MRSA colonisation (eradicating colonisation in people without active invasive infection)

Search date June 2014

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ABSTRACT

INTRODUCTION: Methicillin-resistant Staphylococcus aureus (MRSA) contains a gene that makes it resistant to methicillin as well as to other beta-lactam antibiotics, including flucloxacillin, cephalosporins, and carbapenems. MRSA can be part of the normal body flora (colonisation), especially in the nose, but it can cause infection. Until recently, MRSA has primarily been a problem associated with exposure to the healthcare system, especially in people with prolonged hospital admissions or underlying disease, or after antibiotic use. In many countries worldwide, a preponderance of S aureus bloodstream isolates are resistant to methicillin. METHODS AND OUTCOMES: We conducted a systematic overview, aiming to answer the following clinical question: What are the effects of treatment for MRSA nasal or extra-nasal colonisation in adults? We searched: Medline, Embase, The Cochrane Library, and other important databases up to June 2014 (BMJ Clinical Evidence overviews are updated periodically; please check our website for the most up-to-date version of this overview). RESULTS: At this update, searching of electronic databases retrieved 850 studies. After deduplication and removal of conference abstracts, 356 records were screened for inclusion in the overview. Appraisal of titles and abstracts led to the exclusion of 273 studies, and the further review of 83 full publications. Of the 83 full articles evaluated, no studies were added at this update. We performed a GRADE evaluation for three PICO combinations. CONCLUSIONS: In this systematic overview, we categorised the efficacy for five interventions based on information about the effectiveness and safety of antiseptic body washes, chlorhexidine-neomycin nasal cream, mupirocin nasal ointment, systemic antimicrobials, and other topical antimicrobials.

Key points

- Methicillin-resistant *Staphylococcus aureus* (MRSA) has a gene that makes it resistant to methicillin as well as other beta-lactam antibiotics, including flucloxacillin, cephalosporins, and carbapenems, which limit the number of treatment options for infection.
- MRSA can be part of the normal body flora (colonisation), especially in the nose, but it can cause infection, especially in people with prolonged hospital admissions or underlying disease, or after antibiotic use.
- MRSA carriers are at increased risk for recurrent MRSA infection.
- MRSA carriers who are found to be colonised with MRSA at multiple body sites or who are found to be persistently colonised with MRSA over time are at greater risk of infection with that bacterium.
- Trauma, wounds, surgical incisions, or use of indwelling medical devices can facilitate the introduction of MRSA, which colonises the skin and mucosa into deeper tissues, leading to MRSA infection.
- MRSA is now a leading cause of community-associated skin and soft tissue infections.
- Bloodstream infection due to MRSA is an all-too-common problem worldwide.
- We have searched for evidence from RCTs and systematic reviews of RCTs on eradication of colonised MRSA in adults in hospitals and residential homes, outpatients, and healthcare workers.
- Mupirocin nasal ointment may reduce or eradicate MRSA colonisation compared with placebo, and may be as effective as topical fusidic acid plus oral trimethoprim-sulfamethoxazole (co-trimoxazole), although studies have given conflicting results.

  We don't know whether antiseptic body washes, chlorhexidine–neomycin nasal cream, systemic antimicrobials, or other topical antimicrobials are effective at clearing MRSA colonisation.

Clinical context

GENERAL BACKGROUND

Methicillin-resistant *Staphylococcus aureus* (MRSA) carriers are at increased risk for recurrent MRSA infection. Carriers who are found to be colonised with MRSA at multiple body sites or who are found to be persistently colonised

with MRSA over time are at greater risk of infection with that bacterium. Furthermore, trauma, surgical incisions, or use of indwelling medical devices in the MRSA carrier may facilitate the introduction of the organism into deeper tissues, leading to MRSA infection.

FOCUS OF THE REVIEW

It has been thought that reduction or elimination of MRSA colonisation might lead to reductions in MRSA infection rates. Different topical and systemic antimicrobial regimens have been tried in various patient populations, with variable outcomes. Given that MRSA infection remains a significant problem in healthcare settings and, now, in the community, it is important to re-examine the evidence for or against the treatment of MRSA-colonised patients.

COMMENTS ON EVIDENCE

We found RCT evidence for three of our five interventions of interest. No direct information from RCTs was found for chlorhexidine-neomycin nasal cream or other topical antimicrobials. The included studies may have limitations to their generalisability for a variety of reasons including: the use of co-interventions, inclusion of patients with MSSA, or small number of comparators.

SEARCH AND APPRAISAL SUMMARY

The update literature search for this overview was carried out from the date of the last search, January 2010, to June 2014. For more information on the electronic databases searched and criteria applied during assessment of studies for potential relevance to the overview, please see the Methods section. Searching of electronic databases retrieved 850 studies. After deduplication and removal of conference abstracts, 356 records were screened for inclusion in the overview. Appraisal of titles and abstracts led to the exclusion of 273 studies and the further review of 83 full publications. Of the 83 full articles evaluated, no studies were added at this update.

DEFINITION	Methicillin-resistant *Staphylococcus aureus* (MRSA) is an organism resistant to methicillin by means of the *mecA* gene. This confers resistance to the majority of beta-lactam antibiotics, including flucloxacillin, oxacillin, cephalosporins, and carbapenems. Antimicrobial resistance is defined as the failure of the antimicrobial to reach a concentration in the infected tissue high enough to inhibit the growth of the infecting organism. MRSA presents in the same way as susceptible *S aureus*. It can be part of the normal flora (colonisation), or it can cause infection. The phenomena of colonisation and infection should be treated as separate entities. In many countries worldwide, a preponderance of *S aureus* bloodstream isolates are resistant to methicillin. **MRSA colonisation** growth of MRSA from a body fluid or swab from any body site. The most common site of colonisation is the anterior nares, but MRSA can also be found in other areas such as the axillae, abnormal skin (e.g., eczema, wounds), urine, rectum, and throat. There should be no signs or symptoms of infection. The colonised site may act as a reservoir of MRSA, which then causes infection at another site or can be passed on to others. Although the colonised patient (or staff member) does not need treatment, a course of decolonisation treatment may be given in order to eradicate carriage and prevent future infections or transmission. [1] [2] In this overview, we have included adults aged 18 years or older in hospitals and residential homes, outpatients, and healthcare workers.
INCIDENCE/ PREVALENCE	The incidence of MRSA varies from country to country. [3] [4] The UK, Ireland, and southern Europe (e.g., Spain, Italy, and Greece) have a high incidence when compared with northern Europe and Scandinavia. The most objective measure of incidence is the percentage of *S aureus* found in blood cultures that are resistant to methicillin. Rates may exceed 40% in many countries. [5]
AETIOLOGY/ RISK FACTORS	Traditional risk factors for MRSA colonisation include prolonged stay in hospital, severe underlying disease, prior antibiotics, exposure to colonised people, and admission to a high-risk unit (critical care, renal unit, etc). MRSA has primarily been a problem associated with exposure to the healthcare system. More recently, MRSA strains have emerged in the community (so-called community-associated MRSA [CA-MRSA] strains) that have no relationship with healthcare-related strains. These strains may colonise and cause infection among young, healthy people. [4]
PROGNOSIS	The virulence of MRSA, or its ability to cause death and severe infection, seems to be greater than that of methicillin-susceptible *S aureus* strains. [2] [4] A meta-analysis of 31 cohort studies found that mortality associated with MRSA bacteraemia was significantly higher than that of methicillin-susceptible *S aureus* bacteraemia (mean mortality not reported; OR 1.93, 95% CI 1.54 to 2.42). [6]
AIMS OF INTERVENTION	To reduce the number of people colonised with MRSA or MRSA infection, with minimal adverse effects of treatment.

OUTCOMES **MRSA eradication** rates, **adverse effects**.

METHODS **Search strategy** *BMJ Clinical Evidence* search and appraisal date June 2014. Databases used to identify studies for this systematic overview include: Medline 1966 to June 2014, Embase 1980 to June 2014, The Cochrane Database of Systematic Reviews 2014, issue 6 (1966 to date of issue), the Database of Abstracts of Reviews of Effects (DARE) and the Health Technology Assessment (HTA) database. **Inclusion criteria** Study design criteria for inclusion in this systematic overview were systematic reviews and RCTs published in English, any level of blinding, and containing more than 20 individuals, of whom more than 80% were followed up. Although there was no minimum length of follow-up required to include studies, we preferentially report outcomes at 1 month or longer; we only include outcomes evaluated at less than 1 month if the same outcome is not reported at a time point of 1 month or longer. *BMJ Clinical Evidence* does not necessarily report every study found (e.g., every systematic review). Rather, we report the most recent, relevant and comprehensive studies identified through an agreed process involving our evidence team, editorial team, and expert contributors. **Evidence evaluation** A systematic literature search was conducted by our evidence team, who then assessed titles and abstracts, and finally selected articles for full text appraisal against inclusion and exclusion criteria agreed *a priori* with our expert contributor. In consultation with the expert contributor, studies were selected for inclusion and all data relevant to this overview extracted into the benefits and harms section of the overview. In addition, information that did not meet our pre-defined criteria for inclusion in the benefits and harms section may have been reported in the 'Further information on studies' or 'Comment' sections (see below). **Adverse effects** All serious adverse effects, or those adverse effects reported as statistically significant, were included in the harms section of the overview. Pre-specified adverse effects identified as being clinically important were also reported, even if the results were not statistically significant. Although *BMJ Clinical Evidence* presents data on selected adverse effects reported in included studies, it is not meant to be, and cannot be, a comprehensive list of all adverse effects, contraindications, or interactions of included drugs or interventions. A reliable national or local drug database must be consulted for this information. **Comment and Clinical guide sections** In the Comment section of each intervention, our expert contributors may have provided additional comment and analysis of the evidence, which may include additional studies (over and above those identified via our systematic search) by way of background data or supporting information. As *BMJ Clinical Evidence* does not systematically search for studies reported in the Comment section, we cannot guarantee the completeness of the studies listed there or the robustness of methods. Our expert contributors add clinical context and interpretation to the Clinical guide sections where appropriate. **Structural changes this update** At this update, we have removed the intervention 'tea tree oil preparations' from this overview as this is no longer used clinically for eradicating MRSA colonisation. **Data and quality** To aid readability of the numerical data in our overviews, we round many percentages to the nearest whole number. Readers should be aware of this when relating percentages to summary statistics such as relative risks (RRs) and odds ratios (ORs). *BMJ Clinical Evidence* does not report all methodological details of included studies. Rather, it reports by exception any methodological issue or more general issue that may affect the weight a reader may put on an individual study, or the generalisability of the result. These issues may be reflected in the overall GRADE analysis. We have performed a GRADE evaluation of the quality of evidence for interventions included in this overview (see table, p 8). The categorisation of the quality of the evidence (into high, moderate, low, or very low) reflects the quality of evidence available for our chosen outcomes in our defined populations of interest. These categorisations are not necessarily a reflection of the overall methodological quality of any individual study, because the *BMJ Clinical Evidence* population and outcome of choice may represent only a small subset of the total outcomes reported, and population included, in any individual trial. For further details of how we perform the GRADE evaluation and the scoring system we use, please see our website (www.clinicalevidence.com).

QUESTION What are the effects of treatment for MRSA nasal or extra-nasal colonisation in adults?

OPTION MUPIROCIN NASAL OINTMENT

MRSA eradication

Mupirocin nasal ointment compared with placebo Mupirocin nasal ointment may be more effective than placebo at reducing the proportion of people colonised with MRSA at the end of trial follow-up (very low-quality evidence).

Mupirocin nasal ointment compared with topical fusidic acid plus oral trimethoprim-sulfamethoxazole (co-trimoxazole; TMP-SMX) We don't know whether mupirocin nasal ointment is more effective than topical fusidic acid plus oral TMP-SMX at increasing eradication of MRSA colonisation for people in intensive care units or a surgical unit (very low-quality evidence).

Note

MRSA colonisation (eradicating colonisation in people without active invasive infection)

Long-term evaluation of eradication treatment has proved to be difficult owing to a high attrition rate in most of the trials.

For GRADE evaluation of interventions for MRSA, see table, p 8 .

Benefits:

Mupirocin nasal ointment versus placebo:
We found three systematic reviews (search date 2003, 1 RCT; [7] search date 2008, 2 RCTs; [8] search date 2008, 3 RCTs [9]). Neither the first nor the second systematic review performed a meta-analysis. [7] [8] The third review included RCTs identified by the first two reviews and pooled data. [9] We have, therefore, reported this review in detail. The third review included RCTs both of MRSA and methicillin-susceptible *Staphylococcus aureus* (MSSA). We have only reported data on the three MRSA RCTs here (see Comment, p 3 below). The review reported that all three included RCTs found higher eradication rates with mupirocin after 1 week or at the end of treatment.

The first included RCT (98 people with MRSA) included inpatients and compared mupirocin nasal ointment plus chlorhexidine body wash with placebo nasal ointment plus chlorhexidine body wash. Duration of follow-up was 26 weeks, and cultures were taken from nose, groin, urine, and wounds. The review reported that MRSA eradication at the end of follow-up was 25% in the mupirocin group versus 18% in the placebo group (statistical analysis between groups not reported). The second included cluster-randomised RCT (134 healthy soldiers with community-acquired MRSA on a healthcare specialist course [combat medics]) compared mupirocin nasal ointment with placebo nasal ointment. Duration of follow-up was 56 weeks, and cultures were taken from the nose. The review reported that the eradication rate at the end of follow-up was 88% with mupirocin versus 65% with placebo (statistical analysis between groups not reported). The third included RCT was undertaken with people in a long-term care facility and compared mupirocin nasal ointment with placebo nasal ointment. This RCT included 63 people with MRSA and 64 people with MSSA. Duration of follow-up was 16 weeks, and cultures were taken from the nose and wounds. Eradication rate after 1 week was 93% with mupirocin versus 15% with placebo, and eradication rate at the end of follow-up was 88% with mupirocin versus 18% with placebo (statistical analysis between groups not reported). Treatment duration ranged from 5 to 14 days in the three RCTs. In its primary analysis, the review pooled data for MRSA and MSSA carriage combined. We have not reported these data here (see Comment). In a subgroup analysis of MRSA carriage alone, the review found that mupirocin significantly reduced the risk of treatment failure compared with placebo at the end of the follow-up period (2 RCTs [not identified by the review]; RR 0.71, 95% CI 0.55 to 0.90; absolute results not reported). There was heterogeneity among the RCTs (I^2 = 90.2%; P value for heterogeneity not reported). The treatment effect varied between the two RCTs included in the analysis (first RCT undertaken in patients: RR 0.91, 95% CI 0.74 to 1.13; second RCT undertaken in healthy carriers: RR 0.29, 95% CI 0.13 to 0.68). [9]

Mupirocin nasal ointment versus topical fusidic acid plus oral trimethoprim-sulfamethoxazole (co-trimoxazole; TMP-SMX):
We found one systematic review (search date 2003, 1 RCT, 84 people colonised with MRSA of the nares [54% had extra-nasal colonisation; 32% had MRSA infection] in intensive care units or a surgical unit; mean age 54 years). [7] The RCT identified by the review found that nearly all people in either group had MRSA eradicated over 90 days with calcium mupirocin (2% 3 times/day for 5 days) or with topical fusidic acid (2% 3 times/day plus oral TMP-SMX once daily) (eradication of MRSA from only nasal site 4 weeks after treatment started: 23/24 [96%] with calcium mupirocin *v* 18/19 [95%] topical fusidate plus TMP-SMX; RR 1.01, 95% CI 0.88 to 1.16).

Longer versus shorter treatment with mupirocin nasal ointment:
We found no systematic review or RCTs.

Harms:

Mupirocin nasal ointment versus placebo:
The first systematic review reported low-level resistance to mupirocin in both groups (11/48 [23%] with calcium mupirocin *v* 12/50 [24%] with placebo; significance assessment not reported). [7] No resistance to the eradicating agents developed during the one RCT which looked for this outcome. [10] The third systematic review that included RCTs in people with MRSA or MSSA reported that acquisition of mupirocin resistance during treatment was found in 6/714 (1%) people in 12 studies, and reported that adverse effects attributable to mupirocin use were mild and did not lead to discontinuation of therapy. [9]

Mupirocin nasal ointment versus topical fusidic acid and oral TMP-SMX:
Mild discomfort was reported with both mupirocin and fusidic acid nasal ointments but absolute numbers were not given. [7] No other adverse events were detected, although serious adverse effects have been associated with oral TMP-SMX. [11]

Longer versus shorter treatment with mupirocin nasal ointment:
We found no RCTs.

Comment: The third review, in its primary analysis, included the outcome of MSSA eradication (6 RCTs in people all with MSSA, or vast majority with MSSA) as well as MRSA eradication (3 RCTs in people all with MRSA, or at least 50% with MRSA). [9] In this analysis, it found that mupirocin significantly reduced the risk of MRSA and MSSA carriage compared with placebo at 16 to 365 days (9 RCTs; RR 0.44, 95% CI 0.39 to 0.50; absolute numbers not reported). [9] However, in these data, the majority of people had MSSA, the analysis included a variety of population groups (patients, healthcare workers, people with HIV, healthy soldiers [combat medics], people in long-term care facilities), and there was marked heterogeneity among RCTs (I^2 = 90.2%; P value for heterogeneity not reported). Hence, these data should be viewed with caution.

Long-term evaluation of eradication treatment has proved to be difficult owing to a high attrition rate in most of the trials.

OPTION ANTISEPTIC BODY WASHES

MRSA eradication
Antiseptic body washes compared with placebo We don't know whether chlorhexidine body wash is more effective than placebo body wash at increasing the proportion of people without MRSA colonisation in people also receiving nasal mupirocin ointment and oral mouth rinses (low-quality evidence).

For GRADE evaluation of interventions for MRSA, see table, p 8 .

Benefits: **Antiseptic body wash versus placebo:**
We found one systematic review (search date 2008), [8] which included one RCT (114 people). [12] The RCT included adults who were MRSA-positive inpatients, outpatients, and residents of nursing homes, and compared 4% chlorhexidine body wash with placebo (water with polysorbate 20, similar to treatment solution in appearance and smell). [9] In addition, all people received intranasal mupirocin ointment three times per day for 5 days and oral chlorhexidine rinses twice daily. Swabs were taken from multiple sites, and results were based on 103/114 (90%) people randomised. [12] The RCT found no significant difference between groups in MRSA carriage at 30 days (proportion of people without colonisation: 4/48 [8%] with chlorhexidine *v* 7/55 [13%] with placebo; OR 0.62, 95% CI 0.14 to 2.60; P = 0.47). The RCT reported that, compared with those colonised at only one body site, people colonised at more than one body site were significantly more likely to fail eradication (OR 11.42, 95% CI 2.08 to 82.75; P = 0.002). [12] The RCT noted that nearly half the participants (47%) had wounds, which may have been a reason for the low success rate.

Harms: **Antiseptic body wash versus placebo:**
The RCT found that, compared with placebo, chlorhexidine body wash significantly increased the proportion of people with skin fissures, pruritus, and burning of the skin (skin fissures: 18% with chlorhexidine *v* 2% with placebo; P = 0.01; pruritus: 42% with chlorhexidine *v* 11% with placebo; P = 0.001; burning of the skin: 50% with chlorhexidine *v* 9% with placebo; P <0.001). [12] People who were treated with chlorhexidine washes were more likely to withdraw from the trial because of adverse events compared with people receiving placebo, but the difference between groups was not statistically significant (P = 0.18). The RCT reported that most adverse events resolved within 48 hours. [12]

Comment: **Clinical guide**
Studies done for other purposes suggest that fewer skin adverse events might occur with chlorhexidine cloths compared with the chlorhexidine body wash.

OPTION CHLORHEXIDINE-NEOMYCIN NASAL CREAM

We found no direct information from RCTs on the effects of chlorhexidine-neomycin nasal cream in people with MRSA nasal or extra-nasal colonisation.

For GRADE evaluation of interventions for MRSA, see table, p 8 .

Benefits: We found no systematic review or RCTs.

Harms: We found no RCTs.

Comment: None.

OPTION SYSTEMIC ANTIMICROBIALS

MRSA eradication

Oral TMP-SMX plus topical fusidic acid compared with mupirocin nasal ointment We don't know whether oral TMP-SMX plus topical fusidic acid is more effective than mupirocin nasal ointment at increasing eradication of MRSA colonisation in people from intensive care units or a surgical units (very low-quality evidence).

Note

We found no clinically important results about systemic antimicrobials compared with placebo in people with MRSA nasal or extra-nasal colonisation.

For GRADE evaluation of interventions for MRSA, see table, p 8 .

Benefits:

Systemic antimicrobials versus placebo:
We found two systematic reviews (search date 2003, 2 RCTs; [7] search date 2008, 2 RCTs [9]). The two RCTs were common to both reviews (first RCT: 16 people in an intensive care unit with MRSA colonisation of the nose, throat, or skin, comparing oral fusidic acid *v* placebo; second 4-armed RCT: 35 people in a long-term care facility with MRSA colonisation of the nose, comparing rifampicin *v* placebo, minocycline *v* placebo, rifampicin plus minocycline *v* placebo). Both systematic reviews performed a meta-analysis and found small sample sizes for individual studies and variable lengths of follow-up. Combining the results of many agents in this way may give misleading results, as the action of each antibiotic is different and they would not necessarily have equal efficacy. The combined results are not presented here. No firm conclusions could be drawn from the results of the individual RCTs (most of the individual trial arms included <10 participants).

Oral TMP-SMX plus topical fusidic acid versus mupirocin nasal ointment:
See Benefits of Mupirocin nasal ointment, p 3 .

Harms:

Systemic antimicrobials versus placebo:
The systematic review reported that no adverse events were reported in the RCTs. [7]

Topical fusidic acid plus oral TMP-SMX versus mupirocin nasal ointment:
See Harms of Mupirocin nasal ointment, p 3 .

Comment:

Clinical guide
The use of topical agents may be preferred for reasons other than drug efficacy. The use of systemic antibiotics for decolonisation, including TMP-SMX, clindamycin, quinolones, and rifampicin, may be limited due to allergies or side effects related to these drugs or significant interactions with other drug classes. In addition, resistance to systemic antibiotics can emerge with increasing use further limiting options for treatment of MRSA infection when it occurs. Systemic antibiotics may be preferred if prior treatment with topical agents has failed or an oropharyngeal or gastrointestinal source of MRSA colonisation is suspected.

OPTION TOPICAL ANTIMICROBIALS OTHER THAN MUPIROCIN NASAL OINTMENT, ANTISEPTIC BODY WASHES, AND CHLORHEXIDINE-NEOMYCIN NASAL CREAM

We found no direct information from RCTs on the effects of topical antimicrobials other than mupirocin nasal ointment, antiseptic body washes, and chlorhexidine-neomycin nasal cream in people with MRSA nasal or extra-nasal colonisation.

For GRADE evaluation of interventions for MRSA, see table, p 8 .

Benefits:

Other topical antimicrobials versus placebo:
We found no systematic review or RCTs.

Other topical antimicrobials versus systemic antimicrobials:
We found no systematic review or RCTs.

Other topical antimicrobials versus mupirocin:
We found no systematic review or RCTs.

Harms:

Other topical antimicrobials versus placebo:
We found no RCTs.

Other topical antimicrobials versus systemic antimicrobials:
We found no RCTs.

Other topical antimicrobials versus mupirocin:
We found no RCTs.

Comment: In this option we have reported any studies on topical antimicrobials that we found other than studies on mupirocin nasal ointment, antiseptic body washes, and chlorhexidine-neomycin nasal cream, which we have reported separately.

GLOSSARY

Low-quality evidence Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.

Very low-quality evidence Any estimate of effect is very uncertain.

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TABLE **GRADE evaluation of interventions for MRSA colonisation (eradicating colonisation in people without active/invasive infection)**

Important outcomes	**MRSA eradication, adverse effects.**								
Number of studies (participants)	**Outcome**	**Comparison**	**Type of evidence**	**Quality**	**Consistency**	**Directness**	**Effect size**	**GRADE**	**Comment**
What are the effects of treatment for MRSA nasal or extra-nasal colonisation in adults?									
3 (unclear) [7] [8] [9]	MRSA eradication	Mupirocin nasal ointment *v* placebo	4	–1	–1	–2	0	Very low	Quality point deducted for incomplete reporting of results; consistency point deducted for statistical heterogeneity among RCTs; directness points deducted for co-intervention in 1 RCT (chlorhexidine body wash) and inclusion of people with MSSA in 1 RCT
1 (43) [7]	MRSA eradication	Mupirocin nasal ointment *v* oral trimethoprim–sulfamethoxazole plus topical fusidic acid	4	–2	0	–2	0	Very low	Quality points deducted for sparse data and incomplete reporting of results; directness points deducted for highly selected population (ITU/surgical unit) and inclusion of people with MSSA infection
1 (103) [8] [12]	MRSA eradication	Antiseptic body wash *v* placebo	4	–1	0	–1	0	Low	Quality point deducted for sparse data; directness point deducted for use of co-intervention (mupirocin, oral rinses)

Type of evidence: 4 = RCT Consistency: similarity of results across studies.
Directness: generalisability of population or outcomes.
Effect size: based on relative risk or odds ratio.