
<td>Evidence Update (2013) No new evidence identified</td>
<td></td>
<td>None identified</td>
<td>No relevant evidence identified</td>
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</tbody>
</table>
### Conclusions of previous reviews

<table>
<thead>
<tr>
<th>Evidence Update (2013)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>None identified</td>
<td></td>
<td>None identified</td>
<td>Most of the evidence supports the guideline recommendation that mechanical bowel preparation should not be used routinely to reduce the risk of surgical site infection. Therefore there is no impact on the guideline.</td>
</tr>
<tr>
<td>3-Year Review (2011)</td>
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<tr>
<td>None identified</td>
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</table>

### 74-14: Does mechanical bowel preparation reduce the rate of surgical site infection?

- **Evidence Update (2013)**
  - None identified
  - 3-Year Review (2011)
  - A Cochrane review (Guenaga et al. 2009) was identified which investigated the effectiveness and safety of Mechanical bowel preparation (MBP) in colorectal surgery. They found no statistically significant evidence that patients would benefit from MBP.
  - Another meta-analysis (Gravante et al 2008) aimed to examine RCTs on the use of MBP before colorectal surgery versus no MBP. Twelve papers (n= A systematic review was identified which assessed comprehensive bowel preparation compared to limited bowel preparation in four studies (Yang et al. 2013). They found no significant difference between the comprehensive bowel preparation and limited bowel preparation in wound infection.
  - None identified
### Conclusions of previous reviews

<table>
<thead>
<tr>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
<th>Clinical feedback from the GDG</th>
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</table>

4919) were included. The authors concluded that the use of MBP before colorectal surgery should be reconsidered.

A systematic review (McCoubrey 2007) investigated MBP in elective colorectal surgery. It concluded that colorectal surgery was safe without MBP.

A second systematic review was also identified (Zhu et al. 2010) that examined the efficacy of mechanical bowel preparation with polyethylene glycol (PEG) in prevention of postoperative complications in elective colorectal surgery. Five RCTs comparing mechanical bowel preparation with PEG (PEG group) and no preparation were included. It was found that the use of mechanical bowel preparation with PEG did not significantly reduce SSI rate.

A meta-analysis (Slim et al. 2009) was
<table>
<thead>
<tr>
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<th>Conclusion of this 6-year surveillance review (July 2014)</th>
</tr>
</thead>
<tbody>
<tr>
<td>identified which assessed 14 RCTs (n=4859) comparing mechanical bowel preparation (MBP) with no MBP in colorectal surgery. It was found that when all surgical site infections were considered, the meta-analysis favoured no MBP. The authors concluded that MBP should not be used before colonic surgery.</td>
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<tr>
<td>A meta-analysis (Pineda et al. 2008) compared MBP with no MBP for patients undergoing elective colorectal resection. It found that MBP was not beneficial for wound infection in this population.</td>
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<tr>
<td>An RCT (Pena-Soria et al. 2008) assessed whether the omission of preoperative mechanical bowel preparation increased the rate of surgical-site infection and anastomotic failure after elective colon surgery with intraperitoneal anastomosis (n=129). It found that routinely omitting MBP did</td>
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<tr>
<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
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<tr>
<td>not result in higher SSI rates. An interim analysis of this RCT was also identified (Pena-Soria et al. 2007). This concluded that surgeons may have the same or worse SSI outcomes when MBP is routinely used for colorectal surgery with primary intraperitoneal anastomosis.</td>
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<tr>
<td>A post hoc analysis (Itani et al. 2007) examining the effect of polyethylene glycol (PEG) and sodium phosphate (SP) MBPs on the rates of postoperative SSIs was identified. It concluded that SP MBP, coupled with antibiotic prophylaxis may improve outcomes and reduce SSI compared to EG coupled with cefotetan antibiotic prophylaxis.</td>
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<tr>
<td>74-15: Does the removal of hand jewellery, artificial nails and nail polish reduce the incidence of surgical site infection?</td>
<td>Evidence update (2013) A Cochrane review was identified (Arrowsmith and Taylor 2012) that</td>
<td>No new evidence identified</td>
<td>None identified</td>
</tr>
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<td></td>
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<td>The guideline recommendation which states that the operating team should remove nail polish before operations will not be</td>
</tr>
<tr>
<td>Conclusions of previous reviews</td>
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<td>Clinical feedback from the GDG</td>
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<td>investigated the effects of wearing or removing nail polish and finger rings among surgical scrub teams. Whilst no trials were found that looked at the primary outcome of infection rate one RCT was identified that evaluated whether nail polish on scrub nurses affected the number of bacteria on hands after scrubbing before surgery. It was found that recent nail polish, old nail polish and no nail polish had no impact on the number of bacteria on hands before or after scrubbing. The evidence update concluded that there was insufficient evidence for an impact of nail polish on SSI rates and skin bacteria levels. 3-Year Review (2011) None identified</td>
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<td>impacted upon by the evidence identified in this review. This is because insufficient evidence was found.</td>
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74-16: What is the clinical effectiveness of parenteral or oral antibiotic prophylaxis for the prevention of surgical site infection compared with placebo or no antibiotic in patients undergoing surgery involving a skin incision?
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<th>Conclusions of previous reviews</th>
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<th>Clinical feedback from the GDG</th>
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<td>Evidence Update (2013)</td>
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<td>Breast cancer surgery</td>
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<tr>
<td>A Cochrane review (Bunn et al. 2012) that included 7 RCTs and controlled trials comparing preoperative or perioperative antibiotic prophylaxis with no antibiotic prophylaxis or placebo found prophylactic antibiotics to significantly reduce SSI incidence. The second study (Cabaluna et al 2013), an RCT, randomised breast cancer surgery patients (n=254) to either placebo or 1g intravenous cefazolin in 10ml sterile water 30 minutes before incision. No difference in infection rates within 30 days was found between groups. However, the authors then pooled their trial results with a subset of studies from a Cochrane review on mastectomy. In doing this, the effect of antibiotic prophylaxis on infections was no longer significant in this patient group</td>
<td>One GDG member stated that there was now new guidance on surgical prophylaxis. Another GDG member stated that there was now new evidence on MRSA decolonisation. No study or paper details were provided</td>
<td>The new evidence is unlikely to impact on the guideline recommendation which states that antibiotic prophylaxis should be given to patients before: clean surgery involving the placement of a prosthesis or implant; clean-contaminated surgery or contaminated surgery and should not be used routinely for clean non-prosthetic uncomplicated surgery. This is because the results from the new evidence are variable. They compare different antibiotics, are administered in different ways and are given in different doses. More evidence is needed on mixed treatment strategies for SSI prevention before considering it for inclusion in the current guideline. New evidence was found for the selective decontamination of the digestive tract during</td>
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<td>Neurosurgery</td>
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<tr>
<td>A meta-analysis (Liu et al. 2014) investigated third-generation cephalosporins as prophylactic antibiotics in neurosurgery. They identified five RCTs enrolling 2209 patients. No significant difference in SSI was identified between third-generation cephalosporins and the alternative regimen.</td>
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<td>Breast surgery</td>
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<tr>
<td>A systematic review (Hardwicke et al. 2013) was identified that looked at systemic antibiotics for aesthetic breast surgery. It found that overall, antibiotics significantly reduced SSI when compared to the control. Furthermore, for reduction mammoplasty a single intravenous</td>
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### Conclusions of previous reviews

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<tr>
<td><strong>Cardiac device implantation surgery</strong></td>
<td>One meta-analysis (Darouiche et al. 2012) was identified that looked at prophylactic antibiotics and antiseptics after electronic cardiac device implantation. From the 15 RCTs included it was found that SSI was significantly reduced with systemic antibiotics plus skin antisepsis one hour before surgery compared to no antibiotics or postoperative antibiotics.</td>
<td></td>
<td>gastrointestinal surgery. However, more research is needed to determine whether this procedure has any adverse effects and in what types of gastric surgery it is most effective. As such, this evidence does not impact upon the guideline.</td>
</tr>
<tr>
<td><strong>Hernia repair</strong></td>
<td>A Cochrane review (Sanchez-Manuel et al. 2012) including 17 RCTs of antibiotic prophylaxis in adults undergoing hernia repair found that overall antibiotic prophylaxis was beneficial for reducing SSI. Subgroup analysis showed reduced infection rates in repairs using a mesh implant but not in repairs performed without a</td>
<td></td>
<td>MRSA is an antibiotic resistant bacteria and the prophylaxis or management of these bacteria is outside of the scope of this guideline.</td>
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<tr>
<td><strong>Bariatric surgery</strong></td>
<td>A systematic review (Fischer et al. 2014) reviewed the use of cefazolin</td>
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CG74: Surgical site infection, Surveillance proposal GE document, September 2014
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<tr>
<td>mesh.</td>
<td>in prophylaxis of surgical wound infection (SSI) in bariatric surgery. The authors concluded that the use of cefazolin for surgical wound infection prophylaxis be recommended, however they suggested that further studies are needed in order to refine parameters including initial dose, re-dose, moment of administration and lasting of prophylaxis</td>
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<td>3-Year Review (2011)</td>
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<td><strong>Breast cancer surgery</strong></td>
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<tr>
<td>A Cochrane review (Bunn et al. 2009) was identified that investigated the effects of prophylactic antibiotics on the incidence of surgical site infection after breast cancer surgery. It was found that prophylactic antibiotics reduced the risk of surgical site infection in patients undergoing surgery for breast cancer.</td>
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<td><strong>Cardiac device implantation surgery or cardiac surgery</strong></td>
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<td>In a double blind RCT (n=1000) (de Oliveira et al. 2009) patients who presented for primary device implantation or generator replacement were randomised to prophylactic</td>
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<tr>
<td><strong>Hernia repair</strong></td>
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<tr>
<td>A meta-analysis (Mazaki et al. 2013) investigated antibiotic prophylaxis for SSI prevention after inguinal or femoral hernia repair. Twelve studies were included (n=1902). The results showed that antibiotic prophylaxis was beneficial in reducing the incidence of SSI.</td>
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<td><strong>Primary total hip or knee</strong></td>
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<td><strong>Antibiotics</strong> (cefazolin) or placebo. It was found that antibiotic prophylaxis significantly reduced infectious complications when compared to placebo.</td>
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| **Vascular surgery**  
An RCT (Friberg 2007) 2000 cardiac surgery patients were randomised to routine prophylaxis with intravenous isoxazolyl penicillin alone or to this prophylaxis combined with application of collagen-gentamicin (260 mg gentamicin) sponges within the sternotomy before wound closure. It was found that local gentamicin reduced the incidence of SWI caused by all major clinically important microbiological agents. |  |  |  |
| **Spinal surgery**  
An RCT (Patrick et al. 2010) (n=169) investigated adding anti-MRSA agents to current standard prophylaxis in low risk patients undergoing elective **arthroplasty**  
A meta-analysis was identified (Wang 2013) that assessed the antimicrobial efficacy and safety of antibiotic-impregnated bone cement (AIBC) for its prophylactic use in primary total joint arthroplasty. It included eight studies with 6381 arthroplasties. Results showed that compared with control (plain cement or systemic antibiotic) AIBC did not decrease the rate of superficial infection but there were significant differences in deep infection rate between the AIBC and control group. For the analysis of gentamicin and cefuroxime subgroups, the gentamicin was superior to the cefuroxime in reducing deep infection rate. |  |  |  |
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<tr>
<td>Vascular procedures. Adding anti-MRSA agents to the current regimen did not appear to reduce MRSA incidence.</td>
<td>A meta-analysis (Chiang et al. 2014) evaluated studies on the effectiveness of local vancomycin powder for decreasing SSIs. They included seven quasi-experimental studies, two cohort studies, and one randomized controlled trial altogether involving 5,888 surgical patients. The findings showed that local vancomycin powder was significantly protective against SSI, deep incisional SSIs and SSIs caused by S. aureus after spinal operations.</td>
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<td><strong>Hand surgery</strong></td>
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<td>A double-blind RCT (n=1340) was identified (Aydin et al. 2010) in which hand surgery patients were given either antibiotics or placebo. Results showed that the groups did not differ significantly with regards to infections. They also did not find any statistical differences between elective or emergency procedures or between crush and dirty wounds.</td>
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<td><strong>Caesarean section</strong></td>
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<td>A Cochrane review (Alfirevic et al. 2010) was identified. This review aimed to determine the balance of benefits and harms between different classes of antibiotic given prophylactically to</td>
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<td><strong>Plastic and reconstructive surgery</strong></td>
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<td>A meta-analysis was identified (Zhang et al. 2014) that assessed the efficacy and safety of antibiotic prophylaxis to prevent postoperative SSI in patients undergoing clean and clean-contaminated plastic and</td>
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<td>Conclusions of previous reviews</td>
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<td>women undergoing caesarean section. They included 25 RCTs of 6367 women. It was found that cephalosporins and penicillins had similar effects in reducing infections after caesareans and similar adverse effects. Furthermore, the effects were similar regardless of whether the caesarean was elective or emergency. A second Cochrane review (Smaill and Gillian 2010) investigating antibiotic prophylaxis in caesarean section was also identified. Eighty-six RCTs and quasi-RCTs comparing prophylactic antibiotics with no treatment were included. Overall, prophylactic antibiotics substantially reduced the incidence of febrile morbidity, wound infection, endometritis and serious maternal infectious complications. The findings were similar whether the caesarean section was elective or non-elective, and whether the antibiotic was given before or after umbilical cord reconstructive surgery. The authors concluded that antibiotic prophylaxis was favourable over placebo for SSI in clean plastic surgeries with high-risk factors and clean-contaminated plastic surgeries</td>
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<td><strong>Mixed Treatment</strong></td>
<td>A systematic review (Zheng et al. 2014) was identified that assessed the comparative efficacy of strategies used to prevent SSI in total hip replacement. It included 12 studies with 123788 total hip replacements. The results showed that the strategy of ‘systemic antibiotics + antibiotic-impregnated cement + conventional ventilation’ significantly reduced the risk of SSI compared with the referent strategy (no systemic antibiotics + plain cement + conventional ventilation). Furthermore, there was some...</td>
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<td>clamping. No conclusions could be made about other maternal adverse effects.</td>
<td>evidence that 'systemic antibiotics + antibiotic-impregnated cement + laminar airflow' could potentially increase infection risk compared with 'systemic antibiotics + antibiotic-impregnated cement + conventional ventilation'.</td>
<td>clinical feedback from the GDG</td>
<td>Conclusion of this 6-year surveillance review (July 2014)</td>
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<tr>
<td><strong>Laparoscopic cholecystectomy</strong></td>
<td>A systematic review (Choudhary et al. 2008) was identified which evaluated the efficacy of prophylactic antibiotics in low-risk patients undergoing laparoscopic cholecystectomy. Nine RCTs (n=1437) that randomised patients to prophylactic antibiotics or placebo/no antibiotics were included. No statistically significant reduction was seen in those receiving prophylactic antibiotics and those who did not for overall infectious complications, superficial wound infections, major infections, distant infections, or length of hospital stay. A Cochrane review (Sanabria et al. 2010) has also investigated antibiotic prophylaxis in this kind of surgery. In</td>
<td>clinical feedback from the GDG</td>
<td>Conclusion of this 6-year surveillance review (July 2014)</td>
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<td>A systematic review (Roos et al. 2013) was identified which compared selective decontamination of the digestive tract (SDD) with systemic antibiotics to systemic antibiotic prophylaxis alone for gastrointestinal surgery. It included eight RCTs (n=1668). The combination of SDD and systemic antibiotics was found to reduce the rate of postoperative infections when compared with antibiotics alone.</td>
<td>evidence that 'systemic antibiotics + antibiotic-impregnated cement + laminar airflow' could potentially increase infection risk compared with 'systemic antibiotics + antibiotic-impregnated cement + conventional ventilation'.</td>
<td>clinical feedback from the GDG</td>
<td>Conclusion of this 6-year surveillance review (July 2014)</td>
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</table>
## Conclusions of previous reviews

This review, 11 RCTs (n=1664) assessing antibiotic prophylaxis versus placebo or no prophylaxis for patients undergoing elective laparoscopic cholecystectomy were included. They found no statistically significant differences in the proportion of SSI or extra-abdominal infection between groups.

An RCT (n=100) enrolling patients undergoing laparoscopic cholecystectomy was also identified (Sharma et al. 2010). Patients were randomised to either a single dose of ceftriaxone or physiologic saline (placebo). The results showed that the incidence of SSI was similar between the two groups.

**Colorectal surgery**

In a Cochrane review (Nelson et al. 2009) the effectiveness of antimicrobial prophylaxis for the prevention of SWI in

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<td>This review, 11 RCTs (n=1664) assessing antibiotic prophylaxis versus placebo or no prophylaxis for patients undergoing elective laparoscopic cholecystectomy were included. They found no statistically significant differences in the proportion of SSI or extra-abdominal infection between groups. An RCT (n=100) enrolling patients undergoing laparoscopic cholecystectomy was also identified (Sharma et al. 2010). Patients were randomised to either a single dose of ceftriaxone or physiologic saline (placebo). The results showed that the incidence of SSI was similar between the two groups. <strong>Colorectal surgery</strong> In a Cochrane review (Nelson et al. 2009) the effectiveness of antimicrobial prophylaxis for the prevention of SWI in</td>
<td>Another systematic review assessing SDD was also identified (Abis et al. 2013). This review included six RCTs and one case-control trial investigating SDD in gastrointestinal surgery. Findings showed that SDD reduced infectious complications.</td>
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<td>patients undergoing colorectal surgery was investigated. One hundred and eighty two trials (n=30,880) and 50 different antibiotics were included. Meta-analysis showed a statistically significant difference in postoperative SWI when prophylactic antibiotics were compared to placebo/no treatment. No statistically significant difference was found when comparing short- and long-term duration of prophylaxis or single dose versus multiple dose antibiotics. Additional aerobic coverage and additional anaerobic coverage both showed statistically significant improvements in SWI as did combined oral and intravenous antibiotic prophylaxis when compared to intravenous alone or oral alone. One RCT (Sato et al. 2009) was identified that assessed the systematic use of antibiotics on postoperative infections in colorectal surgery. In this study, 100 patients were randomised to</td>
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### Conclusions of previous reviews

| Systemic antibiotic cefotiam or no antibiotics. The results showed no significant difference between the two groups for postoperative infection. |
| Another RCT (Fujita et al. 2007) was also identified. In this multicentre trial 384 patients undergoing colorectal surgery were randomised to a single dose of cefmetazole just before skin incision or 2 additional doses of cefmetazole every 8 hours after the first dose just before skin incision. It was found that the three dose regimen was significantly more effective in preventing SSI than the single dose regimen. |
| An additional RCT investigated short-term intravenous antimicrobial prophylaxis in combination with preoperative oral antibiotics on surgical site infection and methicillin-resistant Staphylococcus aureus infection in elective colon cancer surgery (Ishibashi |

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| Clinical feedback from the GDG |
| Conclusion of this 6-year surveillance review (July 2014) |</p>
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<td>et al. 2009). Two hundred and seventy five patients were randomly assigned to receive the intravenous administration of cefmetazol or cefotiam on the day of surgery or for 3 days. There were no significant differences between groups in SSI incidence or MRSA incidence. The efficacy of intravenous antimicrobial prophylaxis alone with combined oral and intravenous antimicrobial prophylaxis for SSI in patients undergoing elective colorectal surgery was studied in an RCT (Kobayashi et al. 2007). Results showed that the incidence of SSI was similar between the two groups. A meta-analysis was identified (Yamamoto et al. 2008) that investigated whether wound infection was lower in open surgery and whether perioperative intravenous antibiotic prophylaxis influenced wound infection</td>
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<td>development in laparoscopic surgery for colorectal cancer. It was found that wound infection rate was significantly lower in the laparoscopic surgery group than in the open surgery group. However, intra and postoperative antibiotic prophylaxis was found to have no positive effect on wound infection development.</td>
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<td><strong>Hip and knee replacement or surgery</strong></td>
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<td>A meta-analysis (AlBuhaim et al 2008) of RCTs investigated the effectiveness of antibiotic prophylaxis for wound infection reduction in total hip and knee replacement patients. Prophylaxis was compared with none, the administration of systemic antibiotics with that of those in cement, cephalosporins with glycopeptides, cephalosporins with penicillin-derivatives, and second-generation with first-generation cephalosporins. The meta-analysis</td>
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<td>found that the risk of wound infection was reduced by antibiotic prophylaxis when compared to no prophylaxis. No other comparisons showed a significant difference in clinical effect. An RCT (Tyllianakis et al 2010) assessed cefuroxime compared to two antistaphylococal agents (fusidic acid and vancomycin), for prophylaxis in total hip arthroplasty (THA) and total knee arthroplasty (TKA). No substantial difference was found between the three groups and so the authors did not recommend the use of specific antistaphylococcal agents for prophylactic use in primary THA and TKA. Another RCT (Kanellakopoulou et al. 2009) was also identified which looked at antibiotic prophylaxis in hip and knee surgery. In this study 616 patients undergoing hip or knee arthroplasty were randomised to either a single</td>
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<td>dose of 10mg/kg teicoplanin upon introduction of anaesthesia or to multiple doses of comparators for 4-6 days as decided by the attending physician. Single-dose teicoplanin was found to be more effective as prophylaxis compared to multiple doses of broad spectrum antimicrobials.</td>
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<td><strong>Proximal femoral and other closed long bone fractures</strong></td>
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<td>A Cochrane review (Gillespie and Walenkamp 2010) examined whether prophylactic antibiotics in people undergoing surgical management of hip or other closed long bone fractures reduced the incidence of SSI and other hospital-acquired infections. It included 23 RCTs or quasi-RCTs (n=8447) which compared antibiotic prophylaxis at the time of surgery with no prophylaxis, placebo of a regimen of a different duration. It was found that</td>
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Conclusions of previous reviews | Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion? | Clinical feedback from the GDG | Conclusion of this 6-year surveillance review (July 2014)

Single dose antibiotic prophylaxis significantly reduced deep SSI, superficial surgical site infections, urinary infections, and respiratory tract infections in people undergoing surgery for closed fracture fixation. Multiple dose prophylaxis had an effect of similar size on deep surgical site infection but no significant effects on urinary and respiratory infections.

**Hernia repair**

A single-centre RCT (Tzovaras et al. 2007) was conducted enrolling patients (n=386) undergoing elective inguinal hernia repair using a tension-free polypropylene mesh technique. Patients were randomised to either single dose amoxicillin and clavulanic acid or placebo. Results showed that antibiotic prophylaxis was not beneficial for the reduction of SSI.

A meta-analysis (Sanchez-Manuel et al. 2008) compared single dose antibiotic prophylaxis with placebo for the reduction of SSI following hernia repair. The meta-analysis included six RCTs (total n=1543) and showed that single dose antibiotic prophylaxis had a smaller effect on the prevention of SSI compared to multiple dose prophylaxis.
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<td>al. 2007) investigating antibiotic prophylaxis for hernia repair was also identified. This included 13 RCTs and 6825 patients. Results showed that there was no difference in infection rates between the prophylaxis and control groups.</td>
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<tr>
<td><strong>Wound, chest and urinary infections</strong></td>
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<td>A meta-analysis (Woodfield et al. 2009) was identified. It included 90 RCTs that investigated ceftriaxone as a first-line antibiotic for prevention of SSI. The meta-analysis showed that ceftriaxone reduced SSI, urinary tract infection and pneumonia when compared to other prophylactic antibiotics.</td>
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<td><strong>Neurosurgery</strong></td>
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<td>An RCT (Erman et al. 2007) was identified in which patients undergoing neurosurgery were randomly assigned to receive cefoperazone/sulbactam or</td>
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<td>Cefazoline for antimicrobial prophylaxis (n=483). It found no statistically significant difference between the groups in overall infection rate.</td>
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<td><strong>Urological surgery</strong></td>
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<td>The efficacy of cefotiam (CTM) and fosfomycin (FOM) for preventing infection associated with urologic surgery were assessed in an RCT (Ishizaka et al. 2007). Results showed that CTM and FOM were equally effective in preventing infection.</td>
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<td><strong>Orthognathic surgery</strong></td>
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<td>One study evaluated the prophylactic value single-dose antibiotic prophylaxis on postoperative infection in patients undergoing orthognathic surgery, compared to single-day antibiotics (Danda et al. 2010). The study included 150 patients who were assessed for rates of infection postoperatively after</td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
<td>Clinical feedback from the GDG</td>
<td>Conclusion of this 6-year surveillance review (July 2014)</td>
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<tr>
<td>Orthognathic surgery. Results showed that whilst there was a clinically significant difference between single-dose antibiotic prophylaxis and single-day antibiotic prophylaxis in reducing the rates of infection there was no statistically significant difference between groups.</td>
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**Minor dermatological surgery**

An RCT (n=972) investigating the effectiveness of a single application of topical chloramphenicol ointment in preventing wound infection after minor dermatological surgery was identified (Heal et al. 2009). Patients were randomised to a single topical dose of chloramphenicol or paraffin ointment (placebo). It was found that incidence of infection was significantly lower in the chloramphenicol group than in the control group.
<table>
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<tr>
<th>Conclusions of previous reviews</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
<th>Clinical feedback from the GDG</th>
<th>Conclusion of this 6-year surveillance review (July 2014)</th>
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<tbody>
<tr>
<td><strong>Appendectomy</strong></td>
<td>An RCT (Tijerina et al. 2010) was identified that assessed the effectiveness of systemic antibiotic application followed by either topical ionized solution (IS) or topical saline solution (placebo) as surgical site infection (SSI) prophylaxis in appendectomy for non-perforated appendicitis. Results showed topical IS prophylaxis to reduce SSI frequency but this result was not statistically significant.</td>
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<tr>
<td><strong>Clean or clean-contaminated surgical procedures</strong></td>
<td>A systematic review (Chambers et al. 2010) of RCTs compared a glycopeptide with an alternative antibiotic regimen for SSI prophylaxis in adults undergoing clean or clean-contaminated surgical procedures. Fourteen studies were included. No</td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
<td>Clinical feedback from the GDG</td>
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<tr>
<td>Evidence to support the use of glycopeptides in preference to other antibiotics for SSI and MRSA prevention was found.</td>
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<tr>
<td>74-17: For which types of surgery would prophylaxis be clinically and cost-effective? When should antibiotic prophylaxis be given – pre/per/postoperatively?</td>
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<tr>
<td>Evidence update (2013)</td>
<td>Timing</td>
<td>None identified</td>
<td>No new evidence was identified on the cost-effectiveness of antibiotic prophylaxis for SSI prevention. With regards to the timing of antibiotic prophylaxis, the identified evidence is unlikely to impact on the current recommendation. This is because the results are variable and inconclusive.</td>
</tr>
<tr>
<td><strong>Antibiotics in cardiac device implantation surgery.</strong></td>
<td>A meta-analysis investigated the timing of antibiotic prophylaxis in women undergoing caesarean section (Heesen et al. 2013). It included five studies and 1777 patients. It found no difference in wound infection between antibiotic administration before incision compared with antibiotic administration after cord clamping. A second meta-analysis investigated prophylactic antibiotics with cefazolin for caesarean delivery given before the procedure versus at cord clamping. Six RCTs</td>
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<td><strong>Antibiotics in tourniquet surgery</strong></td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
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<td>A Nigerian RCT (Akinyoola et al. 2011) was identified that examined the effect of administering antibiotics before and after tourniquet application. One hundred and six elective orthopaedic surgery patients (involving the lower limb) were randomised to intravenous cefuroxime administered either 5 minutes before limb exsanguination and tourniquet inflation or 1 minute after tourniquet inflation. Surgical site infection rates were significantly reduced in those receiving antibiotics after tourniquet inflation.</td>
<td>were included. Results showed that preoperative administration of cefazolin was not associated with a significant reduction in the risk of wound infection.</td>
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<td>3-Year Review (2011)</td>
<td>Baaqee et al. (2013) also investigated the timing of prophylactic antibiotic administration for caesarean section. They included six RCTs reporting on 2313 women. A nonsignificant reduction in wound infection rates was found with preoperative antibiotics when compared to intraoperative administration.</td>
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<tr>
<td>Cost-effectiveness</td>
<td>Another meta-analysis was identified which looked at extended antimicrobial prophylaxis after gastric cancer surgery compared to intraoperative antimicrobial prophylaxis (Zhang et al. 2013). Four RCTs were included with</td>
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<td>had undergone CABG. The study group received a single dose of gentamicin 2 mg/kg, rifampicin 600 mg and vancomycin 15 mg/kg, with three further doses of 7.5 mg/kg at 12-hour intervals. The control group received cefuroxime 1.5 g at induction and three further doses of 750 mg at 8-hour intervals. Results showed that longer and broader spectrum antibiotic prophylaxis significantly reduced sternal wound infection. Furthermore, the study group had a significantly lower cost of antibiotics and a significantly lower hospital cost. An RCT (Yinusa et al. 2007) was identified in which 89 patients undergoing implantation procedures were randomised into three groups: Rocephin (Ceftriaxone) 1g intravenously at induction and 1g 12 hours later, Zinacef (Cefuroxime) 1.5 g intravenously at induction and 750 mg</td>
<td>1095 patients. No statistically significant difference was found for SSI between the two groups. Furthermore, it was found that multiple-dose antimicrobial prophylaxis failed to decrease the incidence of surgical site infection compared with single-dose antimicrobial prophylaxis. A systematic review was identified (Racano et al. 2013) that compared short-term postoperative antibiotics to long-term postoperative antibiotics in long-bone tumor surgery. It found that deep infection rate was lower after long-term antibiotics compared to short-term antibiotics. Another systematic review was identified (Phillips et al. 2013) that examined antibiotic regimens and associated infection rates in breast reconstruction. They included 81</td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
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<td>six hourly for 12 hours and Ciprotab (ciprofloxacin) 400mg intravenously at induction and 200mg six hourly for 12 hours. It was found that all three drugs had similar efficacy and safety in preventing post-operative wound complications. However, the cost benefit ratio for the three drugs showed that treatment with Ciprotab was cheaper.</td>
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<tr>
<td><strong>Timing</strong></td>
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<td>An RCT (Nokiani et al. 2009) investigating the timing of prophylactic antibiotics in caesarean section was identified. In this randomised, double-blind trial 287 caesarean section patients were randomised to receive either 2gr cefazolin before incision or 2gr cefazolin after cord clamping. Results showed that rate of IV line need, neonatal sepsis and NICU admission were not significantly different between groups.</td>
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<tr>
<td>studies. No benefit was found in patients who received more than 24 hours of postoperative antibiotics compared to those who received less than 24 hours. A meta-analysis was identified (Zhang et al. 2014) that assessed the appropriate duration of antibiotic prophylaxis to prevent postoperative SSI in patients undergoing clean and clean-contaminated plastic and reconstructive surgery. They found that long-term administration of prophylaxis showed no evidence of a difference in risk of SSI compared with short-term antibiotic prophylaxis.</td>
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<td>An RCT (Gupta et al. 2010) was identified that assessed whether the duration of antibiotic prophylaxis influenced the rate of surgical site infection in patients undergoing coronary bypass grafting or valve replacement. Two hundred and thirty five patients were randomised to receive prophylactic antibiotic therapy for either 48 h or 72 h. It was found that the 48 h regimen was as effective as the 72 h regimen for preventing SSI.</td>
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<td>74-18: What is the clinical hand decontamination strategy to use between subsequent surgeries?</td>
<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
<td>No new evidence was identified on this question at this review point.</td>
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<td></td>
<td>3-Year Review (2011)</td>
<td>One GDG member stated that there had been further RCTs looking at skin preparation. Another GDG member stated that there was new evidence on skin preparation agents</td>
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</table>
### Conclusions of previous reviews

surgical hand preparation. A total of 3317 patients were included and follow-up was at 30 days. No statistically or clinically significant difference in SSI rate was found between the two groups and the cost difference between the two methods was small.

A Cochrane review (Tanner et al 2008) assessing the effects of surgical hand antisepsis on the number of surgical site infections was also identified. In this review, there was no difference between alcohol rubs which contained additional active ingredients and aqueous scrubs in reducing surgical site infections. However several studies measured the amount of bacteria on the hands before and after the surgical procedure and found that when using aqueous scrubs chlorhexidine was more effective in reducing the amount of bacteria than povidone iodine.

<table>
<thead>
<tr>
<th>Conclusions of previous reviews</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
<th>Clinical feedback from the GDG</th>
<th>Conclusion of this 6-year surveillance review (July 2014)</th>
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<td>surgical hand preparation. A total of 3317 patients were included and follow-up was at 30 days. No statistically or clinically significant difference in SSI rate was found between the two groups and the cost difference between the two methods was small.</td>
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<td>An RCT (Tanner et al. 2009) assessed whether nail picks and brushes were effective in providing additional decontamination during a surgical hand scrub. Operating department staff (n=164) were randomised to chlorhexidine only, chlorhexidine and a nail pick or chlorhexidine and a nail brush. No statistically significant differences in bacterial numbers were found between any two of the three intervention groups.</td>
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<tr>
<td>74-19: What is the cost-effective hand decontamination strategy to use between subsequent surgeries?</td>
<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
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<td>None identified</td>
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<td>3-Year Review (2011)</td>
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<td></td>
<td>None identified</td>
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<tr>
<td>74-20: Is the use of incise drapes clinically and cost-effective in reducing the incidence of surgical site infection?</td>
<td>Evidence Update (2013)</td>
<td>A systematic review was identified</td>
<td>One GDG member stated</td>
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<tr>
<td>Conclusions of previous reviews</td>
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<td>None identified</td>
<td>(Webster et al. 2013) which assessed the effect of adhesive drapes used during surgery on SSI. It included seven studies and 4195 patients. A significantly higher proportion of patients in the adhesive drape group developed a surgical site infection when compared with no drapes. Furthermore, Iodine-impregnated adhesive drapes had no effect on the SSI rate.</td>
<td>that there had been further RCTs conducted on drapes. Current guideline recommendation which states that non-iodophor-impregnated incise drapes should not be used routinely for surgery as they may increase the risk of SSI. As this is a six year review RCTs were not included. However, these will be examined in future reviews of this guideline.</td>
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<td>3-Year Review (2011)</td>
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<td>None identified</td>
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**74-21: Which incise drapes are clinically and cost-effective in reducing the incidence of surgical site infection?**

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<tr>
<th>Evidence Update (2013)</th>
<th>No new evidence identified</th>
<th>None identified</th>
<th>No relevant evidence identified</th>
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<td>None identified</td>
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<tr>
<td>3-Year Review (2011)</td>
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<td>74-22: Is the use of gowns clinically effective in reducing the incidence of surgical site infection?</td>
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<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
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<td></td>
<td>3-Year Review (2011)</td>
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<td></td>
<td>74-23: Is the use of reusable or disposable surgical drapes and gowns related to surgical site infection?</td>
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<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
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<td></td>
<td>3-Year Review (2011)</td>
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<tr>
<td></td>
<td>None identified</td>
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<td>74-24: Is there a difference between double- versus single-gloving affecting the incidence of surgical site infection?</td>
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<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
<td>None identified</td>
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<tr>
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<tr>
<td>None identified</td>
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<td>No relevant evidence identified</td>
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<tr>
<td>3-Year Review (2011)</td>
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<td>None identified</td>
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<td>None identified</td>
<td>No relevant evidence identified</td>
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74-25: Does the puncture rate of gloves correlate to the incidence of surgical site infection?

| Evidence Update (2013)         | No new evidence identified                                                                                                                                                                      | None identified                                                            | No relevant evidence identified                                                                                                                                                                |
| None identified                 |                                                                                                                                                                                                | None identified                                                            | No relevant evidence identified                                                                                                                                                                |
| 3-Year Review (2011)            |                                                                                                                                                                                                | None identified                                                            | No relevant evidence identified                                                                                                                                                                |
| None identified                 |                                                                                                                                                                                                | None identified                                                            | No relevant evidence identified                                                                                                                                                                |

74-26: Is the use of preoperative skin antiseptics clinically effective in the prevention of surgical site infection?

<p>| Evidence update (2013)         | A Cochrane review (Dumville et al. 2013) was identified that examined whether preoperative skin antisepsis immediately prior to surgical incision for clean surgery | Feedback from the GDG indicated that that there was new evidence on skin preparation agents. One GDG member stated that | From the current evidence it is uncertain which preoperative antiseptic is most effective. As such, this evidence is unlikely to have an impact on the guideline |
| Two reviews compared antiseptic skin preparations. The first, a Cochrane review (Hadiati et al 2012), compared |                                                                                                                                                                                                | None identified                                                            | No relevant evidence identified                                                                                                                                                                |</p>
<table>
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<th>Conclusions of previous reviews</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
<th>Clinical feedback from the GDG</th>
<th>Conclusion of this 6-year surveillance review (July 2014)</th>
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<td>different types of preoperative skin preparations for preventing infection after caesarean section. Five trials (n=1462) were identified. Two of these compared incisional drapes with no drapes in women who had received the same preoperative skin disinfection and 3 trials compared different antiseptic preparations. It was found that in those who received skin preparation preoperatively, the use of drapes versus no drapes did not make a significant difference to surgical site infection rate. There was also no significant difference in infection between those receiving parachlorometaxylenol and iodine versus iodine alone. Only one trial compared alcohol scrub plus iodophor drape to iodophor scrub without drape but no infections were reported in either group. The second review (Kamel et al 2012) examined antiseptic skin preparations prevented SSI and aimed to determine the comparative effectiveness of alternative antiseptics. It included 13 studies and 2623 participants. The antiseptics evaluated were found to differ between the included studies but all trials included some form of iodine. The results indicated that preoperative skin preparation with 0.5% chlorhexidine in methylated spirits was associated with lower rates of SSIs following clean surgery than alcohol-based povidone iodine paint. However the authors stated that this single study was poorly reported.</td>
<td>there had been changes in the cost of antiseptics as skin preparation agents. No details of studies were provided.</td>
<td>recommendation which states: 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.</td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
<td>Clinical feedback from the GDG</td>
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<td>and contained 5 RCTs, 2 cohort studies and 2 case-control studies. From these, no conclusions about the most effective antiseptic could be made. However, one RCT from this review showed that an alcohol based solution of chlorhexidine was better at preventing SSI than povidone-iodine antisepsis when used before clean-contaminated surgery. The evidence update concluded that it is uncertain from the current evidence what the most effective antiseptic for skin preparation before surgical incision is. These data are unlikely to affect this guidelines recommendation.</td>
<td>(n=1946). Results showed that vaginal preparation immediately before caesarean delivery significantly reduced the incidence of post-caesarean endometritis. An update of a Cochrane review (Lipp et al. 2013) included in the 3-year review was also identified. This assessed the effects of the preoperative application of microbial sealants (compared with no microbial sealant) on rates of SSI in people undergoing clean surgery. Two new trials were identified in the update. The results showed that there were fewer SSIs with the microbial sealant than with the control sealant. However, the authors concluded that due to the small number of patients in each trial and the quality of studies the findings should be treated with caution.</td>
<td>[\text{Clinical feedback from the GDG}]</td>
<td>[\text{Conclusion of this 6-year surveillance review (July 2014)}]</td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
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<td>no microbial sealant) on the rates of surgical site infection in people undergoing clean surgery. Only one trial was included. They concluded that there was insufficient evidence about the use of microbial sealants reducing SSI risk and stated that more rigorous RCTs were needed.</td>
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<td>A second Cochrane review was also identified (Edwards et al. 2009). This review examined whether preoperative skin antisepsis prevented postoperative surgical wound infection. Authors concluded that there was insufficient evidence to allow conclusions to be drawn.</td>
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<td>A meta-analysis (Fournel et al. 2010) examined the effect of intraoperative povidone-iodine application compared with no antiseptic solution on SSI rate. It included 24 RCTs (n= 5004). The analysis showed that povidone-iodine reduced SSI rates.</td>
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<td>Conclusions of previous reviews</td>
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<td>An RCT (n= 849) was identified (Darouiche et al. 2010) in which adults undergoing clean-contaminated surgery were randomised to preoperative skin preparation with either chlorhexidine-alcohol scrub or povidone-iodine scrub and paint. The overall rate of SSI was found to be significantly lower in the chlorhexidine-alcohol group. Furthermore, the chlorhexidine-alcohol was significantly more protective against superficial incisional infections and deep incisional infections but not against organ-space infections. Adverse events were similar between the groups. Another RCT was also identified (Towfigh et al. 2008). In this RCT, 177 hernia repair patients were randomised to either standard skin preparation with 10% povidone-iodine or skin preparation followed by cyanoacrylate-based liquid microbial sealant. Authors</td>
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CG74: Surgical site infection, Surveillance proposal GE document, September 2014
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<th>Conclusions of previous reviews</th>
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<tr>
<td>concluded that cyanoacrylate-based microbial sealant may be important in reducing wound contamination and potentially help prevent SSI.</td>
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<td>An RCT was identified (Sistla et al. 2010) that investigated the efficacy of chlorhexidine-ethanol and povidone-iodine in the reduction of colony counts of the skin flora and the incidence of surgical site infection in open hernia repair. The results showed that the antibacterial efficacy of chlorhexidine-ethanol and povidone-iodine was comparable.</td>
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<td>Another RCT (Paocharoen et al. 2009) assessed the reduction of bacterial colonisation and surgical wound infection when using povidone iodine and chlorhexidine (n=500). It found that the colonisation of bacteria and surgical wound infection were significantly reduced with chlorhexidine</td>
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The equivalency of two commonly used techniques of surgical skin preparation was investigated in an RCT (Ellenhorn et al. 2005). The study included 234 patients undergoing non-laparoscopic abdominal operations and patients were randomised to vigorous 5-minute scrub with povidone-iodine soap, followed by absorption with a sterile towel, and a paint with aqueous povidone-iodine or surgical site preparation with a povidone-iodine paint only. No difference was found between the two groups in infection rates.

A systematic review (Lee et al. 2010) was identified that compared the use of chlorhexidine with use of iodine for preoperative skin antisepsis to investigate their effectiveness in preventing surgical site infections (SSIs) and costs. Nine RCTs with 3614 patients were included. It was found that preoperative skin antisepsis with
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<td>chlorhexidine was more effective than preoperative skin antisepsis with iodine for preventing SSI and resulted in cost savings.</td>
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<tr>
<td>A meta-analysis (Noorani et al. 2010) was also identified. This was carried out in order to determine whether preoperative antisepsis with chlorhexidine or povidone-iodine reduced surgical-site infection in clean-contaminated surgery. Six eligible studies (n=5031) were identified. Results showed that chlorhexidine reduced postoperative surgical-site infection compared with povidone-iodine.</td>
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<tr>
<td>74-27: Does use of diathermy for surgical incisions affect the rate of surgical site infection?</td>
<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
<td>None identified</td>
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Evidence Update (2013)
A Cochrane review (Charoenkwan et al 2012) looked at the effect of abdominal incision with either a scalpel or electrosurgery on overall wound
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<tr>
<td>complications. Nine RCTs (n=1901) were identified. No difference in overall wound complication rate was seen between those whose incisions were made with a scalpel and those whose incisions were made with diathermy. The evidence update concluded that this is consistent with current recommendations. 3-Year Review (2011) None identified.</td>
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<tr>
<td><strong>74-28: Is patient perioperative oxygenation clinically effective for the prevention of surgical site infection?</strong></td>
<td><strong>Evidence Update (2013)</strong> A meta-analysis (Togioka et al. 2012) investigating perioperative oxygen supplementation was identified. Seven RCTs (n=2728) comparing perioperative oxygen supplementation (80% oxygen during surgery plus at</td>
<td><strong>One GDG member stated that there are now studies which show the irrelevance of increased perioperative oxygenation. Another GDG member stated that there were concerns about the efficacy and safety of the high inspired oxygen therapy. Therefore, the new evidence is unlikely to impact on of SSI.</strong></td>
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<td></td>
<td>A systematic review (Patel et al. 2013) compared high- and low-concentration oxygen in adults undergoing open abdominal surgery. They included six studies involving 2585 patients. No evidence of a reduction in SSIs with high-concentration oxygen</td>
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<td>least 2 hours postoperatively) with controlled oxygen concentrations (30% or 35% oxygen) were included. For SSI rate, no significant difference was found between groups. However, in two subgroup analyses supplemented oxygenation was found to be beneficial for SSI. The first of these involved excluding studies of neuraxial anaesthesia and the second only included studies of colorectal surgery. The evidence update stated that this evidence is unlikely to affect the recommendation in CG74 to give sufficient oxygen to maintain a haemoglobin saturation of more than 95%. However, as indicated by the sub-analyses in which neuraxial anaesthesia was excluded, and colorectal surgery only was included, there may be subgroups of patients for whom supplemented oxygenation could be beneficial. Further research to examine subgroups (incorporating was found. However, substantial heterogeneity was found between trials. A meta-analysis (Hovaguimian et al. 2013) was also identified which looked at intraoperative high inspired oxygen fraction on surgical site infection. It included 22 RCTs with 7001 patients. Authors concluded that intraoperative high FIO2 further decreased the risk of SSI in surgical patients receiving prophylactic antibiotics. Another meta-analysis (Klingel et al. 2013) investigated high compared to low inspired concentrations of oxygen on SSI risk in patients undergoing caesarean section. Five studies with 1966 patients were included. They found no evidence that the perioperative use of high concentrations of oxygen reduced practice recommended in the current guideline concerning the management of perioperative oxygenation. No details for studies were provided.</td>
<td>the current recommendation which states: 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</td>
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<td>appropriate monitoring of patient response in achieving optimal homeostasis) is needed.</td>
<td>surgical site infections in this group.</td>
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<td>3-Year Review (2011)</td>
<td>A meta-analysis of 4 RCTs was identified (Al-Niaimi and Safdar 2009) which investigated the efficacy of supplemental perioperative oxygenation versus standard care for SSI prevention in colorectal surgery. This showed that supplemental perioperative oxygenation was beneficial for SSI.</td>
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<td></td>
<td>A double-blind RCT (Gardella et al. 2008) was also identified. In this, 143 women undergoing caesarean delivery were randomised to either receive low- or high-concentration inspired oxygen via non rebreathing mask during the operation and for 2 hours after. Results showed that high-concentration perioperative oxygen did not decrease</td>
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Conclusions of previous reviews | Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion? | Clinical feedback from the GDG | Conclusion of this 6-year surveillance review (July 2014)

the risk of SSI.

Another RCT was also identified (Meyhoff et al. 2009). In this Danish RCT, 1400 patients undergoing acute or elective laparotomy were randomised to receive either 80% or 30% oxygen during and for 2 hours after surgery. No difference in SSI risk was found between the 80% oxygen group and the 30% oxygen group.

The PROXI-trial was also identified (Meyhoff et al. 2008) In this RCT 80% oxygen was compared to 30% oxygen during abdominal surgery and two hours after surgery. No significant difference in SSI rate was found between the 80% oxygen and the 30% oxygen.

74-29: What is the clinical effectiveness of perioperative perfusion and hydration for the prevention of surgical site infection?

Evidence Update (2013) | No new evidence identified | None identified | The evidence identified is broadly consistent with the
### Conclusions of previous reviews

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<th>Evidence Update (2013)</th>
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<tr>
<td>None identified</td>
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<td>recommendation in CG74 to maintain optimal oxygenation and adequate perfusion during surgery.</td>
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### Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?

| A meta-analysis (Dalfino et al 2011) assessed the effect of haemodynamic goal-directed therapy on SSI. It included 26 RCTs (n=4188) of goal-directed versus standard haemodynamic therapy in patients undergoing abdominal, cardiac or orthopaedic surgery. Goal-directed therapy was found to significantly reduce SSI rate compared to standard therapy. | One GDG member stated that there was new data on patient feeding and optimisation of blood glucose during surgery and in the immediate period after. Another GDG member stated that there was new evidence identified relates to patients with diabetes and so is unlikely to impact on the current guideline recommendation which states that insulin should not be routinely given to patients who do not have diabetes to optimise blood glucose. |
| 3-Year Review (2011) |                                |                                                        |
| None identified         |                                |                                                        |

### 74-30: What is the clinical effectiveness of strict blood glucose control to reduce surgical site infection?

<table>
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<th>Evidence Update (2013)</th>
<th>Clinical feedback from the GDG</th>
<th>Conclusion of this 6-year surveillance review (July 2014)</th>
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<tbody>
<tr>
<td>None identified</td>
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<td>recommendation in CG74 to maintain optimal oxygenation and adequate perfusion during surgery.</td>
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A systematic review (Sathya et al. 2013) was identified that assessed distinct peri-operative glycaemic targets and postoperative outcomes in patients with diabetes. Six studies met the inclusion criteria. Results showed that there...
Conclusions of previous reviews | Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion? | Clinical feedback from the GDG | Conclusion of this 6-year surveillance review (July 2014)

was identified which investigated the impact of glycaemic control in the peri-operative period on the incidence of surgical site infections. Five RCTs were included but meta-analysis was not possible due to heterogeneity. Overall, there was insufficient evidence to support strict glycaemic control versus conventional management for SSI prevention.

A prospective study was identified (Emam et al. 2010) in which 120 diabetic patients undergoing heart surgery were randomly assigned to either simple sliding scale or Braithwaite protocol to maintain BG levels of less than 200 mg/dl. It found that control of DM in the peri-operative period using the Braithwaite regimen led to reduced wound infection and hospital stay.

The clinical safety and outcome effects of intensive insulin therapy were no difference in wound infection between a moderate glycaemic target and a liberal target. This was also the case for moderate versus strict perioperative glycaemic target.

that there were concerns about the efficacy and safety of the practice recommended in the current guideline concerning the management of perioperative normoglycaemia. No study details were provided.

glucose postoperatively as a means of reducing the risk of SSI. No new evidence was found on patient feeding and the optimisation of blood glucose during surgery and in the immediate period after surgery.
## Conclusions of previous reviews

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<td>examined in an RCT (Bilotta 2009). Four hundred and eighty three patients undergoing brain surgery were randomised to intensive insulin therapy or conventional insulin therapy. Results showed that hypoglycaemic episodes were more frequent in those receiving intensive insulin therapy. However, the length of stay in ICU was shorter and the infection rate lower in the intensive insulin group. In another RCT, the relationship between different target levels of glucose and the clinical outcomes of patients undergoing cardiac surgery with cardiopulmonary bypass were assessed (Chan et al 2009). Patients were randomly allocated into two groups: target glucose level of 80-130 mg/dl or a target glucose level of 160-200 mg/dl. No differences were found between the groups in clinical outcomes including postoperative infection.</td>
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<td>Intensive insulin therapy was also compared to conventional intraoperative glucose management in another RCT (Gandhi 2007). It included adults with and without diabetes who were undergoing on-pump cardiac surgery. Mean glucose concentrations were found to be significantly lower in the intensive treatment group. However, there was an increased incidence of death and stroke in the intensive treatment group when compared to the conventional treatment.</td>
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**74-31: Is intracavity lavage or wound irrigation clinically effective for the prevention of surgical site infection?**

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<th>Evidence Update (2013)</th>
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<th>Clinical feedback from the GDG</th>
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<tr>
<td>None identified</td>
<td>A meta-analysis (Zhou et al. 2013) was identified which assessed whether closed-suction drainage was safe and effective in promoting wound healing and reducing blood loss and other complications</td>
<td>One GDG member stated that there have been further RCTs and meta-analyses in the field of antiseptics in lavage but provided no study details.</td>
<td>The evidence found is consistent with current guideline recommendations that wound irrigation and intracavity lavage should not be used to reduce the risk of SSI. No new evidence on antiseptics in lavage was found.</td>
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<tr>
<th>3-Year Review (2011)</th>
<th>Water versus sterile saline</th>
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<tr>
<td>A multi-centre RCT (Moscati et al. 2007) was identified that investigated wound infection rates for irrigation with tap water versus sterile saline before closure of wounds in the emergency department (n=715). The study showed that there was no difference between groups in wound infection rate.</td>
<td>compared with no-drainage in total hip arthroplasty. They found no significant difference between groups in the incidence of infection.</td>
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<td>The new evidence on wound drains is insufficient and so will not impact on the current guideline.</td>
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<td>Saline irrigation before wound closure</td>
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<td>One RCT (Gungorduk et al. 2010) investigated saline wound irrigation before wound closure versus no wound irrigation to prevent infection in 520 caesarean section patients. Saline wound irrigation was found not reduce the infection rate.</td>
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<td>Pulse lavage versus high pressure water jet</td>
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<td>One RCT (Granick et al. 2007)</td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
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<td>investigated the ability of a high-pressure parallel water jet (pressure range 5,025 to 7,360 psi) to pulse lavage (pressure 40 psi) in reducing wound bacterial counts (n=21). It was found that using high-pressure reduced wound bacterial counts.</td>
<td>but there was some evidence from one trial that a subcutaneous drain may increase wound infection compared to a sub-sheath drain.</td>
<td>Another Cochrane review (Gurusamy et al. 2013) looked at the effects on wound infection of inserting a wound drain during surgery to repair incisional hernias. Only one trial was found to be eligible for inclusion and this randomised 24 patients. No statistically significant differences between the groups for wound infection were found.</td>
<td>Another meta-analysis (Milone et al. 2013) was also identified. This looked at the association between the use of drain and the incidence of infections and recurrences after surgery. Authors concluded that drainage was not associated with better outcomes.</td>
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<td><strong>Antibiotic Irrigation</strong></td>
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<td>An RCT (Mirsharifi et al. 2008) investigated the effects of topical cephazolin in controlling infection of the site of surgery after non-laparoscopic cholecystectomy. One hundred and two patients were randomised to 1g of topical Cephazolin prior to the termination of the operation and controls and were followed for six weeks. No significant difference was found between the two groups in incidence of SSI.</td>
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<td><strong>Closed-suction drainage</strong></td>
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<td>A Cochrane review (Parker et al. 2007) was identified which evaluated the effectiveness of closed suction drainage systems for orthopaedic surgery. It included 36 (n= 5697) RCTs and quasi-randomised trials. Authors concluded that there was insufficient evidence to support the routine use of closed suction drainage in this type of surgery.</td>
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<td>One RCT (Kaya et al. 2010) was identified that compared closed-suction drainage versus no closed-suction drainage on SSI rate after abdominal operations (n=402). Results showed that the overall incisional SSI rate was comparable between the two groups.</td>
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74-32: Is the application of intraoperative topical antiseptics/antimicrobials before wound closure clinically effective in reducing surgical site infection rates?

<p>| Evidence Update (2013) | A meta-analysis was identified (Chang et al. 2013) which assessed gentamicin-impregnated | None identified | From the current evidence it is uncertain whether the application of intraoperative topical |</p>
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<td>(Schimmer et al. 2012). This investigated using a retrosternal gentamicin-collagen sponge to reduce wound complications after heart surgery. Patients were randomised to implantation with a collagen sponge (placebo) or to an identical sponge containing 2mg gentamicin sulphate. Significantly fewer infections within 30 days were seen with the gentamicin sponge than with the placebo sponge. However, no significant difference in the incidence of superficial sternal wound infection was found between the two sponges. The evidence update concluded that a gentamicin-impregnated sponge may reduce rates of deep sternal wound infection after cardiac surgery via median sternotomy, but stated that limitations of the evidence mean that the results are unlikely to affect CG74 3-Year Review (2011)</td>
<td>collagen sponges for SSI prevention. It included 15 RCTs. The results showed that gentamicin-impregnated collagen sponges significantly reduced SSI in both clean and clean-contaminated surgery. A systematic review (Mavros et al. 2013) investigated the use of antimicrobials as an adjunct to pilonidal disease surgery. Twelve studies were identified involving 1172 patients. Results showed that gentamicin collagen sponges were not beneficial when compared with no GCS.</td>
<td>antiseptics/antimicrobials before wound closure is effective in reducing SSI rates. Further research is needed in this area for this to be determined. As such, the new evidence does not impact on CG74.</td>
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<tr>
<td>An RCT (Bennett-Guerrero et al. 2010) investigated the effect of implantable gentamicin-collagen sponges on sterna wound infection following cardiac surgery (n=1502). Patients were randomised to insertion of 2 gentamicin-collagen sponges between the sternal halves at surgical closure or to no intervention. No effect on 90-day sterna wound infection rate was found for gentamicin-collagen sponges when compared to no intervention.</td>
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**74-33: Which type of suture is clinically effective as a closure method?**

**Evidence Update (2013)**

**Antimicrobial sutures**

Two systematic reviews were identified that looked at antimicrobial-coated sutures on SSI. The first meta-analysis (Wang et al. 2013) included 17 RCTs (n=3720) comparing sutures coated with triclosan to conventional uncoated.

**Antimicrobial sutures**

A systematic review (Sajid et al. 2013) assessed RCTs that compared the use of antibacterial sutures (ABS) for skin closure in controlling SSI. They found seven trials that met their inclusion criteria.

**Antimicrobial sutures**

One GDG member stated that there had been further RCTs on sutures. No study details were provided. Another GDG member provided details of two meta-analyses examining antimicrobial sutures. One of these was already included in our surveillance review. The

**Antimicrobial sutures**

Further research is needed into the effectiveness of antimicrobial sutures before they can be recommended for inclusion in the guideline. This is because on balance this area was quite small and the evidence still unclear. Ongoing trials have also been identified which are UK based that may potentially impact on the next.
Conclusions of previous reviews

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<tr>
<td>Sutures. For Incidence of SSI, triclosan coated sutures were found to be beneficial compared to uncoated sutures. However, sub-analysis by type of surgical procedure found the beneficial effect was only significant with abdominal surgery and not with breast or cardiac surgery. The second meta-analysis (Edmiston et al 2013) also investigated triclosan coated sutures. This included 13 RCTs (n=3568). Edmiston et al found that risk of infection was significantly reduced with the triclosan coated sutures versus uncoated sutures. The Evidence Update also highlights a large RCT investigating SSI reduction with triclosan coated sutures in hip and knee replacement ongoing in the UK. The evidence update concluded that the evidence suggests that antimicrobial-coated sutures may</td>
<td>that enrolled 1631 patients. Results showed that the use of ABS for skin closure in surgical patients was associated with a reduced risk of developing SSI. <strong>Staples versus sutures</strong> A panoramic meta-analysis (Hemming et al. 2013) was identified that assessed whether staples or sutures were better in improving patient and provider outcomes. Eleven systematic reviews were included. The authors concluded that there was no clear evidence on whether staples or sutures were better for SSI prevention. A meta-analysis (Sajid et al. 2013) was also identified. This compared the effectiveness of suture anastomosis versus stapled</td>
<td>other meta-analysis was an update of a review already included in the surveillance review but this update was not picked up in our search as it was published outside of our search date. The update included two extra studies which confirmed the predominant effect of antimicrobial sutures found in the previous review.</td>
<td>surveillance review. Further research is also required into antibacterial versus non-antibacterial sutures in a range of surgical situations and the use of topical or systemic antibiotics as co-interventions. As such, the new evidence is unlikely, at present, to impact on the guideline. For other types of suture the evidence is inconclusive as one study suggested that suture material did not influence wound outcome whilst another suggested that type of suture did reduce faecal contamination of the sterile field. Inconclusive evidence was also found for sutures versus other closure methods. Therefore, there is unlikely to be any impact on CG74. However, this evidence does relate to a research recommendation which asks: What type of closure method will reduce</td>
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<td>Conclusions of previous reviews</td>
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<td>reduce surgical site infection risk versus uncoated sutures, although this effect may be specific to particular types of surgery (such as abdominal procedures). This evidence may, therefore, have a potential impact on CG74.</td>
<td>anastomosis in patients undergoing ileostomy closure. Four RCTs were included. The rate of SSI was found to be similar between suture anastomosis and stapled anastomosis. Another meta-analysis compared wound infection after stapled or hand sutured ileostomy closure. This included 14 studies which involved 5084 patients. No significant difference was found between the groups in wound infection.</td>
<td>the risk of surgical site infection?</td>
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<tr>
<td><strong>Staples versus sutures</strong></td>
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<tr>
<td>A Cochrane review (Biancari and Tiozzo 2012) was identified that compared SSI rates after staples or sutures. They included 3 RCTs in their meta-analysis comparing staples with any type of suture for wound closure after saphenous vein harvesting for CABG. They found no significant difference in SSI rate between staples and sutures.</td>
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<td>The evidence update concluded that this evidence is unlikely to affect CG74 and stated that additional research focusing on specific patient groups is</td>
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<td><strong>Purse string approximation</strong></td>
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<td>A meta-analysis (McCcartan et al. 2013) was identified which assessed whether purse-string approximation was superior to primary skin closure following stoma reversal. Six studies were included. Results showed purse</td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
<td>Clinical feedback from the GDG</td>
<td>Conclusion of this 6-year surveillance review (July 2014)</td>
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<td>needed. Caesar Section Evidence Update (2013)</td>
<td>string approximation to significantly reduce SSI rate. <strong>Continuous skin sutures</strong> A Cochrane review was identified (Gurusamy et al. 2014) that compared the benefits and harms of continuous compared with interrupted skin closure techniques in participants undergoing non-obstetric surgery. This review included five RCTs (n=827). They found no significant difference between the groups in the proportion of participants who developed superficial surgical site infections. <strong>Primary vs delayed primary skin closure</strong> A meta-analysis was identified (Bhangu et al. 2013) that assessed whether delayed primary skin</td>
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<td>Internal members thought that the evidence concerning sutures and staples for wound closure from the caesarean section evidence update (2013) would be best placed within this guideline. This has been inserted below. The risk of wound complications when using staples or subcuticular suture closure for transverse skin incisions after caesarean delivery was investigated in a meta-analysis (Tuuli et al. 2011). This included five RCTs and one prospective cohort study that compared staples to subcuticular sutures. Results showed that whilst staple closer was faster it was associated with a greater risk of wound complications. This study was also</td>
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CG74: Surgical site infection, Surveillance proposal GE document, September 2014
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<th>Conclusions of previous reviews</th>
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<td>found during the 3-year review of this guideline.</td>
<td>closure of contaminated and dirty abdominal incisions reduced the rate of SSI compared with primary skin closure. It included eight RCTs which enrolled 623 patients. Results for a fixed effect model showed that delayed primary skin closure significantly reduced SSI risk. However when using a random effects model the effect was no longer significant.</td>
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<td>An updated Cochrane review (Mackeen et al. 2012) was also identified. This compared the effects of skin closure techniques and materials on maternal and operative outcomes after caesarean section. It was found that wound infection rates did not significantly differ between absorbable sutures and non-absorbable staples. However, incisions closed by staples were more likely to become separated and need reclosing.</td>
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<tr>
<td>3-Year Review (2011)</td>
<td><strong>Subcutaneous closure versus no subcutaneous closure</strong></td>
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<tr>
<td><strong>Antimicrobial sutures</strong></td>
<td>A Cochrane review (et al. 2014) investigated subcutaneous closure compared with no subcutaneous closure in participants undergoing non-caesarean surgical procedures. They included eight RCTs. From these studies they found no clear evidence of a difference between groups in superficial SSI.</td>
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<td>Conclusions of previous reviews</td>
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<td>dehiscence in 16 cases compared to seven cases in control breasts.</td>
<td><strong>Fibrin glue</strong>&lt;br&gt; A Cochrane review (Sajid et al. 2013) was identified that looked at the effectiveness of fibrin glue in people undergoing breast and axillary surgery. Eighteen RCT’s randomising 1252 patients were included. Results showed that fibrin glue did not influence the incidence of wound infection.&lt;br&gt;&lt;br&gt;A meta-analysis (Orci et al. 2014) also investigated fibrin glue but examined its effectiveness in pancreatic surgery. They included seven studies with 897 patients. Results showed that there was no difference between fibrin glue and standard care for wound infections.</td>
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<td>An RCT (Mingmalairak et al. 2009) evaluated the efficacy and safety of polygalactin 910 suture coated with triclosan compared with a traditional polygalactin 910 suture. Patients were undergoing an appendectomy operation with SSI being evaluated for 30 days, 6 months and 1 year. There was no statistical difference between the two sutures in SSI.</td>
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<tr>
<td><strong>Staples versus sutures</strong>&lt;br&gt; A Cochrane review (Biancari and Tiozzo 2010) was identified that examined the rates of SSI and wound dehiscence of staples and sutures for wound closure after saphenous vein graft harvesting for CABG. They identified three randomised studies. They found no evidence of a difference in SSI risk or wound dehiscence when staples are used.</td>
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<td>staples rather than sutures were used. A meta-analysis (Leung et al. 2008) was identified that compared stapled versus handsewn closures of loop ileostomies on wound infection. No statistically significant differences in wound infection were found between the two techniques. Another meta-analysis (Smith et al. 2010) investigated sutures versus staples for skin closure in orthopaedic surgery. It found that there was a significantly higher risk of developing a wound infection when the wound was closed with staples rather than sutures. This risk was specifically greater in patients who had undergone hip surgery. There was no significant difference between sutures and staples in the development of inflammation, discharge, dehiscence, necrosis, and allergic reaction.</td>
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<td>Conclusions of previous reviews</td>
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<td>The risk of wound complications when using staples or subcuticular suture closure for transverse skin incisions after caesarean delivery was investigated in a meta-analysis (Tuuli et al. 2011). This included five RCTs and one prospective cohort study that compared staples to subcuticular sutures. Results showed that whilst staple closer was faster it was associated with a greater risk of wound complications.</td>
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<td><strong>Skin adhesives versus sutures</strong></td>
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<td>A meta-analysis (Sajid et al. 2009) investigated the effectiveness of skin adhesives and sutures in the closure of laparoscopic port-site wounds. It found that there was no difference between the two wound closure methods for wound infection, wound dehiscence or patient satisfaction. However, statistically tissue adhesives were quicker in port-site wound closure as</td>
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<td>Conclusions of previous reviews</td>
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<td>compared with sutures.</td>
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**Absorbable sutures**

A single-blind RCT (n=174) was identified (Agrawal et al. 2009) that assessed wound outcome following closure of a laparotomy incision with either absorbable or non-absorbable sutures, using continuous or interrupted techniques, in peritonitis patients. Patients were randomised to 4 groups: Group A (Polygalactin-910 continuous suturing, n=40), B (Polygalactin-910 interrupted suturing, n=47), C (Polypropylene continuous suturing, n=45) and D (Polypropylene interrupted suturing, n=42) and were followed for 4 years. It was found that suture material and technique of closure did not influence wound outcome except for a significantly lower incidence of sinus formation when using non-absorbable sutures.
<table>
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<th>Conclusions of previous reviews</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
<th>Clinical feedback from the GDG</th>
<th>Conclusion of this 6-year surveillance review (July 2014)</th>
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<tr>
<td>Purse string sutures</td>
<td>An RCT (n=40) was identified (Biller et al. 2008) in which patients undergoing vaginal surgery involving the posterior compartment were randomised to either a purse-string suture closing the anus or to not receive the suture. No wound infections or healing abnormalities were noted in either group. However, this type of suture was found to be an effective way of reducing faecal contamination of the sterile field. Another RCT (n=61) compared purse-string closure technique with conventional linear closure for ileostomy wounds (Reid et al. 2010). The purse-string closure was found to result in significantly less SSIs compared with conventional closure.</td>
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Suture length
## Conclusions of previous reviews

### Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?

### Clinical feedback from the GDG

### Conclusion of this 6-year surveillance review (July 2014)

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<tr>
<th>An RCT (Millbourn et al. 2009) assessed wound complications following short stitch length versus long stitch length in midline incisions closed with a single-layer running suture (n=737). Multivariate analysis showed that long stitch length was an independent risk factor for SSI.</th>
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<td><strong>Subcutaneous sutures</strong></td>
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<td>In one trial, 415 patients undergoing elective abdominal surgery were randomised to subcutaneous suturing or no suturing (Paral 2007) to determine the necessity of suturing subcutaneous fat tissue. No statistically significant group differences in infectious wound complications were found between groups.</td>
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<td><strong>Interrupted versus continuous closure</strong></td>
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<td>A meta-analysis (Gupta et al. 2008)</td>
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<td>Conclusions of previous reviews</td>
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<td>was identified which investigated interrupted versus continuous methods of wound closure in abdominal wound repair. From the 23 included studies it was found that interrupted wound closure reduced the odds of dehiscence by half when compared to continuous wound closure. An RCT (Pauniah et al. 2010) evaluating if absorbable suturing increases the risk of complications in appendectomy wounds was identified. One hundred and ninety eight children were randomised into two groups; interrupted non-absorbable (NA) and continuous intradermal absorbable (A) sutures. Authors found no differences in the inflammatory markers or the appearance of the wound between the groups. The total wound infection rate was also low in both groups (2.3 % in NA Group and 1.3% in A Group).</td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
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<td><strong>Tissue adhesives</strong></td>
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<td>A Cochrane review (Coulthard et al. 2010) assessed the relative effects of various tissue adhesives and conventional skin closure techniques on the healing of surgical wounds. Fourteen RCTs were included (n=1152). The review found that sutures were significantly better than tissue adhesives for minimising dehiscence and were significantly faster to use.</td>
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<td><strong>Conventional gauze versus vacuum-assisted closure wound therapy</strong></td>
<td>An RCT (Moues et al. 2007) was identified that compared the efficacy of vacuum therapy to conventional moist gauze therapy (n=54) in full-thickness wounds. Results showed that vacuum therapy led to healthier wound conditions, a shorter duration of therapy and a significantly faster reduction in wound surface area.</td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
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<td><strong>Primary versus secondary intention</strong></td>
<td>A Cochrane review (Al-Khamis et al. 2010) investigated the effectiveness of open or closed surgical management for pilonidal sinus. The review included 26 studies. Results showed that there was no clear benefit of open healing over surgical closure (using stitches).</td>
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<td>An RCT (Duttaroy et al. 2009) was identified that investigated delayed primary closure of dirty abdominal incisions and its impact on SSI (n=81). The study found that delayed primary closure significantly lowered the rate of superficial SSI, fascial dehiscence and reduced the mean complete incision healing time and hospitalisation.</td>
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<td>Another RCT (Anteby 2009) was identified which investigated the effect of non-closure of the visceral and parietal peritoneum during caesarean</td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
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<td>section. In this trial 533 women were randomised to closure or non-closure. No significant differences were found between the two groups in the number of women with wound infection. Overall, closure of non-closure had no significant impact on postoperative analgesic usage or short-term morbidity. A randomised factorial trial (CAESAR study collaborative group 2010) investigated whether single- versus double-layer closure of the uterine incision, closure versus non-closure of the pelvic peritoneum and liberal versus restricted use of a subrectus sheath drain affected the risk of adverse outcomes in caesarean section. For each pair of interventions, there were no differences between the arms of the trial for maternal infectious morbidity. There were also no differences in any of the secondary morbidity outcomes and no significant</td>
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<td>Conclusions of previous reviews</td>
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<td>adverse effects of any of the techniques used.</td>
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<td>74-34: Which type of suture is clinically and cost-effective as a closure method?</td>
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<tr>
<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
<td>One GDG member stated that there have been changes to the cost of antimicrobial sutures but no further details were provided</td>
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<tr>
<td>None identified</td>
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<td>3-Year Review (2011)</td>
<td>None identified</td>
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<td>74-35: Which type of dressing is advocated for immediate postoperative wound/incision coverage? Is it clinically and cost-effective to use interactive dressings in the immediate postoperative management of a surgical wound to prevent surgical site infection?</td>
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<td>Evidence update (2013)</td>
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<td>All dressings</td>
<td>Early dressing removal</td>
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<td>A Cochrane review (Dumville et al. 2011) looked at wound dressings for SSI prevention. It included 16 RCTs</td>
<td>A Cochrane review (Toon et al. 2013) compared the benefits and harms of removing a dressing covering a closed surgical incision</td>
<td>One GDG member stated that there had been further RCTs on dressings but no study details were provided</td>
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<td>Conclusions of previous reviews</td>
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<td>(n=2578) that compared either different wound dressings, or dressing versus no dressing in patients with postoperative wounds healing by primary intention. The authors concluded that there was no evidence that covering wounds reduced SSI rate and stated that no particular wound dressing appeared to be better than the others, or than leaving the wound uncovered.</td>
<td>site within 48 hours permanently (early dressing removal) or beyond 48 hours of surgery permanently with interim dressing changes allowed (delayed dressing removal), on surgical site infection. They found four trials which met the inclusion criteria but all were at a high risk of bias. The authors found that the early removal of dressings from clean or clean contaminated surgical wounds had no detrimental effect on SSI or superficial wound dehiscence.</td>
<td>The new evidence on Aloe vera and negative pressure therapies is also unlikely to impact on CG74 because it is inconclusive about what methods are most appropriate. However, this information is relevant to a research recommendation which states: What are the most appropriate methods of chronic wound care (including alginites, foams and hydrocolloids and dressings containing antiseptics such as antimicrobial honey, cadexomer iodine or silver) in terms of management of surgical site infection as well as patient outcomes?</td>
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<td><strong>Silver dressings</strong> An RCT conducted in the U.S.A (Krieger et al 2011) was identified that evaluated silver nylon dressings for preventing SSI. Patients undergoing elective colorectal surgery were randomised to silver nylon or gauze dressing applied in the operating room after surgery. Follow-up was at 7-10 days and at 30 days. It was found that the silver nylon dressing reduced the total number of infections compared to gauze.</td>
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<td><strong>Aloe Vera for Chronic wound care</strong> A meta-analysis (Wang 2013) was identified that evaluated the effectiveness of aloe vera and its products for acute and chronic wounds. It included 15 RCTs randomising 773 patients. It was found that, compared with silver</td>
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<td><strong>Negative Pressure Wound Therapy</strong></td>
<td>Two RCTs were identified that assessed the use of Negative pressure wound therapy (NPWT). The first RCT (Masden et al. 2012) was conducted in the U.S.A (n=81) and examined NPWT compared to control (dry dressing with a non-adhesive silicone layer plus a silver layer) in patients with multiple comorbidities needing closure of abdominal or lower limb wounds. Average follow up was 113 days. No significant difference was found for wound infection between the two groups. The second RCT was multicentred (n=249) and again conducted in the U.S.A (Stannard et al. 2012). This examined NPWT on infection rate after lower limb fracture and patients were randomised to either NPWT or standard dressing. Significantly more infections were seen in the standard</td>
<td>Sulfadiazine, aloe vera products increased the proportion of healing wounds for burn patients. Furthermore, when compared to antibiotic cream, aloe vera products reduced the average healing time for burn patients.</td>
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<td><strong>Topical negative pressure</strong></td>
<td>A meta-analysis (Pan et al. 2013) was identified that investigated topical negative pressure to treat surgical site infections. It included 12 low quality cohort studies including 873 patients. The authors concluded that topical negative pressure might be more effective than standard therapy in the cure of deep SSIs. However, multicenter RCTs are needed to confirm the potential value of this treatment.</td>
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<td>dressing group than in the NPWT group and risk of infection was greater with standard dressing. The authors also noted that those in the NPWT group were discharged 0.5 days earlier than those with standard dressings. However, this was a non-significant result.</td>
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<td><strong>3-Year Review (2011)</strong></td>
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<tr>
<td><strong>Silver dressings</strong></td>
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<td>A Cochrane review (Vermeulen et al. 2007) investigated topical silver and silver dressings for the treatment of contaminated and infected acute or chronic wounds. Three short term RCT’s (n=847) were included and all three focused on chronic wounds. The reviews showed that there was insufficient information to recommend the use of silver-containing dressings or topical agents for treatment of infected or contaminated chronic</td>
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### Conclusions of previous reviews

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### Another Cochrane review (Storm-Versloot et al. 2010) investigated silver containing wound dressings and topical agents for preventing wound infection. They found insufficient evidence to establish whether silver-containing dressings and topical agents prevented infection or promoted wound healing.

A systematic review (Lo et al. 2008) was identified that examined RCTs and non-randomised trials of silver-releasing dressings in infected chronic wounds. It included 14 papers involving 1285 participants. The review found that silver dressings had positive effects on infected chronic wounds. However, authors did state that additional well-designed trials are needed.

### Adhesive drape versus absorbent dressing
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<th>Conclusion of this 6-year surveillance review (July 2014)</th>
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<tr>
<td>An RCT (Segers et al. 2007) was identified which compared adhesive drapes (impermeable to water and air) with a water and air permeable absorbent dressing in patients undergoing sternotomy for cardiothoracic surgery (n= 1185). No significant difference was found in incidence of SSI between the two methods.</td>
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<td><strong>Hydrocolloid dressing versus polyurethane foam dressing</strong></td>
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<td>One prospective trial was identified (Teshima et al. 2009) that investigated the effectiveness of a hydrocolloid dressing placed over median sternotomy wounds using an occlusive dressing technique. The hydrocolloid dressing was compared with a polyurethane foam dressing in 253 patients Results showed that the hydrocolloid dressing prevented SSI</td>
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<td>Conclusions of previous reviews</td>
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<td>and was more cost-effective compared to the polyurethane foam dressing.</td>
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<td><strong>Moist wound healing</strong></td>
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<td>An RCT (Vogt et al. 2007) examined moist wound healing using a hydrofibre dressing compared to a standard type of dry dressing in primary closed wounds after vascular surgery (n=160). Results showed that the hydrofibre dressing needed significantly fewer changes than the standard dressing and was as comfortable. However, the hydrofibre dressing was more expensive.</td>
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<td><strong>Occlusive versus gauze dressings</strong></td>
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<td>In an RCT (Ubbink et al. 2008) the effectiveness and costs of gauze-based vs occlusive, moist-environment dressing principles were compared. Two hundred and eighty five surgical patients with open wounds received</td>
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Conclusions of previous reviews

Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?

Clinical feedback from the GDG

Conclusion of this 6-year surveillance review (July 2014)

either occlusive or gauze based dressings. It was found that occlusive dressings did not lead to quicker healing or less pain than the gauze dressings. Furthermore, occlusive dressings had a higher daily cost but lower nursing time costs per day than gauze dressings. The total cost for local wound care per patient per day during hospitalisation was also significantly higher in the occlusive dressing group.

Ubbink et al. 2008 also examined homecare costs of local wound care in surgical patients randomised between occlusive and gauze dressings. They found that the use of occlusive dressings did not lead to a reduction in cost or wound healing time for those who received wound care at home.

In another RCT (Shinohara et al 2008), 134 patients were randomised to have their wound dressed with either
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<tr>
<th>Conclusions of previous reviews</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
<th>Clinical feedback from the GDG</th>
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<tr>
<td>occlusive hydrocolloid dressing or gauze dressing after abdominal surgery. Results showed no differences between the two groups in the need for dressings to be changed or infection incidence. Furthermore, occlusive hydrocolloid dressing was less expensive.</td>
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<td><strong>Modern dressings versus saline or gauze</strong></td>
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<tr>
<td>A systematic review (Chaby et al. 2007) was identified which examined the efficacy of modern dressings in healing chronic and acute wounds by secondary intention. No evidence was found that any of the modern dressings was better than the others, or better than saline of paraffin gauze in terms of general performance. In terms of healing, only weak levels of evidence were found on the clinical efficacy of modern dressings compared to saline or paraffin gauze with the exception of</td>
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<td>hydrocolloids which were found to be superior.</td>
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<tr>
<td>74-36: Is there any clinical evidence to support the use of a postoperative non-touch dressing change technique rather than the use of a clean dressing change technique in relation to the incidence of surgical site infection?</td>
<td>Evidence Update (2013) No new evidence identified</td>
<td>None identified</td>
<td>No relevant evidence identified</td>
</tr>
<tr>
<td></td>
<td>No new evidence identified</td>
<td>None identified</td>
<td>No relevant evidence identified</td>
</tr>
<tr>
<td>3-Year Review (2011)</td>
<td>None identified</td>
<td></td>
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<tr>
<td>74-37: Is it clinically and cost-effective to use a wound cleansing solution for the management of a surgical wound healing by primary or secondary intention to reduce the incidence of surgical site infection?</td>
<td>Evidence Update (2013) No new evidence identified</td>
<td>None identified</td>
<td>No relevant evidence identified</td>
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<tr>
<td></td>
<td>No new evidence identified</td>
<td>None identified</td>
<td>No relevant evidence identified</td>
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<tr>
<td>3-Year Review (2011)</td>
<td>A Cochrane review (Fernandez et al. 2008) was identified that examined the effects of water compared with other</td>
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<td>Conclusions of previous reviews</td>
<td>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</td>
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<tr>
<td>solutions for wound cleansing. Eleven trials were identified. Results showed that there was no evidence that using tap water to cleanse acute wounds in adults increased infection rate. However, there is also no evidence that cleansing per se is better than not cleansing.</td>
<td></td>
<td>None identified</td>
<td>No relevant evidence identified</td>
</tr>
<tr>
<td>74-38: Is it cost-effective to use a wound cleansing solution for the management of a surgical wound healing by secondary intention to reduce the incidence of surgical site infection?</td>
<td>Evidence Update (2013)</td>
<td>No new evidence identified</td>
<td>None identified</td>
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<tr>
<td>None identified</td>
<td>3-Year Review (2011)</td>
<td>None identified</td>
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<tr>
<td>74-39: What is the clinical effectiveness of topical antimicrobials to reduce surgical site infection?</td>
<td>Evidence Update (2013)</td>
<td>Honey</td>
<td>None identified</td>
</tr>
<tr>
<td>None identified</td>
<td>The Cochrane review (Jull et al.)</td>
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<tr>
<td>3-Year Review (2011)</td>
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<tr>
<td>Honey</td>
<td>A Cochrane review (Jull et al. 2008) was identified that investigated whether honey increased the rate of healing in acute wounds and chronic wounds. Nineteen trials were included (n=2554). In acute wounds, honey may improve healing times in mild to moderate superficial and partial thickness burns compared with some conventional dressings. For chronic wounds, honey dressings as an adjuvant to compression did not significantly increase leg ulcer healing at 12 weeks. There was insufficient evidence to determine the effect of honey compared with other treatments for burns or in other acute or chronic wound types.</td>
<td>2013) identified in the three year review was updated in 2013. Six new trials were identified in the update and added to the 19 trials already included. The updated review found that honey dressings as an adjuvant to compression did not significantly increase leg ulcer healing. Furthermore, the authors found that honey might reduce time to healing compared with some conventional dressings and when compared with early excision and grafting, honey delays healing in partial- and full-thickness burns. There was insufficient evidence to determine the effect of honey compared with other treatments for other wound types.</td>
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74-40: Is it clinically effective to use topical antiseptics and antibiotics for the management of surgical wounds healing by secondary intention?
<table>
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<tr>
<th>Conclusions of previous reviews</th>
<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
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<tr>
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<td>Which is the most clinically effective dressing in the management of surgical wounds healing by secondary intention?</td>
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<tr>
<td><strong>Evidence Update (2013)</strong></td>
<td>No new evidence identified</td>
<td>None identified</td>
<td>No relevant evidence identified</td>
</tr>
<tr>
<td><strong>3-Year Review (2011)</strong></td>
<td>A Cochrane review (Vermeulen et al. 2009) was identified which assessed the effectiveness of dressings and topical agents on surgical wounds healing by secondary intention. It found insufficient evidence to determine whether choice of dressing or topical agents affected healing of surgical wounds by secondary intention.</td>
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<tr>
<th>74-41: Is the use of debridement techniques clinically effective in the prevention and management of surgical site infection?</th>
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<tbody>
<tr>
<td><strong>Evidence Update (2013)</strong></td>
</tr>
<tr>
<td>None identified</td>
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<tr>
<td><strong>3-Year Review (2011)</strong></td>
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<tr>
<td>A Cochrane review was identified (Smith et al. 2013) that assessed different debridement methods on surgical wounds. Five RCTs were included that enrolled 159 patients</td>
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<tr>
<td>A Cochrane review (Dryburgh et al. 2008) was identified which investigated the effect of different methods of debridement on surgical wound healing. Five RCTs were included but no meta-analysis could be conducted due to the unique comparisons in each trial. One trial reported dextranomer achieved a clean wound bed significantly more quickly than Eusol, and one trial comparing enzymatic debridement with saline-soaked dressings reported that the enzyme treated wounds were cleaned more quickly.</td>
<td>but meta-analysis was not possible due to the different comparisons in each trial. One trial reported that dextranomer achieved a clean wound bed significantly more quickly than Eusol, and one trial comparing enzymatic debridement with saline-soaked dressings reported that the enzyme-treated wounds were cleaned more quickly. However, authors concluded that larger, high quality RCTs are needed on this topic.</td>
<td>treatments for debridement in the management of SSI. This is because the evidence is inconclusive.</td>
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</table>

Areas not currently covered in the guideline.

Intraoperative phase – Minimally invasive surgery

Evidence Update (2013)

Two systematic reviews were identified that assessed the effect of laparoscopy on postoperative infections. The first | A meta-analysis (Antoniou et al. 2014) was identified that assessed wound infection in single-incision laparoscopic surgery compared to conventional laparoscopic surgery. | None identified | From the new evidence, laparoscopy appears to be associated with lower rates of surgical site infection compared to open surgery. However, reduced |
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<tr>
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<th>Is there any new evidence/intelligence identified during this 6-year surveillance review (July 2014) that may change this conclusion?</th>
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<th>Conclusion of this 6-year surveillance review (July 2014)</th>
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<tr>
<td>meta-analysis (Shabanzadeh and Sorensen 2012) included 8 RCTs (n=615) and 36 observational studies (n=58,755) of obese patients that compared the effect of laparoscopic versus open surgery on SSI. For the meta-analysis of RCTs it was found that laparoscopy significantly reduced SSI rate compared to open surgery. This was also the case for the meta-analysis of observational studies.</td>
<td>Five RCTS were included. Wound infection rates were found to be similar between groups. Another meta-analysis (Li et al. 2014) compared wound infection in laparoscopic versus open techniques in the treatment of recurrent inguinal hernias. From the 11 included studies it was found that the laparoscopic procedure was associated with a lower incidence of wound infection.</td>
<td>rates of SSI may not be a primary reason to undertake minimally invasive surgery. Patient selection for laparoscopy also depends on other risk factors and criteria. Therefore, this evidence is unlikely to impact on CG74.</td>
<td></td>
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<tr>
<td>The second systematic review (Phatak et al. 2012) examined different types of intervention (including laparoscopy) on SSI after colorectal surgery. They included data from 9 Cochrane reviews and conducted both standard meta-analysis and Bayesian analysis. From the standard meta-analysis, laparoscopic colorectal surgery was found to be beneficial in reducing SSI risk. This is similar to the Bayesian analysis which showed that laparoscopy had a high probability</td>
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<tr>
<td>(99%) of bringing about a greater than 20% reduction in SSI.</td>
<td>3-Year Review (2011) None identified</td>
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<td>3-Year Review (2011) None identified</td>
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### Intraoperative phase – Wound-edge protection devices

**Evidence Update (2013)**

A meta-analysis (Gheorghe et al. 2012) was identified which assessed wound guards on SSI after open abdominal surgery. Twelve studies were included (10 RCTs, 2 controlled trials; n=1933). An exploratory meta-analysis (RE model) suggested that wound guards were beneficial in reducing SSI.

**3-Year Review (2011)**

None identified

| | No new evidence identified | None identified | More evidence on wound guards is needed before they can be considered for this guideline. Therefore, this evidence does not currently impact on the CG74. |
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