<table>
<thead>
<tr>
<th>Full Title of Guideline:</th>
<th>Guideline for Surgical Prophylaxis within Breast Surgery for Adult Patients</th>
</tr>
</thead>
</table>
| Author (include email and role): | Ms Gutteridge (Consultant Breast Surgeon)  
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| Division & Speciality: | Cancer and associated specialities, breast surgery |
| Scope (Target audience, state if Trust wide): | All breast surgery consultants and registrars  
Pharmacists and microbiologists |
| Review date (when this version goes out of date): | May 2021 |
| Explicit definition of patient group to which it applies (e.g. inclusion and exclusion criteria, diagnosis): | Adult patients undergoing breast surgical procedures outlined within the guideline |
| Changes from previous version (not applicable if this is a new guideline, enter below if extensive): | Teicoplanin dose increased so in line with other surgical prophylaxis guidelines |
| Summary of evidence base this guideline has been created from: | • SIGN. Antibiotic prophylaxis in surgery. A national clinical guideline. April 2014.  
• Ng. D Current use of antibiotic prophylaxis in breast surgery. A nationwide survey. 2007;6 (issue1) 68-72  

*This guideline has been registered with the trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt contact a senior colleague or expert. Caution is advised when using guidelines after the review date or outside of the Trust.*
Evidence Scores

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1++</td>
<td>High quality Meta-analyses, systematic reviews of RCTs or RCTs with a very low risk of bias</td>
</tr>
<tr>
<td>1+</td>
<td>Well conducted Meta-analyses, systematic reviews of RCTs or RCTs with a low risk of bias</td>
</tr>
<tr>
<td>1-</td>
<td>Meta-analyses, systematic reviews of RCTs or RCTs with a high risk of bias</td>
</tr>
<tr>
<td>2++</td>
<td>High quality systematic reviews of case control or cohort studies</td>
</tr>
<tr>
<td></td>
<td>High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal</td>
</tr>
<tr>
<td>2+</td>
<td>Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal</td>
</tr>
<tr>
<td>2-</td>
<td>Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal</td>
</tr>
<tr>
<td>3</td>
<td>Non-analytic studies, e.g. case reports, case series</td>
</tr>
<tr>
<td>4</td>
<td>Expert Opinion</td>
</tr>
</tbody>
</table>
1. Introduction:

- Surgical site infection (SSI) is one of the most common healthcare associated infections resulting in an average additional hospital stay of 6.5 days per case.
- SSIs after breast surgery occur more frequently than would be expected for clean cases, rates reported in the literature range from 3-30%, the accepted rate of wound infection after clean surgery is around 1.5%.
- When antibiotics are not given for breast cancer surgery, breast reduction or reconstruction, the odds of developing a SSI is approximately five fold higher.
- SSI after breast surgery can lead to poor cosmesis and amongst breast cancer patients can result in delays in receiving adjuvant chemotherapy or radiotherapy.
- Studies have shown that the administration of prophylactic antibiotics after wound closure do not reduce infection rates further and can result in harm (see below).
- Administration of antibiotics also increases the prevalence of antibiotic-resistant bacteria and predisposes the patient to infection with organisms such as *Clostridium difficile*, a cause of antibiotic-associated colitis. This risk increases with the duration that antibiotics are given for and is higher in the elderly, immunosuppressed, patients who have a prolonged hospital stay or who have received gastro-intestinal surgery.

2. Risk of infection:

The risk of SSI depends on a number of factors; these can be related to the patient or the operation and some of them are modifiable (see Table 1):

<table>
<thead>
<tr>
<th>Patient</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Duration of surgical scrub / Skin antiseptics</td>
</tr>
<tr>
<td>Nutritional status</td>
<td>Preoperative shaving/ preoperative skin prep.</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Length of operation</td>
</tr>
<tr>
<td>Smoking</td>
<td>Appropriate antimicrobial prophylaxis</td>
</tr>
<tr>
<td>Obesity</td>
<td>Operating room ventilation</td>
</tr>
<tr>
<td>Co-existent infections at a remote body site</td>
<td>Inadequate sterilization of instruments</td>
</tr>
<tr>
<td>Colonisation with microorganisms</td>
<td>Foreign material in the surgical site</td>
</tr>
<tr>
<td><em>(e.g. Staph. aureus)</em></td>
<td>Surgical drains</td>
</tr>
<tr>
<td>Immunosuppression (inc. taking glucocorticoid steroids or immunosuppressant drugs)</td>
<td>Surgical technique inc. haemostasis, poor closure, tissue trauma</td>
</tr>
<tr>
<td>Length of preoperative stay</td>
<td>Post-operative hypothermia</td>
</tr>
<tr>
<td>Co-existent severe disease that either limits activity or is incapacitating.</td>
<td></td>
</tr>
<tr>
<td>Malignancy</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 Risk factors that increase the rate of SSI

There are several risk factors amongst breast cancer surgery patients which make this patient group more susceptible to infection, including use of chemotherapy prior to surgery (neo-adjuvant chemotherapy); technique of diagnostic biopsy; re-operation for recurrence or to achieve better tumour margins; reconstructive surgery with implants and seroma accumulation and drainage.
2.1 Screening for MSSA

National guidance for oncoplastic breast reconstruction recommends that implant cases should be screened for Meticillin Sensitive Staphylcoccus aureus (MSSA). All high risk cases (those having an implant or tissue expander insertion) should be screened for MSSA in addition to the Meticillin resistant Staphylococcus aureus (MRSA) screens that are done as per the Trust MRSA policy. When sending the screening swabs the nasalsample should be requested separately, asking for MSSA and MRSA screening.

If a patient is newly identified with MSSA, decolonisation treatment with both Mupirocin 2% nasal ointment and Octenisan washes should be prescribed:

Octenisan body wash. Wash daily for 5 days and wash hair twice in the 5 days Mupirocin 2% nasal ointment Apply three times a day to both nostrils for 5 days.

If the patient is newly identified as MRSA positive, then the Trust MRSA policy should be followed.

3 Antibiotic Prophylaxis

3.1 Timing for Administration

- Antibiotic prophylaxis administered too early or too late increases the risk of SSI. Studies suggest that antibiotics are most effective when given ≤60 minutes before skin is incised.
- The pragmatic approach is to administer prophylaxis towards the end of induction and ensure that surgery starts within 60 minutes of this time wherever possible.

3.2 Additional Intra-operative doses

- High antibiotic levels, at the site of incision, for the duration of the operation, are essential for effective prophylaxis.
- Patient’s who experience major blood loss (greater than 1500ml) should have fluid resuscitation, followed by re-dosing with the recommend prophylaxis regimen for that operation (see section 4 and 5).
- For operations lasting > 4 hours re-dosing may be necessary (see table 3)

3.3 Post-operative antibiotic prophylaxis

- Studies have shown that giving additional antibiotic prophylaxis after wound closure does not reduce infection rates further. There are no published trial data to support the routine use of post-operative antibiotics to prevent SSI after breast operations and there is no evidence to support continued prophylaxis whilst surgical drains are in place. Post-operative antibiotics should only be given to treat active/on-going infection (e.g. perforated appendectomy) unless specifically recommended against the surgical procedure.

<table>
<thead>
<tr>
<th>Common Antibiotics</th>
<th>Recommended re-dosing interval/dose to give</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cefuroxime</td>
<td>4 hours, give 1.5g IV</td>
</tr>
<tr>
<td>Co-amoxiclav</td>
<td>4 hours, give 1.2g IV</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>re-dosing not recommended</td>
</tr>
<tr>
<td>Teicoplanin</td>
<td>re-dosing not recommended</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>re-dosing not recommended</td>
</tr>
</tbody>
</table>

Table 3: Recommend re-dosing interval
4. Breast Surgery Antibiotic Prophylaxis Regimens

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Antibiotic dose/route</th>
<th>Mild Penicillin allergy (Not to be used in serious penicillin allergy, e.g. urticarial rash within the first 72 hours, anaphylaxis or angioedema)</th>
<th>Anaphylaxis to penicillins/cephalosporin allergy or MRSA carrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastectomy (nipple sparing)</td>
<td>Co-amoxiclav 1.2g IV single dose at induction</td>
<td>Cefuroxime 1.5g IV single dose plus Metronidazole 500mg IV single dose at induction.</td>
<td>Teicoplanin 800mg IV single dose plus Metronidazole 500mg IV single dose at induction</td>
</tr>
<tr>
<td>Wide local excision</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Axillary Clearance</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Breast reduction</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Duct excision</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Sentinel node biopsy</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Diagnostic breast lump biopsy without wire</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Nipple reconstruction</td>
<td>Co-amoxiclav 1.2g IV at induction plus 2 further doses 8 hours apart. <strong>Plus</strong> Gentamicin IV 2mg/kg single dose at induction only</td>
<td>Cefuroxime 1.5g IV followed by two further doses of 1.5g IV 8 hours apart <strong>and</strong> Metronidazole IV 500mg at induction followed by two further doses of 500mg 8 hours apart <strong>Plus</strong> Gentamicin IV 2mg/kg single dose at induction only.</td>
<td>Teicoplanin 800mg IV plus Gentamicin IV 2mg/kg single dose at induction only</td>
</tr>
<tr>
<td>Reconstructive breast surgery with or without tissue expander (Inpatient)</td>
<td>Teicoplanin 800mg IV plus Gentamicin 2mg/kg single dose at induction only.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reconstructive breast surgery with or without tissue expander (Daycase)</td>
<td>Teicoplanin 800mg IV plus Gentamicin 2mg/kg single dose at induction only.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>