Prevention and control of infection in burns services: report of a Healthcare Infection Society and British Burn Association Joint Working Party

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Author contributions

P.J. chaired the Working Party. M.M. conducted the literature searches, sifted the search results, prepared evidence tables, profiles and statements, and documented the Working Party's interpretation of the evidence and formulation of recommendations. All authors reviewed the list of excluded studies and provided feedback during development of the evidence tables, profiles and statements, were involved in interpreting the evidence and formulating recommendations (including research recommendations).

Key words

Burn unit, burn infection, infection prevention, infection control, building design, wound care, equipment contamination, multi-drug resistant organisms

1 Executive summary

This report was prepared by a joint Working Party of the Healthcare Infection Society (HIS) and the British Burn Association (BBA). The report constitutes guidance for the prevention and control of infection in burns services and supersedes guidance issued jointly by BBA and HIS in 1991 for the design of burns units. The new guidance covers the prevention of infection in burns patients and the design and layout of premises in which burns services are delivered, including associated intensive

care units (ICUs) and high dependency units (HDUs); it does not cover the management of suspected or confirmed infection.

Infection prevention and control (IPC) in burns services is important because infection is a leading cause of morbidity and mortality in burns patients. Burn injuries compromise the skin's barrier function and create an environment that facilitates microbial growth, thus delaying the healing of burn wounds. Physiological changes associated with burn injuries also suppress the immune system. Burns patients are at risk of systemic infection (such as sepsis or pneumonia) and the use of invasive devices such as central venous catheters as part of acute care for severely burned patients introduces a risk of device-related infection. Colonization and infection with multidrug-resistant micro-organisms (including meticillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococcus (VRE)) can be a problem for burns patients who may act as reservoirs for such micro-organisms and a source for transmission to other patients. Aspects of building design that impact on air and water quality, for example, are important in the consideration of IPC in burns services, as are procedures for minimizing other potential sources of environmental contamination.

The Working Party's considerations regarding the effectiveness of interventions related to preventing and controlling infection in burns services were based on a systematic review and synthesis of evidence in the peer-reviewed research literature, including quality assessment of the evidence using recognized techniques. The composition of the Working Party reflected the role of multidisciplinary teams (MDTs) in burn care, and the members of the Working Party used their collective experience and expertise to supplement analysis of the published literature. Many of the recommendations were developed as good practice points (GPPs). Although they were largely developed for hospital settings the recommendations might be useful in other healthcare settings providing care for burns patients. The Working Party reflected on continuing professional development (CPD) needs and formulated recommendations for further research to address gaps in the evidence.

Recommendations

A summary of the recommendations in Section 8.1.5 will be included here before final publication

2 Lay summary

Burn injuries are a serious public health problem in the UK and around the world. Approximately 250,000 people experience burn injuries in the UK each year, with around 13,000 being admitted to hospital (see the BBA national burn care review). Infection is a major complication of burn injury and may result in death.[1] In the UK, around 300 burns patients die in hospital each year; people aged over 60 years are particularly at risk of dying following a burn injury (see the BBA national burn care review). The prevention and management of infection is a major challenge for teams looking after burns patients and this report has been prepared in response to increasing concern about a lack of relevant guidance. As well as developing infections themselves, burns patients can be a source of infection for other patients.

This guidance brings together advice for preventing infection in burns patients, for example, using antibiotics to prevent infection, and applying antiseptics and dressings to burn wounds. The guidance also covers the design, layout, and operation of premises in which burns patients are cared for, including aspects related to air quality, water quality, cleaning and disinfection, and factors related to staffing, transfer of patients between burns services, and visitors to burns patients. The guidance does not cover the care of patients in whom infection is already suspected or confirmed.

A glossary explaining key terms used in the report is presented in Appendix A.

3 Introduction

This guidance covers infection prevention and control (IPC) in burns services, including the prevention of infection in burns patients and the design and layout of premises in which burns services are delivered. In England and Wales, burns services are organized in a tiered structure: the most severely burned patients are cared for in services designated as Burns Centres; less severely injured patients requiring less intensive clinical support are cared for in services designated either as Burns Units or Burns Facilities, with Burns Facilities providing care for the least severely burned patients (see the BBA national standards for the provision of adult and paediatric burn care 2023). The management of burn injuries requires a multidisciplinary approach that includes resuscitation, early excision and skin grafting, wound care, IPC, pain relief, nutrition, and rehabilitation (see the BBA national standards for the provision of adult and paediatric burn care 2023).

Infection is a leading cause of morbidity and mortality in burns patients (see, for example, D'Abbondanza *et al.*,[2] Ladhani *et al.*,[3] Vinaik *et al.*,[4] and Williams *et al.*).[5] Burn injuries compromise the skin's barrier function[5] and create an environment that facilitates microbial growth; this delays healing of burn wounds and can lead to scarring additional to that caused by the burn injury itself. Physiological changes associated with burn injuries also suppress the immune system.[2, 5]

Risk factors for infection in burns patients include the size (total body surface area) of the burn[2, 5] and the depth of the burn injury.[5] Burns patients are at risk of systemic infection (such as sepsis or pneumonia)[2, 5] and the use of invasive devices such as central venous catheters as part of acute care for severely burned patients introduces a risk of device-related infection.[5]

Immediately after a burn injury the burn wound will be sterile but subsequent colonization, initially by Gram-positive micro-organisms and later by Gram-negative micro-organisms, is typical.[3, 5] Colonization and infection with multidrug-resistant micro-organisms can be a problem for burns patients[4] who may act as reservoirs for such micro-organisms and a source for transmission to other patients.[3] This may have implications for cohorting of similarly vulnerable patients. Aspects of building design that impact on air and water quality, for example, are important in the consideration of IPC in burns services (see the NHS health technical memorandum on specialized ventilation for healthcare buildings and the NHS health technical memorandum on safe water in healthcare premises), as are procedures for minimizing other potential sources of environmental contamination. General guidance regarding IPC measures (including cleanliness) that healthcare providers should adhere to is contained in the Health and Social Care Act 2008: code of practice on the prevention and control of infections.

4 Guidance development team

4.1 Acknowledgments

The Working Party gratefully acknowledges the contribution of the late Amber Young who was a key member of the Working Party from its formation.

The Working Party records the involvement of Rebecca Martin, Alex Scott, and Michael Weinbren who were members of the Working Party until May 2021, November 2022, and November 2023, respectively.

Gemma Marsden undertook the role of second reviewer for the sifting of search results based on titles, abstracts, and full texts.

4.2 Source of funding

The Healthcare Infection Society (HIS) funded the development of this guidance. There was no external funding.

4.3 Disclosure of potential conflicts of interest

All members of the Working Party completed conflict-of-interest forms in line with HIS policy. L.M. and P.H., who declared financial interests in manufacturers of pharmaceuticals (including antimicrobials), participated in the initial discussion of the evidence related to antimicrobials. The remaining members of the Working Party reviewed and finalized recommendations in these areas.

M.W. declared financial interests in manufacturers of water system products and components and in a provider of water services; no specific products or components are recommended in the guidance and so these declarations were not deemed to constitute a material conflict of interest.

No other members of the Working Party disclosed conflicts of interest.

4.4 Relationship of authors with sponsor

HIS commissioned the Working Party to develop the guidance. Several authors are members of HIS (L.M., L.T., P.H., and P.J.) or HIS staff (M.M.). The remaining authors are members of the British Burn Association (BBA; A.Y., C.T., N.M., S.B., S.S., and V.E.-J.).

4.5 Responsibility for the guidance

The views expressed in the report are those of the authors. Endorsement by HIS and BBA is pending

5 Working Party Report

5.1 What is the Working Party Report?

This report contains recommendations for preventing and controlling infection in burns services. The methodology used to develop the recommendations incorporates a systematic evidence review and synthesis and expert opinion (see Section 7 for further details). The Working Party's interpretation of the evidence to formulate recommendations is presented systematically.

5.2 Why do we need a Working Party Report for this topic?

The vulnerability of burns patients to infection, and their potential role in the transmission of infection to other patients, was highlighted above (see Section 3). There have been numerous reports of outbreaks of multidrug-resistant micro-organisms originating in burns patients and involving patient-to-patient transmission (see, for example, Douglas *et al.*).[6] Contamination of invasive devices and the environment in general, and carriage by healthcare workers, have also been implicated in transmission.[7-11] Several outbreaks of multidrug-resistant micro-organisms have been associated with contamination of water systems.[12, 13] Sometimes transmission extends outwards from burns services,[14, 15] whereas inward movement of patients from non-burns services has been identified as the source of other outbreaks.[16, 17]

Providing care for burns patients presents challenges in terms of the underlying risk of infection, susceptibility to infection with multidrug-resistant micro-organisms (with limited therapeutic options), and multifactorial routes of transmission.[18] BBA has no specific guidance on the prevention and control of infection in burns patients, and while BBA and HIS jointly issued guidance for the design of burns units in 1991,[19] the recommendations have not previously been updated. The International Society for Burn Injuries (ISBI) issued guidance for burn care in two parts, the first of which features IPC in terms of cleanliness of the hospital environment and hand hygiene.[20]

Although the second part of the ISBI guidance covers infections in burns patients,[21] the main focus of the relevant sections is the recognition and treatment of local, systemic and device-related infections, rather than IPC more broadly.

It has long been observed that specific strategies are required to prevent acquisition and spread of infection in burns patients. These include consideration of the unique clinical characteristics of such patients, their segregation from other patients, strict adherence to aseptic technique, and rigorous decontamination of medical equipment and the patient environment. Amid increasing concern among healthcare professionals who care for patients with burn injuries regarding a lack of consistent guidance for preventing and controlling infection in such patients, especially in relation to environmental issues, this Working Party Report was developed to address IPC considerations for this vulnerable patient group.

5.3 What is the purpose of the Working Party Report's recommendations?

The Working Party Report's recommendations constitute guidance for the prevention of infection in burns patients and the design and layout of burns services to minimize the development and spread of infection.

5.4 What is the scope of the guidance?

The guidance covers interventions designed to prevent local or systemic infection in burns patients (including device-related infection). It also covers the design and operation of the built environment in which burns services function. It does not cover the management of suspected or confirmed infection. The guidance was largely developed for hospital settings, but the recommendations might be useful in other healthcare settings providing care for burns patients.

5.5 What is the evidence for the guidance?

The guidance topic was proposed by the former HIS Scientific Development Committee (whose remit was transferred to the HIS Guidelines Committee in 2019) and approved by the HIS Council. The Working Party's considerations regarding the effectiveness of interventions related to preventing and controlling infection in burns services were based on a systematic review and evidence synthesis of peer-reviewed research literature, including quality assessment of the evidence using recognized techniques. The members of the Working Party used their experience and expertise to supplement analysis of the published literature.

5.6 Who developed the guidance?

The Working Party comprised a multidisciplinary group: a consultant burns surgeon, consultants in infectious diseases and clinical microbiology, a consultant clinical scientist, a specialist burns nurse, consultant anaesthetists and intensivists who care for burns patients, a consultant physiotherapist, scientists with specific interest and experience in burn care, and a patient representative. HIS staff with expertise in systematic reviewing prepared the evidence synthesis.

5.7 Who is the guidance for?

Any healthcare practitioner may use the guidance and adapt it as needed. Users will include clinical staff, IPC teams, burn care teams, and commissioners and managers of burns services. The guidance will also be of interest to burns patients and their families/carers.

5.8 How is the guidance structured?

The rationale for the advice is presented in the context of the supporting evidence identified through systematic literature searches or, in the case of clinical areas for which no evidence was identified through the searches, the expert opinion of the Working Party. Evidence statements

summarize the main findings of the systematic literature searches and evidence synthesis. The phrasing and classification of recommendations reflects the strength of the supporting evidence or reliance on expert opinion.

5.9 How frequently will the guidance be reviewed and updated?

The guidance will be reviewed at least every four years and updated if changes are necessary or if new evidence emerges that requires a change in practice.

5.10 Aim

The Working Party report has been developed to guide IPC practice in burns services. It builds on, but does not duplicate, the BBA national standards for the provision of adult and paediatric burn care 2023.

6 Implementation of the guidance

6.1 How can the guidance be used to improve clinical effectiveness?

The guidance can be used to ensure relevant professional groups work in partnership to prevent and control healthcare-associated infection in burns patients and to improve patient safety. It will support quality improvement strategies based on education, training, and clinical audit. It will be relevant both in improving existing services and in new-build projects.

6.2 How much will it cost to implement the guidance?

Some cost implications are to be expected if the guidance is implemented in full. The biggest changes in practice will be around the built environment (for example, providing standalone burns services and sufficient single-occupancy-patient rooms). These changes may result in increased costs if existing services are refurbished or new-build projects are undertaken. Other incremental changes that are less resource intensive will improve efficiency and patient outcomes, for example, ensuring appropriate and timely cleaning and disinfection practices.

6.3 Summary of audit measures

The following may be used as audit measures to evaluate implementation of the guidance.

- All burns patients receive a package of care designed to minimize the risk of healthcare-associated infection. For example, the percentage of burns patients in single-occupancy patient rooms with access to an *en suite* bathroom.
- The built environment in which burns services are delivered meets criteria for preventing and controlling healthcare-associated infection. For example, the percentage of burns services that use filtered or sterile water in patient care.

6.4 Supplementary tools

Continuing professional development (CPD) questions and model answers for self-assessment are presented in Appendix B.

7 Methodology

7.1 Overview

The processes and methods used to develop the systematic evidence review evaluating the effectiveness of interventions for preventing and controlling infection in burns services were based on those described in the NICE guidelines manual. The review question was expressed in the patient-intervention-comparator-outcome (PICO) framework as presented in Table 1.

Table 1: The review question formulated using the PICO framework

Population/setting	Intervention	Comparator	Outcomes
Burns patients and their visitors Burns services	IPC measures specific to burns patients, visitors and services Including but not limited to: • antimicrobial prophylaxis • burn wound dressings • hydrotherapy • microbiological surveillance • cleaning and disinfection processes • air quality • water quality • building design • staffing • communication • education	Alternative IPC measures specific to burns patients, visitors and services (including alternative routes of administration for antimicrobial prophylaxis, etc) Standard IPC measures	Clinical outcomes • colonization • local or systemic infection • mortality attributable to infection • patient perception, including pain • quality of life • duration of hospital stay

IPC infection prevention and control; MRSA meticillin-resistant *Staphylococcus aureus*; PICO patient-intervention-comparator-outcome

Exclusion criteria: descriptive or non-comparative studies; articles published in languages other than English; conference abstracts; studies in which IPC was not the primary aim; studies related to automated decontamination of patient areas (these are covered by the HIS guidance on automated room decontamination),[22] IPC measures targeting MRSA (these are covered by the joint HIS and IPS guideline on the prevention and control of MRSA in healthcare facilities),[23] immunology, immunonutrition, or treatment (rather than prevention) of infection

The Working Party agreed that although antimicrobial prophylaxis and burn wound dressings were not IPC measures in the strictest sense, they were important topics to be included in the guidance. The Working Party further agreed that isolation techniques were not to be included because single-occupancy patient room isolation is now the established standard (see, for example, Raes *et al.*).[24]

Given the large volume of evidence with potential for inclusion, the Working Party agreed a pragmatic approach of including published systematic reviews that closely mirrored the PICO question and the methodology used in developing the guidance, even where these did not mirror every aspect of the PICO framework. See Section 8.1.1 for further details.

7.2 Data sources and search strategy

Three electronic databases (Embase, Emcare and MEDLINE) were searched for published articles using medical subject headings (MeSH) and free-text terms. Reference lists from published reviews identified in the literature searches were used to identify additional studies to be considered for inclusion in the guidance review. No date restrictions were applied as part of the searches. The searches were, however, restricted to English language publications. The searches were first executed in April 2022 and again in July 2023. Further details of the searches are presented in Appendix C.

7.3 Study eligibility and selection criteria

Published articles identified through the literature searches were screened for relevance against the PICO framework. One reviewer examined titles, abstracts, and full texts of all records identified through the searches. A second reviewer checked at least 10% of records earmarked for exclusion at each stage of screening. The results are presented in the study selection flowchart in Appendix D. A list of studies excluded after full-text screening is presented in Appendix E. The entire Working Party reviewed the list of excluded studies.

7.4 Data extraction, analysis, and quality assessment

The characteristics of included studies were summarized in evidence tables presented in Appendix F. For each included study, data were extracted into an evidence table. Included studies were appraised for quality using recognized critical appraisal checklists. The results of study-level quality appraisal are tabulated in Appendix G, with results stratified (organized) by study design. The entire Working Party reviewed the evidence tables and quality appraisal tables.

7.5 Rating of evidence and recommendations

Evidence synthesized in the guidance review was assessed for quality at outcome level using the approach known as Grading of Recommendations Assessment, Development and Evaluation (GRADE) developed by the GRADE working group. The resulting GRADE tables are presented in Appendix H, with results stratified by type of intervention. Using GRADE, the overall quality of the evidence for each clinical outcome was classified as very low, low, moderate, or high.

Evidence statements were constructed by combining the outcome-level classification of evidence quality determined using GRADE and the following terms reflecting the overall confidence in using the evidence to formulate recommendations:

- strong evidence – further research is unlikely to alter confidence in the estimated effect
- moderate evidence – further research might alter the estimated effect and its strength
- weak evidence – further research is very likely to alter the estimated effect and its strength
- inconsistent evidence – current studies report conflicting evidence and further research is very likely to alter the estimated effect.

In accordance with the GRADE approach, the Working Party's recommendations related to clinical outcomes represented in the evidence were phrased to reflect the strength of the evidence and the Working Party's confidence in using it as the basis for developing recommendations.

Where there was little or no evidence related to a particular type of intervention that could be used to guide recommendations, the Working Party used informal consensus to formulate good practice points (GPPs) based on their collective experience and expertise. In addition, the Working Party formulated recommendations for further research to address gaps in the evidence.

7.6 Consultation process

This section will be completed after the external consultation

8 Rationale for recommendations

8.1 What infection prevention and control measures are effective in burns services?

8.1.1 Search results and study selection

The literature searches, which were performed in accordance with the search terms in Tables C.1 and C.2, identified 2854 articles; a further nine articles were identified by handsearching reference lists etc (see Figure D.1). Two thousand, eight hundred and twenty-six articles were eventually excluded, with those considered at the full-text stage being listed in Table E.1 together with reasons for exclusion. A total of 37 articles representing 36 distinct studies were selected for inclusion (see Table F.1).[8, 25-60]

As outlined above, the Working Party made a pragmatic decision to include published systematic reviews that had sufficient similarity to the guideline PICO question. Five such reviews were ultimately included.[27, 33, 42, 54, 59]

A large proportion of the evidence evaluated the following specific types of interventions:

- antimicrobial prophylaxis, including topical and systemic administration and use of non-absorbable antibiotics (selective digestive decontamination)[27, 30, 31, 50, 57]
- burn wound dressings and topical agents[28, 33, 36, 42, 48, 49, 52, 54, 59]
- hydrotherapy[56]
- device-related cleaning and disinfection processes, including those associated with central venous line port protectors,[38] placement of central venous catheters,[43, 46] skin disinfection at central venous catheter insertion sites,[55] and hang time of enteral feeding administration sets[41]
- environmental cleaning and disinfection processes, specifically enhanced measures related to use of infectious waste containers[40]
- staffing in terms of clothing routines for healthcare professionals[47] and enhanced nursing management.[58]

Other interventions reflected in the evidence included bathing practices,[35, 45] decolonization practices,[26] implementation of universal contact precautions,[32] and limiting the use of broad-spectrum antibiotics.[39]

No included studies focused exclusively on interventions related to microbiological surveillance, air quality, water quality, building design, communication, or education. However, several studies evaluated multimodal IPC measures,[25, 37, 44, 51, 53] including some that featured the previously mentioned types of interventions that were not evaluated individually.

Modifiable risk factors for infection were investigated in several observational studies,[8, 29, 34, 60] with a degree of overlap between the risk factors investigated and the types of interventions listed above (for example, hydrotherapy). All four of these studies focused on risk factors for *Acinetobacter baumannii* acquisition or infection.

8.1.2 Assessment of methodological quality

In addition to the five published systematic reviews of randomized controlled trials (RCTs),[27, 33, 42, 54, 59] the included studies comprised eight controlled trials reported in nine articles,[28, 36, 47-49, 52, 55, 57, 58] one controlled before–after study,[39] one interrupted time series,[53] 14 quasi-

experimental (uncontrolled before–after) studies,[25, 26, 30-32, 35, 37, 38, 40, 41, 44, 45, 51, 56] three cohort studies,[43, 46, 50] and four case–control studies.[8, 29, 34, 60] Methodological quality assessments for the included studies are presented according to study design in Tables G.1, G.2, G.3, G.4, G.5, G.6, and G.7, respectively.

8.1.3 GRADE tables

GRADE tables were constructed for each category of evidence described in Section 8.1.1. Tables H.1 to H.45 summarize evidence from published systematic reviews related to antimicrobial prophylaxis, burn wound dressings and topical agents. These tables were prepared sequentially such that outcomes related to treatment contrasts already extracted from a published systematic review were not duplicated in subsequent GRADE tables (to prevent double counting of evidence). For the most part the terminology used in Tables H.1 to H.45 mirrors that of the source systematic reviews to aid cross-referencing with the source material. However, the Working Party's preference for the terminology 'synthetic/biological dressings' (rather than 'skin substitutes' as used in some published systematic reviews) was reflected in the broad categorization of the evidence presented in the GRADE tables. Tables H.46 to H.54 summarize additional evidence related to antimicrobial prophylaxis, burn wound dressings and topical agents; this includes evidence from articles indexed after the published systematic reviews were completed and evidence that met the broader inclusion criteria of the systematic review undertaken as part of the guidance development process. Table H.55 summarizes evidence related to hydrotherapy, Tables H.56 to H.61 summarize evidence regarding device-related cleaning/disinfection processes, Table H.62 summarizes evidence regarding environmental cleaning/disinfection processes, Tables H.63 to H.66 summarize evidence related to staffing considerations, Tables H.67 and H.68 summarize evidence related to bathing practices, Table H.69 summarizes evidence related to decolonization practices, Table H.70 summarizes evidence related to implementation of universal contact precautions, and Table H.71 summarizes evidence related to limiting the use of broad-spectrum antibiotics. Evidence related to multimodal interventions is summarized in Tables H.72 to H.76, and evidence related to modifiable risk factors for infection is summarized in Tables H.77 to H.80.

Most of the evidence was assigned an overall quality rating of very low or low even where it originated from RCTs. Some evidence was rated as being of moderate quality, but this occurred mainly for outcomes such as incidence of colonization or duration of hospital stay, rather than incidence of infection. A frequently occurring reason for downgrading the quality of individual outcomes was serious or very serious risk of bias (as identified through the methodological quality assessments based on study design referred to above). Another frequently occurring reason for downgrading the quality of the evidence was serious or very serious imprecision. In the case of relative treatment effects such as odds ratios (ORs) and risk ratios (RRs), quality of the evidence was downgraded for serious (or very serious) imprecision when the 95% confidence interval (CI) for the relative effect crossed one (or both) prespecified thresholds of 0.8 and 1.25. In the case of absolute treatment effects represented by mean differences (MDs), quality of the evidence was downgraded for serious (or very serious) imprecision when the 95% CI crossed one (or both) prespecified thresholds of half the median standard deviation (SD) of the control groups at baseline (or at follow-up if the SD at baseline was not available).

8.1.4 Evidence statements

Antimicrobial prophylaxis (including topical and systemic administration and use of non-absorbable antibiotics), burn wound dressings, and topical agents

There is moderate evidence that topical antibiotic prophylaxis using silver sulfadiazine increases the incidence of burn wound infection, pain, and duration of hospital stay compared to using burn

wound dressings (including synthetic/biological dressings; Tables H.2, H.12, H.14, H.21, H.22, H.32, and H.33).

There is weak evidence that topical antibiotic prophylaxis using silver sulfadiazine, mafenide acetate, or neomycin with bacitracin and bacitracin/polymyxin B increases the incidence of sepsis and duration of hospital stay compared to using silver nitrate or routine care (Table H.4).

There is weak evidence that topical antibiotic prophylaxis increases pain compared to using silver-based antiseptics, but the impact on infection-related outcomes is unknown (Table H.34).

There is weak evidence that topical antibiotic prophylaxis using silver sulfadiazine reduces the incidence of burn wound colonization compared to enzyme alginogel, but the impact on incidence of burn wound infection, pain, anxiety, health-related quality of life, and duration of hospital stay is very uncertain (Table H.52).

There is weak evidence that topical antibiotic prophylaxis using silver sulfadiazine increases the incidence of burn wound infection and pain compared to using honey or honey-based dressings (Tables H.15 and H.35).

There is weak evidence that topical antibiotic prophylaxis using silver sulfadiazine reduces pain compared to using Aloe Vera, but the impact on infection-related outcomes is very uncertain (Table H.36).

There is weak evidence that topical antibiotic prophylaxis using silver sulfadiazine reduces pain compared to using collagenase ointment applied with bacitrin/polymyxin B, but the impact on infection-related outcomes is very uncertain (Table H.17).

There is weak evidence that topical antibiotic prophylaxis using silver sulfadiazine with chlorhexidine increases the incidence of burn wound infection and pain compared to diphenyldantoin (Table H.18).

There is weak evidence that topical antibiotic prophylaxis using silver sulfadiazine with cerium nitrate reduces the incidence of sepsis and pain compared to silver sulfadiazine alone (Table H.42), but the impact on other infection-related outcomes and duration of hospital stay is very uncertain (Table H.24).

There is weak evidence that topical nystatin for skin grafts reduces the acquisition of yeasts and the incidence of fungaemia compared to no topical nystatin (Table H.47).

There is weak evidence that systemic antibiotic prophylaxis using ampicillin and cloxacillin reduces the incidence of infection with *Staphylococcus aureus* and increases the incidence of infection with *Klebsiella aerogenes* compared to no systemic chemoprophylaxis (Table H.48).

There is weak evidence that systemic antibiotic prophylaxis using gentamicin and erythromycin reduces the incidence of infection with *Klebsiella aerogenes* and increases the incidence of infection with *Pseudomonas aeruginosa* compared to no systemic chemoprophylaxis (Table H.48).

There is weak evidence that systemic antibiotic prophylaxis using trimethoprim-sulfamethoxazole reduces the incidence of pneumonia compared to placebo, but this evidence came from a study in which the primary focus was prevention and control of meticillin-resistant *Staphylococcus aureus* (MRSA) pneumonia (Table H.5).

There is weak evidence that systemic antibiotic prophylaxis using vancomycin reduces the acquisition of MRSA compared to baseline IPC measures, but this evidence came from a study in which the primary focus was prevention and control of MRSA (Table H.46).

There is weak evidence that non-absorbable antibiotic prophylaxis (selective digestive decontamination) using polymyxin E, tobramycin, and amphotericin B increases the duration of hospital stay compared with placebo, but the impact on infection-related outcomes is very uncertain (Table H.8).

There is weak evidence that using a hydrogel dressing reduces pain compared to usual care, but the impact on infection-related outcomes is very uncertain (Table H.30).

There is weak evidence that using a nanocrystalline silver-coated dressing reduces the incidence of burn wound infection compared to using a Vaseline gauze dressing, but this study considered culture of samples from the wound as evidence of infection (Table H.38).

There is weak evidence that using honey-impregnated gauze reduces the incidence of burn wound infection compared to using a bio-occlusive, moisture-permeable polyurethane dressing (Table H.39).

There is weak evidence that changing burn wound dressings once a day rather than twice a day does not increase the incidence of burn wound infection, bacteraemia, pneumonia, or urinary tract infection (UTI), but the impact on these outcomes is very uncertain (Table H.54).

There is weak evidence that using a topical antimicrobial hydrocolloid dressing for facial burns increases patient perception/satisfaction compared to using moist exposed burn ointment (MEBO), but the impact on the incidence of infection-related outcomes is very uncertain (Table H.43).

There is weak evidence that using a topical antimicrobial agent for facial burns increases pain and duration of hospital stay compared to using synthetic/biological dressings, but the impact on the incidence of infection-related outcomes is unknown (Table H.44).

There is weak evidence that topical treatment using MEBO for facial burns reduces pain compared to using a cream containing Helix Aspersa, but the impact on infection-related outcomes is unknown (Table H.45).

There is weak evidence that topical treatment using MEBO for facial burns increases patient perception/satisfaction compared to using saline, but the impact on infection-related outcomes is unknown (Table H.45).

Hydrotherapy

There is weak evidence that discontinuing hydrotherapy reduces the incidence of sepsis-related mortality compared to using hydrotherapy routinely, but the impact on other infection-related outcomes and duration of hospital stay is very uncertain (Table H.55).

There is further evidence related to the impact of hydrotherapy (see multimodal interventions and modifiable risk factors for infection below).

Device-related cleaning and disinfection processes

There is weak evidence that inserting a central venous catheter near an open burn wound increases the incidence of catheter-related bacteraemia compared to insertion far from an open burn wound (Table H.58).

There is weak evidence that disinfecting the skin at central venous catheter insertion sites using mupirocin plus povidone iodine reduces the incidence of skin colonization at the insertion site compared to disinfection using povidone iodine alone, but the impact on the incidence of central line-associated bloodstream infection (CLABSI) is very uncertain (Table H.59).

There is weak evidence that disinfecting the skin at central venous catheter insertion sites three times a day rather than once a day reduces the incidence of skin colonization at the insertion site (Table H.60).

There is weak evidence that using a hang time of 8 hours rather than 4 hours for enteral feeding administration sets does not increase the incidence of hospital-acquired infection, but the impact on this outcome is very uncertain (Table H.54).

There is further evidence related to the impact of device-related cleaning and disinfection processes (see multimodal interventions below).

Environmental cleaning and disinfection processes

There is weak evidence that enhanced infection control measures (such as disinfecting container lids and improved hand hygiene) reduce the incidence of hospital-acquired infection compared to baseline infection control measures (Table H.62).

There is further evidence related to the impact of environmental cleaning and disinfection processes (see staffing considerations and multimodal interventions below).

Staffing considerations

There is weak evidence that a formalized nursing quality management programme (including strengthened training, cleaning/disinfection procedures, and communication with patients) reduces patient anxiety, depression and duration of hospital stay compared to routine nursing management, but the impact on infection-related outcomes is very uncertain (Table H.66).

There is further evidence related to staffing considerations (see multimodal interventions below).

Bathing and decolonization practices

There is weak evidence that total body bathing using chlorhexidine gluconate reduces acquisition of *Candida* and Enterococcus spp. compared to routine bathing (initial surface decontamination using povidone-iodine followed by regular bathing with soap), but the impact on infection-related outcomes is unknown (Table H.67).

There is further evidence related to bathing and decolonization practices (see multimodal interventions below).

Implementation of universal contact precautions and limiting the use of broad-spectrum antibiotics

There is weak evidence that limiting broad-spectrum cephalosporin use reduces the incidence of vancomycin-resistant enterococcus (VRE) infection compared to not limiting broad-spectrum cephalosporin use, but the impact on duration of hospital stay is very uncertain (Table H.71).

There is further evidence related to limiting the use of broad-spectrum antibiotics (see multimodal interventions and modifiable risk factors for infection below).

Microbiological surveillance

No evidence focused exclusively on this topic was identified for inclusion.

Air quality

No evidence focused exclusively on this topic was identified for inclusion. There is some evidence related to air quality (see multimodal interventions below).

Water quality

No evidence focused exclusively on this topic was identified for inclusion.

Building design

No evidence focused exclusively on this topic was identified for inclusion. There is some evidence related to building design (see multimodal interventions below).

Communication

No evidence focused exclusively on this topic was identified for inclusion. There is some evidence related to communication (see staffing considerations above).

Education

No evidence focused exclusively on this topic was identified for inclusion. There is some evidence related to education for healthcare workers (see staffing considerations above and multimodal interventions below).

Multimodal interventions

There is weak evidence that multimodal intensification of infection control measures (more infection control nurses, education programmes for all healthcare workers, increased emphasis on hand hygiene, more stringent clinical waste disposal procedures, implementation of published clinical guidelines for antibiotic use, precautions related to venous cannula sites and urinary catheter use) reduces the prevalence of burn wound infection compared to baseline infection control measures (Table H.72).

There is weak evidence that multimodal intensification of infection control measures (education programmes for all healthcare workers, increased emphasis on hand hygiene, more frequent environmental cleaning/disinfection, increased bed capacity overall and fewer shared patient rooms, increased emphasis on antibiotic stewardship, discontinuation of hydrotherapy tank use, improved air conditioning, appointment of more experienced healthcare professionals, changes to surgical procedures) reduces the incidence of hospital-acquired infection and burn wound infection compared to baseline infection control measures (Table H.74).

There is weak evidence that multimodal intensification of infection control measures aimed at reducing CLABSI (such as a line insertion checklist, daily assessment of need for central access, use of alcohol-impregnated caps, and enhanced nursing care documentation) reduces the incidence of CLABSI compared to baseline infection control measures (Table H.75), but the evidence for this outcome is very uncertain.

There is weak evidence that multimodal intensification of infection control measures aimed at reducing CLABSI (such as development of new blood culture procurement procedures, implementation of chlorhexidine bathing/dressings, use of alcohol-impregnated caps, and routine central venous catheter changes) reduces the incidence of CLABSI compared to baseline infection control measures (Table H.76).

Modifiable risk factors for infection

There is weak evidence that acquisition of multidrug-resistant *A. baumannii* is associated with the number of burn wound excisions (Table H.77), the number of antimicrobials used (Table H.76), use

of carbapenem (Table H.78), receipt of blood products (Table H.79), use of hydrotherapy (Tables H.79 and H.80), and duration of mechanical ventilation (Table H.79).

8.1.5 Interpretation of the evidence

Outcomes that matter most

The Working Party identified colonization, local or systemic infection, and mortality attributable to infection as being the most important outcomes to consider when developing evidence-based guidance for preventing and controlling infection in burns services. The Working Party further considered patient experience (or perception), including pain, and quality of life to be important outcomes. Aspects of quality of life of relevance in developing guidance on the prevention and control of infection in burns services would be those resulting from infectious complications of burn injuries and the impacts of isolation or timing of surgery. Duration of hospital stay was specified as an outcome of interest, in part because of its potential impact on service provision and economic considerations. However, duration of hospital stay might be influenced by factors unrelated to infection risk or its management. It was agreed that patient characteristics such as burn severity and surgical management techniques should be summarized as part of the data extraction process to aid interpretation of the evidence.

The Working Party considered specifying a list of micro-organisms for which data should be extracted, for example, to focus on endogenous or exogenous sources, or multidrug-resistant micro-organisms. Rather than trying to construct such a list in advance, it was agreed that the interpretation of the evidence should take account of the particular micro-organisms associated with colonization, infection, mortality, etc.

The Working Party was aware of a recently published core outcome set for clinical research related to burn care.[61] There were similarities between the Working Party's prioritization of clinical outcomes and those in the core outcome set, but there were differences because the core outcome set was not specific to prevention and control of infection in burns patients. For example, in developing its guidance, the Working Party concluded that mortality attributable to infection was of primary interest, whereas mortality from any cause featured in the core outcome set. Similarly, quality of life was specified as an overarching outcome category in the development of the guidance, whereas ability to undertake daily tasks and psychological wellbeing were specified separately in the core outcome set.

Quality of the evidence

The Working Party highlighted the potential relevance of burn severity and surgical management techniques in influencing the effectiveness of IPC measures, however, many of the included studies did not report such information. Among the clinical outcomes for which the Working Party sought evidence the most frequently reported in the included studies were colonization, local or systemic infection (or device-related infection), pain, and duration of hospital stay. The remaining outcomes of interest to the Working Party (mortality attributable to infection, aspects of patient experience other than pain, and quality of life) were reported very infrequently. Although four of the five published systematic reviews sought evidence related to quality of life they did not report this outcome for interventions and comparators covered by the guidance review.[33, 42, 54, 59]

Overall, most of the evidence was rated as being of very low or low quality, even where it originated from RCTs. The Working Party emphasized the rigour of the analysis undertaken in developing the guidance, despite acknowledging quality issues associated with some of the evidence.

In discussing the evidence, the Working Party highlighted several challenges in designing, conducting, and interpreting research studies related to IPC. One such challenge concerns the definition of infection (and the distinction between colonization and infection). The recognition of infection often involves clinical judgement and decision making in relation to physiological observations, and the absence of a standardized definition of infection (not least in the studies included in the guidance review) can be problematic. Several members of the Working Party had been involved in developing a core indicator set for standardizing reporting of burn wound infection.[62] Similar considerations apply to the recognition of sepsis in burns patients, and in this case a consensus definition has been developed.[63] However, of the studies included in the published systematic reviews that reported sepsis or sepsis-related mortality, all but one predated publication of the consensus definition.

Another challenge concerns the underlying infection rate in some of the included studies. Where the baseline infection level is low, a small sample size may be insufficiently powered to detect a statistically significant difference in infection rates between intervention and comparator groups. For example, Table H.37 reports an incidence rate of less than 4% for the comparator group in a study involving people with relatively minor burns (in whom infection of burn wounds would be a relatively rare occurrence). Additionally, most of the evidence was from single-centre studies with small sample sizes; these characteristics would have contributed to imprecision of effect estimates. Larger, multicentre studies would be needed to recruit sufficiently large samples of burns patients in whom the risk of infection is low.

Benefits and harms

Antimicrobial prophylaxis, antiseptics, and burn wound dressings – general remarks

The greatest volume of evidence included in the guidance review related to antimicrobial prophylaxis, antiseptics, and burn wound dressings. The Working Party considered this evidence in detail but did not find it particularly informative in terms of preventing or controlling infection. Neither topical nor systemic antibiotic prophylaxis had a beneficial effect in terms of reducing infection rates, except in a study cited by one of the published systematic reviews.[27] In this study,[64] the main focus was on preventing MRSA pneumonia in patients with severe burns who required ventilator support. The study was not considered further by the Working Party because HIS plans to develop separate guidance for MRSA prophylaxis. Other studies included in the evidence review did not report a statistically significant effect when pneumonia was considered as an outcome.

On the whole, the evidence related to antimicrobial prophylaxis, antiseptics, and burn wound dressings demonstrated beneficial effects in terms of reducing pain, but not necessarily in reducing infection-related outcomes. The Working Party emphasized that its deliberations and guidance considered how infection impacts on pain, not burn-related pain *per se*, and so any studies that did not report at least one infection-related outcome would be less relevant in the Working Party's discussions. In some instances, absolute effects on infection rates reported in the evidence were beneficial but such effects were generally small and associated with very low-quality evidence (often because of small sample sizes). The Working Party noted that pain might be an easier outcome to measure than infection, and that infection-related outcomes would require larger sample sizes to detect a difference. Nonetheless, the Working Party recognized that the general principles of burn management should apply and they used their expert opinion and experience to formulate several recommendations highlighting the role of topical antimicrobials and antiseptics (combined with aggressive wound care involving early excision and grafting) in reducing the incidence of burn wound infection. Despite there being a lack of evidence that using topical antimicrobials or antiseptics for

superficial burns influences infection-related outcomes, the evidence concerning pain (and other aspects of patient experience) demonstrated that topical antimicrobials and antiseptics might be indicated for reasons other than preventing infection. The Working Party noted that different depths and sizes of burns might require different approaches. There was insufficient evidence to recommend specific types of antimicrobials or antiseptics for topical use. The evidence related to burn wound dressings also highlighted beneficial effects in terms of reducing pain rather than influencing infection-related outcomes. The Working Party noted that some dressings might suppress the multiplication of micro-organisms, thus delivering a nuanced effect on infection-related outcomes. The Working Party emphasized that the effectiveness of burn care does not depend on dressings alone.

The Working Party discussed the relevance of honey in some of the evidence related to topical interventions; this mostly related to honey itself rather than products containing active components of honey. There was insufficient evidence to make a specific recommendation related to honey or honey-containing products.

Antimicrobial prophylaxis, antiseptics, and burn wound dressings – antimicrobial stewardship

Although the Working Party did not specify antimicrobial resistance as an outcome to be considered in the evidence review, principles of effective antimicrobial stewardship were emphasized in the recommendations to reflect standard practice and the Working Party's expert opinion (there being no evidence specific to burns patients). The recommendation concerning antimicrobial resistance might apply to specific antibiotics and across antibiotic classes.

The Working Party recognized that systemic and enteral antimicrobials might be used in the care of burns patients. In such cases, the specific agents to be used should be selected according to local patterns of resistance and the results of any screening or diagnostic samples from the individual patient.

Antimicrobial prophylaxis, antiseptics, and burn wound dressings – dosing

The Working Party highlighted that optimal doses of antimicrobials were important (as might administration of single versus multiple doses be). Several different dosing regimens were reflected in the evidence, but these were insufficient to inform the development of recommendations related to dosing. The Working Party was aware of difficulties in generalizing standard dosages to burns patients because of altered pharmacokinetics in such patients.[65, 66] Moreover, pharmacokinetic parameters could differ dramatically according to the patient's individual circumstances.[67] Considerations linked to altered pharmacokinetics were, therefore, highlighted in a recommendation referring to the use of systemic antimicrobial prophylaxis. The possibility of toxicity when using topical antimicrobials and antiseptics that could be absorbed systemically was also highlighted.

Dosing of antimicrobials is an important consideration in antimicrobial stewardship. The Working Party noted that low antimicrobial dosages associated with antimicrobial dressings might explain their ineffectiveness in preventing infection. Pain, toxicity, and effectiveness were all highlighted as being important when considering antimicrobial dressings.

Antimicrobial prophylaxis, antiseptics, and burn wound dressings – selective decontamination of the digestive tract

The Working Party's interpretation of the evidence related to non-absorbable antibiotic prophylaxis (selective digestive decontamination) was that selective decontamination of the digestive tract was

ineffective in burns patients. The Working Party therefore recommended that selective decontamination of the digestive tract should not be used for this patient group.

Interventions other than antimicrobial prophylaxis, antiseptics, and burn wound dressings – general remarks

The evidence related to areas other than antimicrobial prophylaxis, antiseptics, and burn wound dressings was largely uninformative in terms of specifying recommendations for clinical practice. However, the relevance of multimodal approaches for preventing and controlling infection in burns services (owing to the multifactorial nature of transmission routes)[68] was emphasized. The Working Party's recommendations in these other areas were mainly based on the expert opinion and experience of the Working Party. This was consistent with the findings of Gus *et al.*[69] who considered that the "*evidence available in the literature is not sufficient to create a definitive infrastructure guideline to inform burn unit design"* and that *"consensus guidelines on burn unit infrastructure should be developed, to help healthcare providers, architects, and engineers make informed decisions, when designing new or renovated facilities".* The Working Party's recommendations build on and complement existing national guidance, including the NHS health technical memorandum on specialized ventilation for healthcare buildings the NHS health technical memorandum on safe water in healthcare premises, the NHS national standards of healthcare cleanliness 2021, the Health and Social Care Act 2008: code of practice on the prevention and control of infections, and the BBA national standards for the provision of adult and paediatric burn care 2023. Specific considerations and justifications for key recommendations are outlined below.

Air quality – negative pressure ventilation

The recommendation that rooms in intensive care units (ICUs) and high dependency units (HDUs) and theatres be ventilated at negative pressure to their surrounding environments is additional to the guidance in the NHS health technical memorandum on specialized ventilation for healthcare buildings, which addresses three applications of operating theatres:

- standard operating theatres
- ultraclean operating theatres
- operating theatres for infectious patients.

In the first two categories, the approach to ventilation is to dilute contamination generated in the theatre (that contamination being mainly bacteria on skin scales shed by the surgical team) and flush it out to less critical areas of the theatre suite and the corridor. In the third category (which applies to infectious disease units and isolation facilities, and not specifically to burns services), it is intended that there is a balanced rate of supplied and extracted air from the theatre such that "*air should not cascade from the theatre to the surrounding rooms*"; this is described as "*neutral pressure*". It is, in practice, difficult to ensure precise neutrality such that air will never pass from the theatre to surrounding areas. With burns patients, colonization or infection with bacteria that are a hazard to other burns patients is likely, and bacteria liberated in the theatre from a patient should not be able to pass out into common areas of the burns service. A theatre at negative pressure to its surroundings will achieve this with far higher quality assurance than a theatre intended to be at neutral pressure. There is no advantage in using a neutral pressure design for burns theatres. The theatre can have both supply and extract ventilation but the theatre pressure should be around 10 pascals negative pressure to the corridor. The clean preparation room should be around 10 pascals positive pressure to the theatre (so 20 pascals positive pressure to the corridor, also protecting stored items from contamination from that direction). The dirty utility (sluice) should be around 5 pascals negative pressure to the theatre (that is, –15 pascals to the corridor). The anaesthetic room

can have equal supply and extract ventilation but air should also flow into it from the corridor and then into the theatre. These pressures are approximate and it is the robust and reliable direction of airflows that is important, rather than the pressures that result. The air change rate in the theatre should be calculated from the theatre extract rate and should be around 15–20 air changes per hour, but this is a less critical parameter than for other theatre types.

Water quality – recognition of risks

The Working Party wished to highlight the risks of infection associated with burns services in general, and risks associated with water, wastewater and non-sterile aqueous solutions (for example, solutions contained in preprepared wipes) in particular. While *Pseudomonas aeruginosa* might be regarded as the most common waterborne micro-organism in burns services, a wide range of micro-organisms (including other bacteria and fungi) found in water, wastewater, and aqueous solutions have been implicated in causing infection in such services. All routes by which water, wastewater or aqueous solutions come into contact with burns patients and their immediate environment should be considered as part of a healthcare organization's water safety plan. This should include consideration of the periphery of the water system (the last 2 m of pipework preceding a water outlet, any devices attached to the outlet, and the corresponding wastewater system).[70] Unless this is undertaken, waterborne opportunistic pathogens may still find their way to the patient. In burns services the temptation may be to concentrate on water used for hydrotherapy and miss other sources. For example, contaminated cleaners' spray cleaning bottles, water used for shaving, and splashing from wash-hand basins have all been implicated in outbreaks of waterborne infections. The Centers for Disease Control and Prevention (CDC) provides information about waterborne opportunistic pathogens and potential transmission routes from water to patients (see the CDC online resources for preventing healthcare-related infections).

Water quality – reducing the use of tap water and exposure to wastewater

Various strategies have been proposed to reduce or eliminate exposure of patients to contaminated water or wastewater. A specific example involved the removal of all sinks from ICU patient rooms and the introduction of a "*water-free*" approach to patient care whereby all activities related to patient care within patient rooms that would normally require the use of tap water were replaced by 'water-free' alternatives.[71] For example, patient medication was dissolved in bottled water, which was also used for patient drinks and dental care; washing was undertaken using moistened disposable wash gloves, with wipes followed by alcohol-based hand rub being used for the removal of visible contamination. The introduction of 'water-free' patient care was associated with a reduction in the rate of colonization of patients with Gram-negative bacteria. The term 'water-free care' is not entirely accurate because of the use of water from alternative sources such as bottled water instead of tap water. Also the ICU had access to a mobile hand-wash basin for use in the event of a serious outbreak of *Clostridium difficile* infection.

The Working Party recognized the evolving nature of interventions designed to reduce the risk of burns patients experiencing water-related infections, and debate surrounding the use of water in other areas of clinical practice (for example, using water for cleansing wounds in any healthcare setting).[72] While some intensive care and burns services have started to reduce the use of water, particularly for personal care of patients (patient hygiene), there is a diversity of opinion in existing international guidance. The Working Party's view was that it would be reasonable to consider including measures intended to reduce exposure of burns patients to water and wastewater as part of new-build projects, or during the substantial refurbishment of an existing burns service. However, many existing burns services would find it difficult to introduce 'water-free' burns services immediately. The Working Party ultimately concluded that there was insufficient evidence at the

time of preparing the guidance to formulate strong recommendations concerning 'water-free' care. However, the consensus view of the Working Party was that a recommendation encouraging burns services to explore possibilities for reducing the use of water where it is safe to do so, or using sterile water where feasible, should be included. It was noted that cultural and behavioural change would be needed to support implementation of the recommendations, and development of training in this area would be helpful.

Water quality – hydrotherapy baths

The use of hydrotherapy baths was highlighted as a particular area of concern, both in the evidence included in the guidance systematic review and the Working Party's wider experience. The Working Party concluded that hydrotherapy baths should be avoided for adults, and for those children for whom shower trolleys can be used, and that hydrotherapy baths with internal recirculation jets should not be used.

Cleaning and disinfection (decontamination)

The challenges involved in preventing and controlling infection in burns services are well documented,[10, 13, 73, 74] and the Working Party recognized that effective cleaning and disinfection (decontamination) of equipment and the environment is an important aspect of IPC strategies. This motivated many of the Working Party's recommendations regarding cleaning and disinfection, which were developed with reference to the recently published joint HIS and ESCMID guideline on rituals and behaviours in operating theatres[75] and the HIS guidance on automated room decontamination.[22] The Working Party emphasized the importance of terminal decontamination in burns services since inanimate surfaces that make direct or indirect contact with burns patients can be vectors of microbial contamination between patients. When a burns patient moves into a space previously occupied by another such patient, they will be at prolonged exposure to what has been dispersed from the previous patient. Terminal decontamination is a standard term used to encompass all measures involved in eliminating the microbial contamination.

Microbiological screening and diagnostic sampling

The Working Party was aware of the role of microbiological surveillance in burns services. This refers to the systematic collection, analysis, and interpretation of data on patterns of micro-organisms and antibiotic susceptibility in samples obtained from burns patients. Surveillance typically involves the microbiology of burn wounds and blood cultures from burns patients. The Working Party distinguished between microbiological surveillance conducted at a population level and the need for screening for multidrug-resistant micro-organisms at various stages during the care of individual burns patients (for example, screening on admission for MRSA, VRE and carbapenem-resistant micro-organisms), and diagnostic sampling for those burns patients with clinical signs consistent with an acute infection.

Staffing

In terms of staffing, the Working Party was aware of the importance of multidisciplinary team (MDT) involvement in the care of burns patients. This is emphasized in the BBA national standards for the provision of adult and paediatric burn care 2023. The Working Party was particularly aware of research studies highlighting the role of nursing staff in providing effective care for burns patients, in part through articles included in the guidance systematic review, and through knowledge of the wider research literature.[76-78]

Environmental impact and sustainability

This is the first Working Party Report developed with HIS funding to include consideration of the environmental impact and sustainability of its recommendations. The Working Party's discussions

highlighted various issues related to environmental impact and sustainability in providing care in burns services. For example, the biodegradability of burn wound dressings is unknown, although these are in any case disposed of through healthcare waste systems and incineration. Manufacturing materials and processes could be important in terms of environmental impact and sustainability, and the future design of, for example, new dressings might take account of their carbon footprint. There may be opportunities for recycling some items such as dressing pots. Ultimately the Working Party concluded that clinical considerations in relation to the use of burn wound dressings and other aspects of IPC in burns services should take precedence over environmental considerations because of the need to ensure patient safety. Nevertheless, the Working Party recommended that consideration be given to the environmental impact and sustainability of resources used in burns services while acknowledging the current need for single-use and single-patient use items. The Working Party's recommendations highlighted that burns services should refer to their local green plan (see, for example, the NHS guidance on delivering a 'net zero' national health service). A local green plan should outline how a healthcare provider's carbon footprint will be reduced in the areas of: estates and facilities; travel and transport; the supply chain; medicines; and research, innovation, and offsetting. When implementing this joint HIS and BBA guidance, burns services should be mindful of the impact on their local green plan with particular reference to the disposal of clinical waste and decontamination of reusable equipment.

Cost effectiveness and resource use

Some studies included in the systematic evidence review conducted as part of the guidance development process identified interventions that were as effective as the relevant comparator but required fewer resources such as nursing input. Implementation of these interventions would result in cost savings. For example, there was evidence in relation to once-daily dressing changes as compared to twice-daily dressing changes (Table H.54) and increased hang time of enteral feeding administration sets as compared to standard hang time (Table H.61). However, these interventions were not seen to be of sufficient practical benefit for general implementation, and so they did not feature in the Working Party's recommendations. For the most part, the Working Party's recommendations mirrored current practice, meaning that they would not incur the use of additional healthcare resources. Preventing and controlling infection is generally considered to be preferable to treatment necessitated as a result of infection.

Other considerations

Recommendations for further research – study design principles

In considering potential areas for future research, the Working Party's discussions focused on research topics themselves and how such research should be conducted. As outlined earlier, the choice of outcomes to be considered as part of a research study and the preference for standardized reporting of burn wound infection were highlighted as being important. The Working Party noted that none of the studies included in the guidance systematic review explored antimicrobial resistance as an outcome metric (nor was this specified as an outcome in the PICO formulation of the Working Party's review question). It was suggested that future research might use a composite clinical definition of burn wound infection (to be distinguished from colonization) and determination of antimicrobial resistance metrics. The Working Party commented that some included studies reported nuanced or subtle effects, and that the statistical power required to detect rare events such as infection in burns patients should prompt the application of large, multicentre study designs.

Recommendations for further research – topics to be prioritized

In terms of topics for future research, the Working Party prioritized the areas of:

- pharmacokinetic and pharmacodynamic (PKPD) studies in burns patients undergoing antimicrobial prophylaxis (this was not investigated in the evidence included in the guidance systematic review, but the Working Party's view was that it might explain some of the variability observed in the evidence)
- improving water safety in burns services
- education and training for professionals working in burns services (with a particular focus on water safety)
- microbiological surveillance (for example, national or international point prevalence studies)
- environmental impact and sustainability.

Further details are provided in Section 9.

Recommendations

Recommendations that are based on the expert opinion and experience of the Working Party, rather than the evidence synthesized in the guidance systematic review, are indicated by the suffix [GPP].

Infection prevention and control strategies in burn care management

Recognition of risks

- Be aware that burns services represent high-risk clinical services from the point of view of infection transmission. Effective IPC strategies are key to preventing:
  - transmission between patients in the burns service
  - the spread of multidrug-resistant or other relevant micro-organisms to other areas of the hospital
  - multidrug-resistant or other relevant micro-organisms from becoming endemic and spreading via transfer of patients between burns services in different geographical areas.
- Be aware that burns patients are highly susceptible to infection from micro-organisms associated with water, wastewater and non-sterile aqueous solutions.

Antimicrobial prophylaxis, antiseptics, and burn wound dressings

- Consensus practice demonstrates the use of topical antimicrobials and antiseptics, in conjunction with aggressive wound care involving early excision and grafting, has been associated with a significant decline in the incidence of burn wound infections. [GPP]
- Superficial burns may be treated with topical antimicrobials, antiseptics, and dressing changes.
- There is insufficient evidence to make recommendations about specific antimicrobials and other topical agents to reduce sepsis or local infections in burns patients.
- Topical antimicrobials that can also be administered systemically can lead to antimicrobial resistance and should be avoided or used only as a last resort.
- Topical antimicrobials and antiseptics that can be absorbed systemically should be considered for possible toxicity because of the large area of absorption.
- Antimicrobial guidelines for systemic or enteral antimicrobials should be based on local resistance patterns of micro-organisms and infection.
- Be aware that, when systemic antimicrobials are used for prophylaxis, special attention should be paid to dosing because of the abnormal pharmacokinetics in burns patients.

- The duration of surgical prophylaxis should not exceed 48 hours from the perioperative period. [GPP]
- Do not use selective decontamination of the digestive tract for burns patients.

Built environment in burns services

Building design and layout

- A burns service should be designed to minimize the need for burns patients to access care outside the service. It should have its own entrance that is controlled so that patients can be brought in and out of the area without having to traverse other areas of the hospital. The service should have a clear access pathway separate from the emergency department. [GPP]
- Burns patients requiring intensive care should be cared for within the burns service and not in a general ICU. If this is not feasible, there should be a self-contained area within the general ICU with staff and facilities specifically for burns patients. [GPP]
- Burns patients requiring intensive or high dependency care should be cared for in single-occupancy patient rooms.
- Store the minimum amount of equipment and supplies (disposable or otherwise) necessary to care for a patient in their room and any item that cannot be thoroughly decontaminated, including disposables, should be discarded when the patient vacates the room. [GPP]
- Clean stores for a burns service should be located in an area that minimizes the risk of contamination. [GPP]
- Each patient room should have storage for its own cleaning equipment in the lobby. [GPP]
- There should be a wash-hand basin in the lobby and a risk assessment should be performed when considering having an additional wash-hand basin in the patient room. [GPP]
- There should be a shower trolley drain in each patient room (see recommendations on water quality). [GPP]
- Drains should be of an adequate size and designed to minimize blockage. Waste traps should be easily removable for cleaning. Design should take account of the need for regular cleaning and maintenance. [GPP]

Air quality – specialized ventilation in burns services

- ICU/HDU rooms and theatres should be ventilated at negative pressure to their surrounding environments (rather than being at neutral pressure, positive pressure, or with switchable air pressures). [GPP]
- Dressing changes should take place in a controlled environment with the door closed with adequate cleaning and disinfection between patients. This should include leaving particles from the patient in room air to settle for 30 minutes or at least five air changes (whichever is quicker) before starting cleaning and disinfection. [GPP]
- At least five air changes should occur after one patient leaves theatre before setting up for the next patient. [GPP]
- Burns theatres should be used only for burns patients. [GPP]
- For other aspects of specialized ventilation follow the NHS health technical memorandum on specialized ventilation for healthcare buildings.

Water quality – water in burn care, including hydrotherapy (water-assisted dressing changes)

- Follow the general guidance on water safety provided in the NHS health technical memorandum on safe water in healthcare premises. The further recommendations below address the extra complexity of burns services and water safety.
- Where there is a safe alternative consider reducing the use of water for the care of burns patients, or using sterile water where feasible. [GPP]
- Water safety plans should:
    - include all routes by which water, wastewater or aqueous solutions come into contact with burns patients and their immediate environment
    - be based on a risk assessment of how micro-organisms could come into contact with burns patients via water, wastewater or aqueous solutions
    - include processes to minimise infection from *Pseudomonas aeruginosa* and other waterborne opportunistic pathogens as determined by local practices such as changes of shower heads and hoses between patient room occupancy.
- Water outlets in burns services should be tested in accordance with the NHS health technical memorandum on safe water in healthcare premises with additional testing based on local risk assessment.
- Provide dedicated facilities within each patient area for the disposal of wastewater. [GPP]
- Water from taps should not flow directly into any drain, as this could splash drain contents out of the sink. Wash-hand basins with drains at the rear of the sink are to be preferred. [GPP]
- Water should drain freely out of sinks and showers to prevent reflux of drain contents and any impairment of drainage should be rectified as soon as possible (before the drain becomes blocked). [GPP]
- Water outlets and wash-hand basins should be placed to minimize the risk of splashing when the outlet is opened. [GPP]
- Consideration should be given to the distance between wash-hand basins and other equipment/supplies to avoid deposition of splashes; for example, 2 metres is reasonable. If this is not feasible, splash screens should separate the wash-hand basin from its surroundings. [GPP]
- Shower trolleys should drain, via an air gap, into a receiving hopper that feeds into a drain via a waste trap. [GPP]
- The use of thermostatic mixing valves should be mandatory on water outlets designed for whole-body immersion and use outside these areas should be risk assessed. [GPP]
- Ongoing water surveillance for micro-organisms should take place in line with the NHS health technical memorandum on safe water in healthcare premises and local risk assessment, comparing relevant patient isolates with those of water samples, with speciation in addition to *Pseudomonas aeruginosa* and typing as necessary.
- Hydrotherapy baths should be avoided for adults, and for those children for whom shower trolleys can be used.
- Hydrotherapy baths with internal recirculation jets should not be used. [GPP]
- When designing a new burns service, hydrotherapy facilities (for example, use of shower trolleys) where required should be provided in single-occupancy patient rooms rather than in a central area to reduce the risk of cross-infection. [GPP]

- Point-of-use filters may be used on a risk-assessed basis to reduce micro-organisms in water; routine use of point-of-use filters is not recommended. [GPP]
- If point-of-use filters are used, these should be replaced as part of the terminal decontamination (see recommendations on cleaning and disinfection). [GPP]

Cleaning and disinfection (decontamination) of equipment and the environment

General considerations

- All UK guidelines and standards for cleaning and disinfection, including the NHS national standards of healthcare cleanliness 2021, will apply to burns services. In addition, consideration is needed for specific challenges in burns services.
- Cleaning an area while one patient occupies it is of minimal importance to preventing infection transmission. The burns environment, including each patient room, should be cleaned at least once daily. [GPP]
- There is no advantage to using daily disinfection because contamination will reoccur rapidly. [GPP]
- The main focus for routine cleaning should be that neither the cleaning equipment nor the cleaner's hands act as a vehicle for contamination transmission to other patient areas. [GPP]
- Be aware of the importance in burns services of effective terminal decontamination (cleaning and disinfection after one patient has left an area and before another patient is brought into that area) because of the risk of environmental contamination with multidrug-resistant or other relevant micro-organisms. [GPP]
- Effective environmental decontamination is best achieved by:
    - methods specified in consultation with the IPC team
    - ensuring that all staff involved are adequately trained, equipped, motivated and supervised
    - implementing systems that recognize that different staff groups will be involved in the decontamination of patient equipment and the environment, and that responsibility for every item is allocated. [GPP]
- For routine cleaning of single-occupancy patient suites, including ICU and HDU, cloths and mops should either be single use or thermally disinfected in a validated wash cycle between uses. Cleaning equipment, such as buckets and mop handles should be used on that suite for the duration of the patient's stay and then discarded. [GPP]
- Cleaning for burns services is a specialist area and requires staff to be allocated specifically to the burns service and trained in the specific requirements of that service. [GPP]
- Equipment requires either cleaning and disinfection between every use or discarding if effective cleaning and disinfection is not possible. [GPP]
- Cleaning equipment should be kept in the ICU/HDU suite, preferably in the lobby, as far as possible. This should be reflected in storage facilities incorporated into the design of new-build premises. [GPP]

Audit of cleaning and disinfection

- Visual audit of cleaning and adherence to standards should take place regularly in line with the NHS national standards of healthcare cleanliness 2021.

- There should be a more in-depth audit of cleaning and disinfection during an outbreak or if there is concern about infection transmission. [GPP]

Burns operating theatres

- Allow sufficient time between patients on a theatre list to ensure thorough cleaning and disinfection of all relevant surfaces. This may be facilitated by putting patients known to be colonized or infected with multidrug-resistant or other relevant micro-organisms last on the list, but this may not always be possible. [GPP]

Buckets for cleaning

- Buckets for cleaning should be filled from a non-hand wash supply. For single-occupancy patient rooms there should be a lobby with a non-hand wash supply. If this is not available, buckets should be filled from a dedicated ward area such as a cleaner's room for each bucket. [GPP]

Disposal of cleaning fluids

- Disposal of cleaning fluids should occur in the patient's shower trolley hopper or dedicated waste disposal in the lobby and never in wash-hand basins. [GPP]
- Care should be taken not to contaminate the environment around the disposal point of cleaning fluids. If such contamination occurs the area should be cleaned and disinfected immediately. [GPP]

Mattresses

- Following vacating of a patient bed, the covers for conventional mattresses should be verified as intact, including inspection of the mattress foam for soiling or wetting. [GPP]
- Mattress covers should be cleaned and then disinfected using a compatible disinfectant with a controlled exposure time before the disinfectant dries. [GPP]
- Dynamic mattresses should be decontaminated either in a validated procedure offsite or in a dedicated facility within the hospital where they can be taken apart and each component decontaminated in a quality-assured process. [GPP]

Pillows

- Pillows should be single-patient use in ICU/HDU, or if the patient is known to be colonized or infected with multidrug-resistant or other relevant micro-organisms, and disposed of after the patient's stay. [GPP]

Curtains

- Privacy curtains and window curtains should be changed between patient occupancies – these should either be laundered or disposed of. Non-removable window coverings and accessories such as fixed operating cords should be avoided. [GPP]

Unused single-use supplies

- All single-use supplies in ICU/HDU suites and single-occupancy patient rooms should be disposed of between patient occupancies (minimizing stock levels in the room will minimize waste). [GPP]
- Where patient contact equipment is not amenable to effective cleaning and decontamination (for example, blood pressure cuffs) these should be treated as single-patient use and disposed of whether intended for single use or not. [GPP]

Shower trolleys

- It is preferable that shower trolleys are single-patient use, especially if the patient is known to be colonized or infected with multidrug-resistant or other relevant micro-organisms. [GPP]
- When terminal decontamination of a shower trolley occurs, all surfaces of both the tray and supporting trolley should be cleaned and then disinfected with an effective, compatible disinfectant (preferably hypochlorite at 1000 parts per million available chlorine). As all surfaces are likely to become contaminated via water films during use, all surfaces of both the tray and supporting trolley should be decontaminated. [GPP]
- There should be particular attention to the integrity of the flexible plastic tray, with only fully intact trays being used. [GPP]
- Some shower trolleys come with flexible drain hoses. Such hoses are impossible to clean and should be replaced as part of the terminal decontamination. [GPP]
- All surfaces that have direct or indirect contact with staff hands or patients should be cleaned and disinfected with compatible disinfectants ensuring good contact with liquid disinfectant for an appropriate time (this is particularly important with a volatile disinfectant such as alcohol). [GPP]
- Shower heads and, if used, flexible shower hoses should be replaced as part of the terminal decontamination (even if there is no contact with the patient, these will be contaminated by contact with staff hands). [GPP]
- Liners offer unreliable protection against the contamination of shower trolleys and should be avoided. [GPP]

Hydrotherapy baths

- Where hydrotherapy baths are used, all associated surfaces that have staff hand or patient contact should be disinfected with an effective, compatible disinfectant (preferably hypochlorite containing 1000 parts per million available chlorine) with prior cleaning of visible contamination. This should include, but not be limited to, the bath surface, taps, the shower head and hose, and all relevant surfaces of any hoist or other patient-moving equipment. Where feasible, attachments such as the shower head and hose should be changed between patients. [GPP]

Automated room decontamination

- Automated room decontamination (using hydrogen peroxide or ultraviolet light systems) should be conducted in line with the HIS guidance on automated room decontamination,[22] noting the importance of completing manual cleaning and disinfection

to the same high standard regardless of the subsequent use of automated decontamination devices.

Splint pans

- Patients' splints should be cleaned and then disinfected with hypochlorite containing 1000 parts per million available chlorine before being immersed in a splint pan for remoulding. [GPP]
- The water temperature of splint pans should be at least 70° C and the attainment of this temperature should be validated and recorded periodically. [GPP]
- Splint pans should be emptied daily and cleaned according to the manufacturer's instructions. [GPP]
- Any parts of splint pans that have not been thermally disinfected should be disinfected with hypochlorite containing 1000 parts per million available chlorine immediately after use if the patient is known to be colonized or infected with multidrug-resistant or other relevant micro-organisms. [GPP]

Rehabilitation equipment and rooms, gyms, and toys

- Therapy and rehabilitation equipment that is amenable to decontamination should be cleaned thoroughly and disinfected after every use. [GPP]
- Patients known to be colonized or infected with multidrug-resistant or other relevant micro-organisms should receive their therapy treatment at the end of the working day or after unaffected patients if the therapist is working alone. Alternatively such patients should be treated by a cohort of therapy staff and contact with unaffected patients should be avoided. [GPP]
- After being used by a patient known to be colonized or infected with multidrug-resistant or other relevant micro-organisms, gymnasium equipment and areas should be cleaned thoroughly and disinfected with hypochlorite or other suitable disinfectant. [GPP]
- Children with major burns and those who are known to be colonized or infected with multidrug-resistant or other relevant micro-organisms should be encouraged to have their own allocated toys. [GPP]
- Playrooms should not be used by children who are highly susceptible to infection or known to be colonized or infected with multidrug-resistant or other relevant micro-organisms. [GPP]

Microbiological screening and diagnostic sampling in burns services

- On admission all burns patients should be screened for multidrug-resistant micro-organisms (for example, MRSA, VRE, and carbapenem-resistant micro-organisms) in line with the Health and Social Care Act 2008: code of practice on the prevention and control of infections and local guidance. Screening for other multidrug-resistant micro-organisms such as *Acinetobacter baumannii* and *Candida auris* may be relevant where there is an epidemiological indication.
- Interval screening should continue for multidrug-resistant micro-organisms for the duration of the patient's admission. [GPP]
- Opportunistic screening should occur when the patient undergoes a procedure such as dressing changes or debridement. [GPP]

- Diagnostic sampling will be needed if there are clinical signs consistent with an acute infection. [GPP]

Staffing in burn care

- Healthcare workers providing burn care should understand and adhere to the IPC standards of the local burns service at all times.
- Burns services should be staffed with trained and competent staff, including temporary workers, compliant with the BBA national standards for the provision of adult and paediatric burn care 2023; the standards include 24/7 staffing.
- There should be documented evidence of IPC in CPD, linked to annual appraisal. [GPP]
- Occupational health should form part of an outbreak team with attention to staff with breaks in skin and skin conditions, and those who are immunocompromized. [GPP]

Transfer of patients between burns services and admission of non-burns patients to burns wards

- When patients are transferred between burns services within the same country, or between different countries, information should be provided about colonization or infection with multidrug-resistant micro-organisms or if there are any local infection incidents or outbreaks.
- The burns service should make decisions about admission of non-burns patients to burns wards. [GPP]

Visitors

- There should be controlled entry of visitors to the burns service. [GPP]
- Visitors should be supervised and given ongoing guidance on relevant IPC practice. [GPP]
- Closely supervised visiting with limited numbers of visitors should be enforced for severely burned patients. [GPP]
- Visitors to patients known to be colonized or infected with multidrug-resistant or other relevant micro-organisms should not mix with visitors to other patients. Arrangements to facilitate this should be determined at MDT level. [GPP]
- Consideration should be given to the possibility of transmission of multidrug-resistant or other relevant micro-organisms in other areas (for example, communal areas outside the burns service and overnight stay facilities). [GPP]

Environmental impact and sustainability

- Consideration should be given to the environmental impact and sustainability of resources used in burns services while acknowledging that burns services currently require single-use and single-patient use items to prevent transmission of infection. [GPP]
- When new ventilation systems are installed, or existing systems upgraded, they should comply with energy recovery efficiencies detailed in the NHS health technical memorandum on specialized ventilation for healthcare buildings.
- Burns services should refer to their local green plan and consider energy-efficient approaches to the disposal of healthcare waste and potential uses of incinerated waste.

9 Further research

The Working Party identified the following as priorities for future research.

- PKPD studies to determine effective dosages in burns patients undergoing antimicrobial prophylaxis (such studies should explore intravascular pharmacokinetics and pharmacodynamics of antimicrobials, and end-organ/tissue concentrations)
- improving water safety in burns services (for example, improving water quality by using point-of-use filters and sterile water whenever possible, and developing 'water-free' care and services such as reducing the number of wash-hand basins)
- education and training for professionals working in burns services (with a particular focus on water safety)
- microbiological surveillance (for example, national or international point prevalence studies focusing on *Pseudomonas aeruginosa* colonization)
- environmental impact and sustainability.

References

1. Ansermino, M. and C. Hemsley, *Intensive care management and control of infection.* British Medical Journal, 2004. **329**(7459): p. 220-223.
2. D'Abbondanza, J.A. and S. Shahrokhi, *Burn infection and burn sepsis.* Surgical Infections, 2021. **22**(1): p. 58-64.
3. Ladhani, H.A., C.J. Yowler, and J.A. Claridge, *Burn wound colonization, infection, and sepsis.* Surgical Infections, 2021. **22**(1): p. 44-48.
4. Vinaik, R., et al., *Management and prevention of drug resistant infections in burn patients.* Expert Review of Anti-Infective Therapy, 2019. **17**(8): p. 607-619.
5. Williams, F.N. and J.O. Lee, *Pediatric burn infection.* Surgical Infections, 2021. **22**(1): p. 54-57.
6. Douglas, M.W., et al., *Multi-drug resistant Pseudomonas aeruginosa outbreak in a burns unit - an infection control study.* Burns, 2001. **27**(2): p. 131-135.
7. Falk, P.S., et al., *Outbreak of vancomycin-resistant enterococci in a burn unit.* Infection Control and Hospital Epidemiology, 2000. **21**(9): p. 575-82.
8. Simor, A.E., et al., *An outbreak due to multiresistant Acinetobacter baumannii in a burn unit: risk factors for acquisition and management.* Infection Control and Hospital Epidemiology, 2002. **23**(5): p. 261-267.
9. Saida, N.B., et al., *Clonality of Providencia stuartii isolates involved in outbreak that occurred in a burn unit.* Burns, 2008. **34**(6): p. 829-834.
10. Decraene, V., et al., *An outbreak of multidrug-resistant Pseudomonas aeruginosa in a burns service in the North of England: challenges of infection prevention and control in a complex setting.* Journal of Hospital Infection, 2018. **100**(4): p. e239-e245.
11. Yagnik, K.J., et al., *Outbreak of Acinetobacter baumannii associated with extrinsic contamination of ultrasound gel in a tertiary centre burn unit.* Infection Prevention in Practice, 2019. **1**(2): p. 100009.
12. Embil, J.M., et al., *An outbreak of methicillin resistant Staphylococcus aureus on a burn unit: potential role of contaminated hydrotherapy equipment.* Burns, 2001. **27**(7): p. 681-688.
13. Tissot, F., et al., *New genotyping method discovers sustained nosocomial Pseudomonas aeruginosa outbreak in an intensive care burn unit.* Journal of Hospital Infection, 2016. **94**(1): p. 2-7.
14. Roberts, S.A., R. Findlay, and S.D.R. Lang, *Investigation of an outbreak of multi-drug resistant Acinetobacter baumannii in an intensive care burns unit.* Journal of Hospital Infection, 2001. **48**(3): p. 228-232.
15. Teare, L., et al., *Outbreak of Panton-Valentine leucocidin-positive meticillin-resistant Staphylococcus aureus in a regional burns unit.* Journal of Hospital Infection, 2010. **76**(3): p. 220-4.

16. Bayat, A., et al., *Implications for Burns Unit design following outbreak of multi-resistant Acinetobacter infection in ICU and Burns Unit.* Burns, 2003. **29**(4): p. 303-306.
17. Herruzo, R., et al., *Two consecutive outbreaks of Acinetobacter baumanii 1-a in a burn Intensive Care Unit for adults.* Burns, 2004. **30**(5): p. 419-423.
18. Girerd-Genessay, I., T. Benet, and P. Vanhems, *Multidrug-resistant bacterial outbreaks in burn units: a synthesis of the literature according to the Orion statement.* Journal of Burn Care and Research, 2016. **37**(3): p. 172-180.
19. Ayliffe, G.A.J., et al., *Principles of design of burns units: report of a Working Group of the British Burn Association and Hospital Infection Society.* Journal of Hospital Infection, 1991. **19**(1): p. 63-66.
20. Ahuja, R.B., et al., *ISBI Practice Guidelines for Burn Care.* Burns, 2016. **42**(5): p. 953-1021.
21. Allorto, N., et al., *ISBI Practice Guidelines for Burn Care, Part 2.* Burns, 2018. **44**(7): p. 1617-1706.
22. Beswick, A.J., et al., *Automated room decontamination: report of a Healthcare Infection Society Working Party.* Journal of Hospital Infection, 2022. **124**: p. 97-120.
23. Coia, J.E., et al., *Joint Healthcare Infection Society (HIS) and Infection Prevention Society (IPS) guidelines for the prevention and control of meticillin-resistant Staphylococcus aureus (MRSA) in healthcare facilities.* Journal of Hospital Infection, 2021. **118**(Supplement): p. S1-S39.
24. Raes, K., et al., *Protective isolation precautions for the prevention of nosocomial colonisation and infection in burn patients: A systematic review and meta-analysis.* Intensive & critical care nursing, 2017. **42**: p. 22-29.
25. Atukorala, S.D., *Monitoring effectiveness of controlling hospital acquired infections by prevalence surveys.* The Ceylon Medical Journal, 1998. **43**(3): p. 134-137.
26. Baier, C., et al., *Universal decolonization with octenidine: First experiences in a tertiary burn intensive care unit.* Burns Open, 2019. **3**(1): p. 8-11.
27. Barajas-Nava, L.A., et al., *Antibiotic prophylaxis for preventing burn wound infection.* Cochrane Database of Systematic Reviews, 2013(6).
28. Brown, M., et al., *A randomized controlled study of silver-based burns dressing in a pediatric emergency department.* Journal of Burn Care and Research, 2016. **37**(4): p. e340-e347.
29. Cavalcante, R.D.S., P. Canet, and C.M.C.B. Fortaleza, *Risk factors for the acquisition of imipenem-resistant Acinetobacter baumannii in a burn unit: An appraisal of the effect of colonization pressure.* Scandinavian Journal of Infectious Diseases, 2014. **46**(8): p. 593-598.
30. Cerda, E., et al., *Enteral vancomycin controls methicillin-resistant Staphylococcus aureus endemicity in an intensive care burn unit: A 9-year prospective study.* Annals of Surgery, 2007. **245**(3): p. 397-407.
31. Dube, M.P., et al., *Fungemia and colonization with nystatin-resistant Candida rugosa in a burn unit.* Clinical Infectious Diseases, 1994. **18**(1): p. 77-82.
32. Ho, A.L., et al., *Universal contact precautions do not change the prevalence of antibiotic resistant organisms in a tertiary burn unit.* Burns : journal of the International Society for Burn Injuries, 2017. **43**(2): p. 265-272.
33. Hoogewerf, C.J., et al., *Topical treatment for facial burns.* Cochrane Database of Systematic Reviews, 2020. **2020**(7): p. CD008058.
34. Huang, P.Y., et al., *Acquisition and clearance of multidrug resistant Acinetobacter baumannii on healthy young adults concurrently burned in a dust explosion in Taiwan: The implication for antimicrobial stewardship.* BMC Infectious Diseases, 2017. **17**(1): p. 598.
35. Ichida, J.M., et al., *Evaluation of protocol change in burn-care management using the Cox proportional hazards model with time-dependent covariates.* Statistics in Medicine, 1993. **12**(3-4): p. 301-10.

36. Keshavarzi, A., et al., *Therapeutic efficacy of Great Plantain (Plantago major L.) in the treatment of second-degree burn wounds: A case-control study.* International Journal of Clinical Practice, 2022. **2022**: p. 4923277.
37. Lindford, A., et al., *Successful eradication of multidrug resistant Acinetobacter in the Helsinki Burn Centre.* Journal of Burn Care and Research, 2015. **36**(6): p. 595-601.
38. Martino, A., et al., *Efforts of a Unit Practice Council to implement practice change utilizing alcohol impregnated port protectors in a burn ICU.* Burns : journal of the International Society for Burn Injuries, 2017. **43**(5): p. 956-964.
39. May, A.K., et al., *Reduction of vancomycin-resistant enterococcal infections by limitation of broad-spectrum cephalosporin use in a trauma and burn intensive care unit.* Shock, 2000. **14**(3): p. 259-64.
40. Neely, A.N., M.P. Maley, and G.L. Taylor, *Investigation of single-use versus reusable infectious waste containers as potential sources of microbial contamination.* American Journal of Infection Control, 2003. **31**(1): p. 13-17.
41. Neely, A.N., et al., *A microbiologic study of enteral feeding hang time in a burn hospital: Can feeding costs be reduced without compromising patient safety?* Nutrition in Clinical Practice, 2006. **21**(6): p. 610-616.
42. Norman, G., et al., *Antiseptics for burns.* Cochrane Database of Systematic Reviews, 2017. **2017**(7): p. CD011821.
43. O'Mara, M.S., et al., *Central venous catheter infections in burn patients with scheduled catheter exchange and replacement.* Journal of Surgical Research, 2007. **142**(2): p. 341-50.
44. Ozkurt, Z., et al., *Reducing hospital infection rates in the burn unit by adherence to infection control measures: A six-year experience.* Turkish Journal of Medical Sciences, 2012. **42**(1): p. 17-24.
45. Popp, J.A., et al., *Hospital-acquired infections and thermally injured patients: Chlorhexidine gluconate baths work.* American Journal of Infection Control, 2014. **42**(2): p. 129-132.
46. Ramos, G.E., et al., *Catheter infection risk related to the distance between insertion site and burned area.* Journal of Burn Care and Rehabilitation, 2002. **23**(4): p. 266-271.
47. Ransjo, U., *Attempts to control clothes-borne infection in a burn unit. 2. Clothing routines in clinical use and the epidemiology of cross-colonization.* Journal of Hygiene, 1979. **82**(3): p. 369-384.
48. Rashaan, Z.M., et al., *Flaminal versus Flamazine in the treatment of partial thickness burns: A randomized controlled trial on clinical effectiveness and scar quality (FLAM study).* Wound Repair and Regeneration, 2019. **27**(3): p. 257-267.
49. Rashaan, Z.M., et al., *Long-term quality of life and cost-effectiveness of treatment of partial thickness burns: A randomized controlled trial comparing enzyme alginogel vs silver sulfadiazine (FLAM study).* Wound Repair and Regeneration, 2020. **28**(3): p. 375-384.
50. Rashid, A., A.P. Brown, and K. Khan, *On the use of prophylactic antibiotics in prevention of toxic shock syndrome.* Burns, 2005. **31**(8): p. 981-985.
51. Remington, L., et al., *Assessment of a central line-associated bloodstream infection prevention program in a burn-trauma intensive care unit.* JAMA Surgery, 2016. **151**(5): p. 485-486.
52. Sheridan, R.L., et al., *Once-daily wound cleansing and dressing change: Efficacy and cost.* Journal of Burn Care and Rehabilitation, 1997. **18**(2): p. 139-140.
53. Sood, G., et al., *Use of implementation science for a sustained reduction of central-line-associated bloodstream infections in a high-volume, regional burn unit.* Infection Control and Hospital Epidemiology, 2017. **38**(11): p. 1306-1311.
54. Storm-Versloot, M.N., et al., *Topical silver for preventing wound infection.* Cochrane Database of Systematic Reviews, 2010(3).

55. Tao, L., et al., *Risk factors for central line-associated bloodstream infection in patients with major burns and the efficacy of the topical application of mupirocin at the central venous catheter exit site.* Burns, 2015. **41**(8): p. 1831-1838.
56. Tredget, E.E., et al., *Epidemiology of infections with Pseudomonas aeruginosa in burn patients: The role of hydrotherapy.* Clinical Infectious Diseases, 1992. **15**(6): p. 941-949.
57. Ugburo, A.O., et al., *An evaluation of the role of systemic antibiotic prophylaxis in the control of burn wound infection at the Lagos University Teaching Hospital.* Burns : journal of the International Society for Burn Injuries, 2004. **30**(1): p. 43-48.
58. Wang, X., et al., *Effect of nursing quality management on the nosocomial infection rate and psychology state of patients with burn and plastic surgery.* Iranian Journal of Public Health, 2020. **49**(9): p. 1659-1665.
59. Wasiak, J., et al., *Dressings for superficial and partial thickness burns.* Cochrane Database of Systematic Reviews, 2013. **2013**(3): p. CD002106.
60. Wisplinghoff, H., W. Perbix, and H. Seifert, *Risk factors for nosocomial bloodstream infections due to Acinetobacter baumannii: A case-control study of adult burn patients.* Clinical Infectious Diseases, 1999. **28**(1): p. 59-66.
61. Young, A., et al., *Establishment of a core outcome set for burn care research: development and international consensus.* BMJ Medicine, 2022. **1**(1): p. e000183.
62. Davies, A., et al., *Consensus demonstrates four indicators needed to standardize burn wound infection reporting across trials in a single-country study (ICon-B study).* Journal of Hospital Infection, 2020. **106**(2): p. 217-225.
63. Greenhalgh, D.G., et al., *American Burn Association consensus conference to define sepsis and infection in burns.* Journal of Burn Care and Research, 2007. **28**(6): p. 776-790.
64. Kimura, A., et al., *Trimethoprim-sulfamethoxazole for the prevention of methicillin-resistant Staphylococcus aureus pneumonia in severely burned patients.* The Journal of Trauma, 1998. **45**(2): p. 383-7.
65. Weinbren, M.J., *Pharmacokinetics of antibiotics in burn patients.* Journal of Antimicrobial Chemotherapy, 1999. **44**(3): p. 319-327.
66. Pruskowski, K.A., *Pharmacokinetics and pharmacodynamics of antimicrobial agents in burn patients.* Surgical Infections, 2021. **22**(1): p. 77-82.
67. Hoey, L.L., et al., *Wide variation in single, daily-dose aminoglycoside pharmacokinetics in patients with burn injuries.* Journal of Burn Care and Rehabilitation, 1997. **18**(2): p. 116-124.
68. Teare, L., et al., *Acinetobacter - the trojan horse of infection control?* Journal of Hospital Infection, 2019. **102**(1): p. 45-53.
69. Gus, E., et al., *Burn unit design - The missing link for quality and safety.* Journal of Burn Care and Research, 2021. **42**(SUPPL 1): p. S171.
70. Weinbren, M., T. Inkster, and F. Lafferty, *Drains and the periphery of the water system – what do you do when the guidance is outdated?* Infection Prevention in Practice, 2021. **3**(4): p. 100179.
71. Hopman, J., et al., *Reduced rate of intensive care unit acquired gram-negative bacilli after removal of sinks and introduction of 'water-free' patient care.* Antimicrobial Resistance and Infection Control, 2017. **6**(1): p. 59.
72. Fernandez, R., et al., *Water for wound cleansing.* Cochrane Database of Systematic Reviews, 2022(9).
73. Pirii, L.E., et al., *Extensive colonization with carbapenemase-producing microorganisms in Romanian burn patients: infectious consequences from the Colectiv fire disaster.* European Journal of Clinical Microbiology and Infectious Diseases, 2018. **37**(1): p. 175-183.
74. Garvey, M.I., C.W. Bradley, and P. Jumaa, *Environmental decontamination following occupancy of a burns patient with multiple carbapenemase-producing organisms.* Journal of Hospital Infection, 2016. **93**(2): p. 136-40.

75. Humphreys, H., et al., *Rituals and behaviours in the operating theatre - joint guidelines of the Healthcare Infection Society and the European Society of Clinical Microbiology and Infectious Diseases.* Journal of Hospital Infection, 2023. **140**(10): p. 165.e1-165.e28.
76. Arnow, P.M., P.A. Allyn, and E.M. Nichols, *Control of methicillin-resistant Staphylococcus aureus in a burn unit: Role of nurse staffing.* Journal of Trauma, 1982. **22**(11): p. 954-959.
77. Bettencourt, A.P., et al., *Nurse staffing, the clinical work environment, and burn patient mortality.* Journal of Burn Care and Research, 2020. **41**(4): p. 796-802.
78. Leaver, J., et al., *Comparison of the international Burn Injury Database nurse dependency tool with the Safer Nursing Care Tool: Observational study.* International Journal of Nursing Studies Advances, 2021. **3**: p. 100018.

Appendix A – Glossary

Aggressive wound care: wound care involving stronger, more intensive clinical interventions (rather than conservative or cautious approaches)

Aqueous solution: water containing a dissolved substance or substances; in the healthcare context includes solutions contained in preprepared wipes, premoistened cleaning gloves, etc

Air gap: in plumbing, an unobstructed vertical space between a water outlet and the spillover level of another component of the water system; used to prevent backflow of water

Antibiotics: antimicrobials that kill or inhibit the growth of bacteria; they may be applied systemically (see systemic antimicrobials) or topically (see topical antimicrobials)

Antimicrobial prophylaxis: use of antimicrobials (such as antibiotics) to prevent (rather than treat) infection

Antiseptics: topical antimicrobials that may be applied to burn wounds to prevent the growth of micro-organisms and to prevent infection

Automated room decontamination: automated (no-touch) room decontamination devices and systems typically use hydrogen peroxide or microbicidal ultraviolet light to disinfect unoccupied patient areas; such systems are used to decontaminate environmental surfaces (rather than equipment, devices or the air)

Burn wound dressings: dressings applied to burn wounds, including those that create a barrier preventing micro-organisms from entering the wound or outward transmission of micro-organisms from the wound; many different types of dressing are available, including hydrocolloid dressings, polyurethane film dressings, hydrogel dressings, silicone-coated nylon dressings, synthetic/biological dressings (sometimes referred to as biosynthetic skin substitute dressings), antimicrobial (silver- and iodine-containing) dressings, fibre dressings (such as calcium alginate dressings), and wound dressing pads (including tulle and gauze dressings); see Wasiak *et al.*[59] for further details

Burns services: burns services provide specialized care for burns patients; in England and Wales, such services are organized in a tiered structure comprising Burns Centres (for the most severely burned patients), Burns Units, and Burns Facilities (for the least severely burned patients)

Clean stores: designated storage space for clinical supplies

Cleaning: the removal of any substance not part of an item itself, including dirt, blood or other body fluid, and many of the micro-organisms in them; a prerequisite to effective disinfection

Cohorting of staff: the assignment of (healthcare) staff to a cohort (or group) who work together; for example, a staff cohort may work the same shift, have the same breaks, or care only for patients in a particular group (and not have contact with other patients)

Colonization: the presence of micro-organisms such as bacteria (for example, in a burn wound) without eliciting a physiological response

Controlled environment: any environment where ventilation parameters and factors that result from these, such as airflow between rooms and temperature conform to preset specifications

Cross-infection: the spread of infection between people; cross-infection may arise through direct transmission of micro-organisms between individuals (patients, staff, or visitors) or indirect transmission via contaminated environmental surfaces, equipment, or medical devices

Debridement: removal of dead, damaged or infected tissue to improve healing of the remaining healthy tissue; includes surgical debridement (excision) and mechanical debridement (for example, using water; see also hydrotherapy)

Decontamination: any combination of cleaning, disinfection and sterilization that renders equipment or the environment safe for patients; in the context of this guidance decontamination refers to the cleaning and disinfection

Diagnostic sampling: obtaining and testing clinical samples with the aim of diagnosing (or ruling out) a condition in a patient with symptoms or signs of illness

Disinfection: the elimination or reduction of pathogenic (harmful) micro-organisms from inanimate objects and surfaces; should be preceded by effective cleaning

Dynamic mattress: a pressure-relieving mattress comprising multiple air pockets or cells that can be inflated or deflated at different times; typically used for patients with limited mobility or who are unable to reposition themselves

Excision: surgical removal of damaged skin (a type of debridement); early excision refers to excision performed before spontaneous sloughing (shedding of dead surface cells from the skin) or invasive infection (such as bacteraemia, pneumonia, or urinary tract infection (UTI)) can occur, typically within a few days of the burn injury occurring

Enteral antimicrobials: substances that kill or inhibit the growth of micro-organisms and are administered via the digestive tract; includes antibiotics

Environmental contamination: contamination of healthcare surfaces, equipment, and other inanimate objects with micro-organisms

Epidermal burns: burns affecting the outer surface of the skin; sometimes referred to as superficial burns or first-degree burns

First-degree burns: see epidermal burns

Full-thickness burns: burns affecting all layers of the skin (and sometimes structures beneath the skin such as muscle and bone); sometimes referred to as third-degree burns (or fourth-degree burns when structures beneath the skin are affected)

Grafting: surgical transplantation of skin

Green plan: all healthcare providers should have in place a local green plan outlining how the organization’s carbon footprint will be reduced; the green plan should cover estates and facilities, travel and transport, the supply chain, medicines, research, innovation, and offsetting

Hydrotherapy: water-assisted dressing changes

Hydrotherapy bath: a bath, tank, or tub used for immersion of burned patients undergoing hydrotherapy; traditionally such facilities would have been used by multiple patients in succession (rather than being for single-patient use)

Infection: a physiological response to the presence of micro-organisms such as bacteria, typically resulting in inflammation, pain, or fever; a local infection is restricted to a specific part of the body (for example, a burn wound), whereas a systemic infection is more widespread (for example, sepsis or pneumonia)

Interval screening: see microbiological screening

Local infection: see infection

Major burns: the overall severity of a burn injury or injuries may be classified as minor, moderate, or major; this classification takes account of the depth, size, and source of the burn injury or injuries, the parts of the body affected, and the patient's age; major (or severe) burns are the most severe, requiring hospital admission and the most complex forms of clinical management; minor burns are the least severe, and may not require hospital treatment or admission; moderate burns represent an intermediate category that usually requires hospital admission

Microbiological screening: screening refers to routine sampling and testing in people who are not already suspected to have a condition being tested for; in the context of burns patients, microbiological screening means checking for carriage of multidrug-resistant micro-organisms, for example, on admission to the burns service, at regular intervals during the patient's care (this is referred to as interval screening), or when the patient undergoes a clinical procedure (this is referred to as opportunistic screening)

Microbiological surveillance: the systematic collection, analysis, and interpretation of data on patterns of micro-organisms and antibiotic susceptibility; in the context of burns patients, microbiological surveillance typically involves the microbiology of burn wounds and blood cultures (with interpretation at a population level, for example, across a burns service or healthcare organization)

Minor burns: see major burns

Moderate burns: see major burns

Multidrug-resistant micro-organisms: micro-organisms (including bacteria, viruses, and fungi) that are highly resistant to a group of antimicrobials; examples include meticillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococcus (VRE), carbapenem-resistant micro-organisms, *Acinetobacter baumannii,* and *Candida auris*

Negative pressure ventilation: a ventilation strategy where the rate of air extract exceeds supply, resulting in air being drawn into the room and preventing contaminated air from escaping to surrounding areas

Neutral pressure ventilation: a ventilation strategy where the rates of air supply and extract are equal, resulting in no, or minimal, air exchange with surrounding areas

Opportunistic screening: see microbiological screening

Partial-thickness burns: burns affecting varying amounts of the skin; subdivided into superficial partial-thickness burns involving the superficial (upper) layer of the skin and deep partial-thickness burns involving the reticular (lower) layer of the skin; sometimes referred to as second-degree burns

Patient area: any area of a burns service in which patients are cared for, including patient rooms and burns theatres

Pharmacokinetics and pharmacodynamics: pharmacokinetics refers to how a patient's physiology and biochemistry affect the absorption, metabolism, and excretion of a pharmaceutical drug (medicine); conversely, pharmacodynamics refers to how a pharmaceutical drug affects the patient's physiology and biochemistry; pharmacokinetic and pharmacodynamic (PKPD) studies explore dose–response relationships to identify clinical benefits and adverse effects

Point-of-use filter: a water filter designed to be attached to a water outlet (for example, a tap); the pore size of such filters is sufficiently small to trap bacteria

Positive pressure ventilation: a ventilation strategy where the rate of air supply exceeds the rate of extract, resulting in air flowing out of that room into surrounding areas

Quality of life: (health-related) quality of life refers to an individual's perception of their overall physical, mental, and social wellbeing; assessments of wellbeing are typically combined over several domains (for example, mobility, ability to perform day-to-day tasks, and pain or discomfort) using a validated tool

Receiving hopper: in plumbing, a device (usually with a large opening) through which wastewater enters a drain

Second-degree burns: see partial-thickness burns

Selective decontamination of the digestive tract: administration of non-absorbable antimicrobials (for example, antibiotics) to reduce micro-organisms in the digestive tract with the aim of preventing infection; sometimes referred to as selective digestive decontamination or non-absorbable antibiotic prophylaxis

Severe burns: see major burns

Shower trolley drain: a drain intended to take water discharged from a shower trolley

Shower trolley hopper: a receiving hopper associated with a shower trolley drain

Splint pan: a water bath used to prepare splints for use; splints are used in rehabilitation to position body parts, for example, to immobilize or stretch joints

Superficial burns: see epidermal burns

Surgical prophylaxis: antimicrobial prophylaxis administered shortly before a patient undergoes a surgical procedure with the aim of preventing surgical site infection

Switchable air pressure ventilation: a ventilation strategy where a ventilation system can be set to give positive pressure, negative pressure or sometimes neutral pressure ventilation

Systemic antimicrobials: substances that kill or inhibit the growth of micro-organisms and are administered via the circulatory system (for example, using injection or ingestion) to achieve a widespread effect; includes antibiotics

Systemic infection: see infection

Terminal decontamination: this refers collectively to all measures involved in eliminating microbial contamination at the end of a patient's stay; this is important because inanimate surfaces that make direct or indirect contact with burns patients can be vectors of microbial contamination between patients; without effective terminal decontamination, a burns patient moving into a space previously occupied by another burns patient would be at prolonged exposure to what has been dispersed from the previous patient

Thermostatic mixing valve: in plumbing, a valve with a single outlet that mixes hot and cold water to achieve a specified temperature

Third-degree burns: see full-thickness burns

Topical antimicrobials: substances that kill or inhibit the growth of micro-organisms and are applied to specific parts of the body (for example, burn wounds) to achieve a localized effect; includes antibiotics and antiseptics

Waste trap: in plumbing, a device designed to prevent backflow of wastewater and sewage

Wastewater: in plumbing, includes water mobilized from drains by taps flowing directly into the drain; items left in sinks or filled by placing a container in a sink can be contaminated by wastewater through contact with the drain; the same applies to face towels that are wetted in a sink

Waterborne opportunistic pathogens: micro-organisms that can cause disease and which can be transmitted via water; such micro-organisms may be acquired through ingestion, bathing, etc

Water-free care: an approach to patient care in which sinks are removed from patient rooms and activities related to patient care that take place in patient rooms and would normally require the use of tap water are replaced by alternatives that are 'water-free' or use safe sources of water (such as bottled water); the term 'water-free care' is not entirely accurate because of the use of alternatives to tap water

Water safety group: a multidisciplinary group that undertakes the commissioning, development, and ongoing management of a water safety plan on behalf of a healthcare organization; the group should advise on remedial action to address contaminated water outlets or systems; see water safety plan

Water safety plan: a risk-management framework designed to ensure water safety in a healthcare setting; the plan should identify effective practice with regard to water supply and distribution, identify potential hazards and the likelihood of their occurrence, and specify relevant control measures

Water outlet: in plumbing, this refers to components such as taps and shower heads

Appendix B – Continuing professional development questions and answers

This section will be completed after the external consultation (to reflect the final wording of recommendations)

Appendix C – Search strategies and results

As noted earlier (see Section 7.2), the searches were first executed in April 2022 and repeated in July 2023. Any studies added to the databases after 3 July 2023 (including those published before 3 July 2023, but not yet indexed) were not considered for inclusion. Tables C.1 and C.2 include the results of the searches conducted in April 2023 – for further information on the number of articles identified through the searches see Appendix D.

Table C.1: Embase, Emcare and MEDLINE search strategy

Database: Embase <1974 to 2022 April 06>, Ovid Emcare <1995 to 2022 Week 13>, Ovid MEDLINE(R) ALL <1946 to April 06, 2022>
Search Strategy:
---
1 Burns/ (84482)
2 (burn or burns).mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, nm, ox, px, rx, ui, sy] (206159)

3. 1 or 2 (206159)
4 Patients/ (1740268)
5 (patient or patients).mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, nm, ox, px, rx, ui, sy] (22189024)
6 Visitors to Patients/ (2882)
7 (visitor or visitors).mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, nm, ox, px, rx, ui, sy] (34102)
8 visit$.mp. (845884)
9 Transportation of Patients/ (50830)
10 4 or 5 or 6 or 7 or 8 or 9 (22472827)
11 Burns Units/ (0)
12 (burns unit or burn unit or burns units or burn units).mp. (10660)
13 (burns centre or burn centre or burns center or burn center).mp. (7527)
14 11 or 12 or 13 (16110)
15 Infection Control/ (152678)
16 Cross Infection/ (82985)
17 nosocomial infection.mp. (20852)
18 nosocomial infections.mp. (30917)
19 infection control.mp. (189093)
20 (cross infection or cross-infection).mp. [mp=ti, ab, hw, tn, ot, dm, mf, dv, kf, fx, dq, nm, ox, px, rx, ui, sy] (86928)
21 infection prevention.mp. (109980)
22 15 or 16 or 17 or 18 or 19 or 20 or 21 (370276)
23 ((3 and 10) or 14) and 22 (3036)
24 limit 23 to english language (2671)

Table C.2: Cochrane Library search strategy

Search Name: Burns search April 2022

Date Run: 07/04/2022 17:30:52

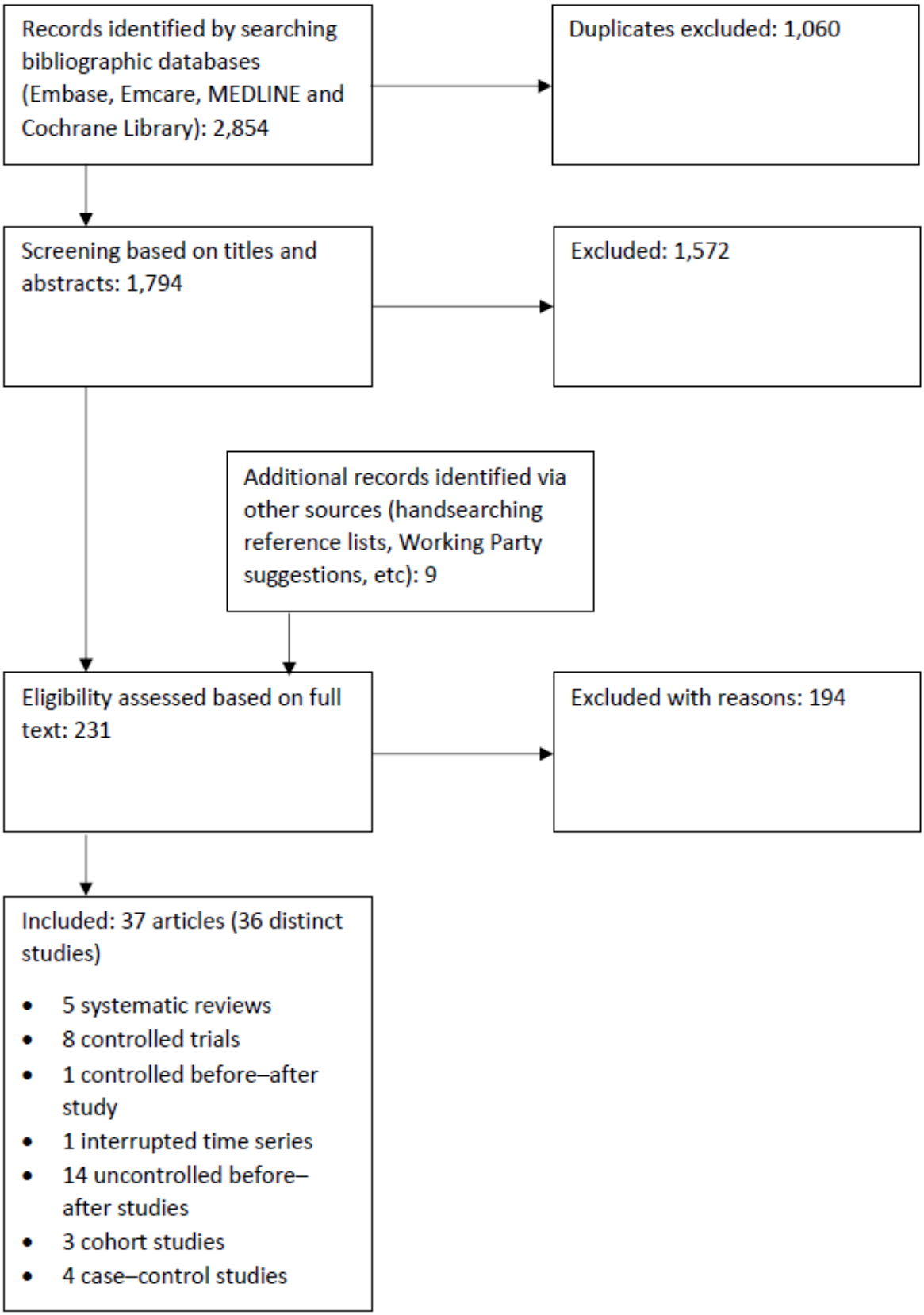
Comment:

ID	Search	Hits
#1	MeSH descriptor: [Burns] this term only	1547
#2	(burn or burns):ti,ab,kw	5429
#3	#1 or #2	5429
#4	MeSH descriptor: [Patients] this term only	397
#5	(patient or patients):ti,ab,kw	1059741
#6	MeSH descriptor: [Visitors to Patients] this term only	36
#7	(visitor or visitors):ti,ab,kw	760
#8	(visit$):ti,ab,kw	56083
#9	MeSH descriptor: [Transportation of Patients] this term only	112

1	#10	#4 or #5 or #6 or #7 or #8 or #9	1077381
2	#11	MeSH descriptor: [Burn Units] this term only	46
3	#12	(burns unit or burn unit or burns units or burn units):ti,ab,kw	571
4	#13	(burns centre or burn centre or burns center or burn center):ti,ab,kw	572
5	#14	#11 or #12 or #13	1027
6	#15	MeSH descriptor: [Infection Control] this term only	576
7	#16	MeSH descriptor: [Cross Infection] this term only	1217
8	#17	(nosocomial infection):ti,ab,kw	1303
9	#18	(nosocomial infections):ti,ab,kw	1001
10	#19	(infection control):ti,ab,kw	33041
11	#20	(cross infection or cross-infection):ti,ab,kw	4417
12	#21	(infection prevention):ti,ab,kw	22435
13	#22	#15 or #16 or #17 or #18 or #19 or #20 or #21	43161
14	#23	((#3 and #10) or #14) and #22 in Cochrane Reviews, Cochrane Protocols	14

Appendix D – Study selection flow chart

Figure D.1: Study selection flow chart



Appendix E – Excluded studies

Table E.1: Excluded studies

Citation	Reason for exclusion
Afshari, A., et al., 2.5% Mafenide Acetate: A Cost-Effective Alternative to the 5% Solution for Burn Wounds. Journal of Burn Care and Research, 2017. 38(1): p. e42-e47.	British Library On Demand unable to supply full text of article
Aggarwal, S., S. Smailes, and P. Dziewulski, Tracheostomy in burns patients revisited. Burns : journal of the International Society for Burn Injuries, 2009. 35(7): p. 962-6.	Infection prevention and control not primary aim of the study
Ahmad, S.I. and O.G. Iranzo, Treatment of post-burns bacterial infections by Fenton reagent, particularly the ubiquitous multiple drug resistant Pseudomonas spp. Medical Hypotheses, 2003. 61(4): p. 431-434.	Laboratory experiment - no clinical data
Ahuja, R.B., et al., ISBI Practice Guidelines for Burn Care. Burns, 2016. 42(5): p. 953-1021.	Guidance article - references checked for relevant articles
Aikins, K., et al., Pediatric burn wound impetigo after grafting. Journal of burn care & research : official publication of the American Burn Association, 2015. 36(2): p. e41-6.	Infection prevention and control not primary aim of the study
Akin, S. and M. Ozcan, Using a plastic sheet to prevent the risk of contamination of the burn wound during the shower. Burns, 2003. 29(3): p. 280-283.	Not a comparative study
Al-Benna, S., Protective measures for burn care professionals during the coronavirus disease 2019 pandemic: Systematic review. Annals of Burns and Fire Disasters, 2020. 33(3): p. 182-190.	Systematic review - references checked for relevant articles
Alinejad, F., et al., Comparing the effect of two types of silver nano-crystalline dressings (Acticoat and agcoat) in the treatment of full thickness burn wound. Iranian Journal of Microbiology, 2018. 10(6): p. 378-384.	Focus is treatment (rather than prevention) of infection
Allorto, N., et al., ISBI Practice Guidelines for Burn Care, Part 2. Burns, 2018. 44(7): p. 1617-1706.	Guidance article - references checked for relevant articles
Alp, E., et al., Risk factors for nosocomial infection and mortality in burn patients: 10 years of experience at a university hospital. Journal of Burn Care and Research, 2012. 33(3): p. 379-385.	Exploratory study
Amel, M., et al., Role of carbapenemase detection in optimization antimicrobial therapy in burns. Annals of Intensive Care, 2018. 8(1 Supplement 1).	Conference abstract
Askew, A.A., et al., Improvement in catheter sepsis rate in burned children. Journal of Pediatric Surgery, 1990. 25(1): p. 117-119.	British Library On Demand unable to supply full text of article
Avni, T., et al., Prophylactic antibiotics for burns patients: Systematic review and meta-analysis. BMJ (Online), 2010. 340(7745): p. 517.	Systematic review - references checked for relevant articles
Aycliffe, G.A.J., et al., Principles of design of burns units: Report of a working group of the British Burn Association and Hospital Infection Society. Journal of Hospital Infection, 1991. 19(1): p. 63-66.	Guidance article - references checked for relevant articles
Ayliffe, G.A., et al., Pseudomonas aeruginosa in hospital sinks. Lancet (London, England), 1974. 2(7880): p. 578-81.	British Library On Demand unable to supply full text of article

Citation	Reason for exclusion
Bache, S.E., et al., Clinical studies of the High-Intensity Narrow-Spectrum light Environmental Decontamination System (HINS-light EDS), for continuous disinfection in the burn unit inpatient and outpatient settings. Burns.	Laboratory experiment - no clinical data
Bagin, V., et al., Enteral glutamine supplementation in critically ill patients with burns. Critical Care, 2020. 24(Supplement 1).	Conference abstract
Baier, C., et al., A multimodal infection control concept in a burn intensive care unit - lessons learnt from a meticillin-resistant Staphylococcus aureus outbreak. Journal of Hospital Infection, 2018. 98(2): p. 127-133.	Focus is infection control in the context of an outbreak
Barbut, F., et al., Reducing the spread of Acinetobacter baumannii and methicillin-resistant Staphylococcus aureus on a burns unit through the intervention of an infection control bundle including hydrogen peroxide vapour decontamination. Clinical Microbiology and Infection, 2011. 17(SUPPL. 4): p. S371-S372.	Conference abstract
Barbut, F., et al., Reducing the spread of Acinetobacter baumannii and methicillin-resistant Staphylococcus aureus on a burns unit through the intervention of an infection control bundle. Burns, 2013. 39(3): p. 395-403.	British Library On Demand unable to supply full text of article
Barret, J.P., et al., Infestations and chronic infections in foreign pediatric patients with burns: Is there a role for specific protocols? Journal of Burn Care and Rehabilitation, 1999. 20(6): p. 482-486.	Descriptive study
Barret, J.P. and D.N. Herndon, Effects of burn wound excision on bacterial colonization and invasion. Plastic and Reconstructive Surgery, 2003. 111(2): p. 744-750.	Focus is timing of excision, whereas early excision is now the established standard
Barret, J.P., M.G. Jeschke, and D.N. Herndon, Selective decontamination of the digestive tract in severely burned pediatric patients. Burns : journal of the International Society for Burn Injuries, 2001. 27(5): p. 439-45.	Included in Barajas-Nava 2013 Cochrane review
Bayat, A., et al., Implications for Burns Unit design following outbreak of multi-resistant Acinetobacter infection in ICU and Burns Unit. Burns, 2003. 29(4): p. 303-306.	Descriptive study of an outbreak
Behringer, G.E. and J.F. Burke, The contribution of a bacterially isolated environment to the prevention of infections in seriously burned patients. Annals of the New York Academy of Sciences, 1980. Vol. 353: p. 300-307.	British Library On Demand unable to supply full text of article
Bell, C., M.A. Barron, and G.K. Lindberg, Universal decolonization protocol to reduce MRSA prevalence in a burn center. Journal of Burn Care and Research, 2015. 36(SUPPL. 1): p. S125.	Conference abstract
Berger, M.M., et al., Reduction of nosocomial pneumonia after major burns by trace element supplementation: aggregation of two randomised trials. Critical care (London, England), 2006. 10(6): p. R153.	Focus is immunonutrition
Berger, M.M., et al., Trace element supplementation modulates pulmonary infection rates after major burns: A	Focus is immunonutrition

Citation	Reason for exclusion
double-blind, placebo-controlled trial. American Journal of Clinical Nutrition, 1998. 68(2): p. 365-371.	
Bettencourt, A.P., et al., Nurse staffing, the clinical work environment, and burn patient mortality. Journal of Burn Care and Research, 2020. 41(4): p. 796-802.	Infection prevention and control not primary aim of the study
Bibi, R., et al., Effect of Standardized Guidelines on Nurses' Knowledge and Practices Regarding Prevention of Infection in Burn Patients. Pakistan Journal of Medical and Health Sciences, 2022. 16(5): p. 230-233.	Focus is nurses' knowledge before and after an unspecified educational intervention - no clinical outcomes reported
Blayney, C.B., T. Pham, and N.S. Gibran, Decreasing infection rates: Is it ever enough? Journal of Burn Care and Research, 2012. 33(2 SUPPL. 1): p. S152.	Conference abstract
Booth, O.N., Isolated burn unit prevents contamination. Hospitals, 1968. 42(21): p. 50-1.	British Library On Demand unable to supply full text of article
Bousselmi, K., et al., Colistin in the treatment of sepsis from multi-resistant Gram-negative bacilli in burned patients. Burns, 2009. 35(SUPPL. 1): p. S40.	Conference abstract
Branski, L.K., et al., Emerging infections in burns. Surgical Infections, 2009. 10(5): p. 389-397.	Infection prevention and control not primary aim of the study
Burke, J.F., et al., The contribution of a bacterially isolated environment to the prevention of infection in seriously burned patients. Annals of Surgery, 1977. 186(3): p. 377-387.	Focus is isolation techniques, whereas single-room isolation is now the established standard
Cadogan, K., et al., Assessment of cleaning methods on bacterial burden of hospital privacy curtains: a pilot randomized controlled trial. Scientific reports, 2021. 11(1): p. 21866.	Laboratory experiment - no clinical data
Cancio, L.C., Topical Antimicrobial Agents for Burn Wound Care: History and Current Status. Surgical Infections, 2021. 22(1): p. 103-112.	Narrative review - references checked for relevant articles
Candevir, A., et al., Nosocomial infection surveillance data of a burn centre, 2005-2009: What we have learnt. Clinical Microbiology and Infection, 2010. 16(SUPPL. 2): p. S686.	Conference abstract
Carter, J., et al., Designing a new comprehensive burn center around the patient experience. Journal of Burn Care and Research, 2019. 40(Supplement 1): p. S124.	Conference abstract
Casini, B., et al., Evaluation of a modified cleaning procedure in the prevention of carbapenem-resistant Acinetobacter baumannii clonal spread in a burn intensive care unit using a high-sensitivity luminometer. The Journal of hospital infection, 2017. 95(1): p. 46-52.	Environmental sampling study - no clinical data
Chan, M.C., et al., Efficacy evaluation of automatic hydrogen peroxide dry mist system on healthcare environment disinfection. Journal of Microbiology, Immunology and Infection, 2015. 48(2 SUPPL. 1): p. S103.	Conference abstract
D'Avignon, L.C., et al., Prevention of infections associated with combat-related burn injuries. Journal of Trauma - Injury, Infection and Critical Care, 2011. 71(2 SUPPL. 2): p. S282-S289.	Narrative review - references checked for relevant articles

Citation	Reason for exclusion
D'Avignon, L.C., et al., Prevention and management of infections associated with burns in the combat casualty. Journal of Trauma - Injury, Infection and Critical Care, 2008. 64(SUPPL. 3): p. S277-S286.	Narrative review - references checked for relevant articles
Da Silva, J.M., et al., Piperacillin effectiveness in septic burn patients by comparison of two empiric daily dose 12 versus 16 g against susceptible strains based on drug plasma measurements done in a real time. Critical Care, 2017. 21(2 Supplement 1).	Conference abstract
Davenport, K. and F.X. Keeley, Evidence for the use of silver-alloy-coated urethral catheters. Journal of Hospital Infection, 2005. 60(4): p. 298-303.	Narrative review - references checked for relevant articles
de La Cal, M.A., et al., Survival benefit in critically ill burned patients receiving selective decontamination of the digestive tract: a randomized, placebo-controlled, double-blind trial. Annals of surgery, 2005. 241(3): p. 424-30.	Included in Barajas-Nava 2013 Cochrane review
De Souza, V., et al., Extended infusion improves piperacillin &meropenem effectiveness in septic burn patients with normal renal function against p. aeruginosa &k. pneumoniae intermediate susceptibility. Clinical Pharmacology in Drug Development, 2021. 10(SUPPL 1): p. 64.	Conference abstract
Demling, R.H. and L. DeSanti, Closure of partial-thickness facial burns with a bioactive skin substitute in the major burn population decreases the cost of care and improves outcome. Wounds, 2002. 14(6): p. 230-234.	Infection prevention and control not primary aim of the study
Demling, R.H. and J. Maly, The treatment of burn patients in a laminar airflow environment. Annals of the New York Academy of Sciences, 1980. Vol. 353: p. 294-299.	British Library On Demand unable to supply full text of article
Demling, R.H., et al., The use of a laminar airflow isolation system for the treatment of major burns. American Journal of Surgery, 1978. 136(3): p. 375-378.	British Library On Demand unable to supply full text of article
Drum, B.E., et al., Hospital-Onset Bloodstream Infection Rates After Discontinuing Active Surveillance Cultures for Methicillin-Resistant Staphylococcus aureus in a Regional Burn Center. Infection control and hospital epidemiology, 2017. 38(3): p. 371-372.	Focus is infection prevention and control measures targeting meticillin-resistant *Staphylococcus aureus*
Durtschi, M.B., et al., A prospective study of prophylactic penicillin in acutely burned hospitalized patients. Journal of Trauma, 1982. 22(1): p. 11-14.	British Library On Demand unable to supply full text of article
Echevarria-Guanilo, M.E., et al., Preventing infections due to intravascular catheters in burn victims. Expert Review of Anti-Infective Therapy, 2009. 7(9): p. 1081-1086.	Systematic review - references checked for relevant articles
Eriksson, P., et al., Experience of application of a computer based registry of infections in the linkoping burn centre. Journal of Burn Care and Research, 2018. 39(Supplement 1): p. S164.	Conference abstract
Fore, S.E., et al., Comparison of pediatric burn wound colonization and the surrounding environment. Comprehensive Child and Adolescent Nursing, 2016. 39(2): p. 154-160.	British Library On Demand unable to supply full text of article

Citation	Reason for exclusion
Fournier, A., et al., Antibiotics' consumption to early detect epidemics of P. aeruginosa in a burn center: A paradigm shift in the epidemiological surveillance of nosocomial infections. Antimicrobial Resistance and Infection Control, 2015. 4(SUPPL. 1).	Conference abstract
Fournier, A., et al., Antibiotic consumption to detect epidemics of Pseudomonas aeruginosa in a burn centre: A paradigm shift in the epidemiological surveillance of Pseudomonas aeruginosa nosocomial infections. Burns, 2016. 42(3): p. 564-570.	No intervention
Franceschi, D., et al., Risk factors associated with intravascular catheter infections in burned patients: A prospective, randomized study. Journal of Trauma, 1989. 29(6): p. 811-816.	British Library On Demand unable to supply full text of article
Froese, E.H. and G.M. Hobbs, Cross-contamination of thermal burn patients from poor bathing procedures. Central African Journal of Medicine, 1978. 24(8): p. 159-161.	British Library On Demand unable to supply full text of article
Geyik, M.F., et al., Surveillance of nosocomial infections in Dicle University hospital: A ten-year experience. Turkish Journal of Medical Sciences, 2008. 38(6): p. 587-593.	Change in infection rate over time not reported separately for burns unit
Gideskog, M., et al., Source Control of Gram-Negative Bacteria Using Self-Disinfecting Sinks in a Swedish Burn Centre. Microorganisms, 2023. 11(4).	Focus is environmental contamination comparing self-disinfecting sinks, sinks treated with boiling water, and untreated sinks - no direct comparison of clinical outcomes associated with each type of sink
Ghalambor, A. and M.H. Pipelzadeh, Clinical study on the efficacy of orally administered crushed fresh garlic in controlling pseudomonas aeruginosa infection in burn patients with varying burn degrees. Jundishapur Journal of Microbiology, 2009. 2(1): p. 7-13.	Focus is immunonutrition
Gill, B.A. and C.J. Yowler, Eradication of multi-drug resistant acinetobacter baumannii in a burn unit. Journal of Burn Care and Research, 2014. 35(SUPPL. 1): p. S131.	Conference abstract
Gill, B.A., C.J. Yowler, and A. Khandelwal, Infection control practices in a burn unit to reduce the incidence of hospital acquired infections. Journal of Burn Care and Research, 2015. 36(SUPPL. 1): p. S147.	Conference abstract
Glik, J., et al., A 2000 patient retrospective assessment of a new strategy for burn wound management in view of infection prevention and treatment. International Wound Journal, 2018. 15(3): p. 344-349.	Exploratory study
Goyata, S.L. and L.A. Rossi, Nursing diagnoses of burned patients and relatives' perceptions of patients' needs. International journal of nursing terminologies and classifications : the official journal of NANDA International, 2009. 20(1): p. 16-24.	Qualitative study focusing on burns patients at hospital discharge
Gravante, G., et al., Nanocrystalline silver: A systematic review of randomized trials conducted on burned patients	Systematic review - references checked for relevant articles

Citation	Reason for exclusion
and an evidence-based assessment of potential advantages over older silver formulations. Annals of Plastic Surgery, 2009. 63(2): p. 201-205.	
Gray, D., et al., Universal decolonization with hypochlorous solution in a burn intensive care unit in a tertiary care community hospital. American Journal of Infection Control, 2016. 44(9): p. 1044-1046.	Focus is infection prevention and control measures targeting meticillin-resistant *Staphylococcus aureus*
Greeley, H.L., et al., It takes a village: Multi-disciplinary team key to individualizing burn preceptorship. Journal of Burn Care and Research, 2015. 36(SUPPL. 1): p. S70.	Conference abstract
Green, C., et al., Pulsed-xenon ultraviolet light disinfection in a burn unit: Impact on environmental bioburden, multidrug-resistant organism acquisition and healthcare associated infections. Burns : journal of the International Society for Burn Injuries, 2017. 43(2): p. 388-396.	Focus is automated decontamination of patient areas
Gripp, C.L., J. Salvaggio, and R.B. Fratianne, Use of burn intensive care unit gymnasium as an adjunct to therapy. Journal of Burn Care and Rehabilitation, 1995. 16(2 I): p. 160-161.	Descriptive study - no primary data reported
Guo, H.L., et al., Using competing risk and multistate model to estimate the impact of nosocomial infection on length of stay and mortality in burn patients in Southeast China. BMJ Open, 2018. 8(11): p. e020527.	No intervention
Gus, E., et al., Burn unit design - The missing link for quality and safety. Journal of Burn Care and Research, 2021. 42(SUPPL 1): p. S171.	Systematic review - references checked for relevant articles
Haith, L., et al., Evaluation of nasal methicillin-resistant staphylococcus aureus (mrsa) polymerase chain reaction (PCR) as a screening tool in burn center patients. Surgical Infections, 2012. 13(SUPPL. 1): p. S36.	Conference abstract
Hambraeus, A. and U. Ransjo, Attempts to control clothes-borne infection in a burn unit. I. Experimental investigations of some clothes for barrier nursing. The Journal of hygiene, 1977. 79(2): p. 193-202.	Focus is contamination of clothing
Haynes, B.W., Jr. and M.E. Hench, Hospital isolation system for preventing cross-contamination by staphylococcal and pseudomonas organisms in burn wounds. Annals of surgery, 1965. 162(4): p. 641-9.	Case reports based on isolation technique
Hendriks, W.D.H., et al., Reverse isolation in severely burned patients. Zentralblatt fur Bakteriologie Mikrobiologie und Hygiene - Abt. 1 Orig. A, 1979. 245(Suppl. 7): p. 291-296.	British Library On Demand unable to supply full text of article
Hultman, C.S., et al., Systems-based Practice in Burn Care: Prevention, Management, and Economic Impact of Health Care-associated Infections. Clinics in Plastic Surgery, 2017. 44(4): p. 935-942.	British Library On Demand unable to supply full text of article
Hummel, R.P., et al., Comparison of complete barrier isolation and unidirectional air flow isolation in the treatment of burn wounds. Annals of surgery, 1972. 176(6): p. 742-7.	Focus is isolation techniques, whereas single-room isolation is now the established standard

Citation	Reason for exclusion
Innes, M.E., et al., The use of silver coated dressings on donor site wounds: A prospective, controlled matched pair study. Burns, 2001. 27(6): p. 621-627.	Included in Storm-Versloot 2010 Cochrane review
Ioannovich, J.D., et al., Rationale, design and performance of a clinical trial to investigate interferon-gamma (Imukin) in the prophylactic treatment of severe burns-related infections. Intensive Care Medicine, Supplement, 1996. 22(4): p. S468-S473.	Focus is immunology (Ioannovich 1996 reported the study rationale/design; Wasserman 1998 reported the results)
Ionescu, A., et al., Efficiency of Pseudomonas aeruginosa vaccines in the prevention and treatment of Pseudomonas infections in burned patients. Archives Roumaines de Pathologie Experimentale et de Microbiologie, 1981. 40(4): p. 323-332.	British Library On Demand unable to supply full text of article
Jaspers, M.E.H., et al., The evaluation of nasal mupirocin to prevent Staphylococcus aureus burn wound colonization in routine clinical practice. Burns, 2014. 40(8): p. 1570-1574.	Focus is infection prevention and control measures targeting meticillin-resistant *Staphylococcus aureus*
Jenkins, A.T.A. and A. Young, Smart dressings for the prevention of infection in pediatric burns patients. Expert Review of Anti-Infective Therapy, 2010. 8(10): p. 1063-1065.	Editorial - references checked for relevant articles
Jeschke, M.G., et al., Mortality in burned children with acute renal failure. Archives of Surgery, 1998. 133(7): p. 752-756.	Focus is identification of risk factors for (and severity of) renal failure
Johnson, A.T., et al., The Impact of a Universal Decolonization Protocol on Hospital-Acquired Methicillin-Resistant Staphylococcus aureus in a Burn Population. Journal of burn care & research : official publication of the American Burn Association, 2016. 37(6): p. e525-e530.	Focus is infection prevention and control measures targeting meticillin-resistant *Staphylococcus aureus*
Johnston, C., et al., Do ventilator associated pneumonia prevention bundles work in burn intensive care units? Journal of Burn Care and Research, 2013. 34(2 SUPPL. 1): p. S133.	Conference abstract
Juang, P., et al., Enteral glutamine supplementation in critically ill patients with burn injuries: A retrospective case-control evaluation. Pharmacotherapy, 2007. 27(1): p. 11-19.	British Library On Demand unable to supply full text of article
Kamanga, P., P. Ngala, and C. Hebron, Improving hand hygiene in a low-resource setting: A nurse-led quality improvement project. International Wound Journal, 2022. 19(3): p. 482-492.	Focus is adherence to hand hygiene practice
Kandiah, S., et al., Eradication of multidrug resistantand extremely drug resistant pseudomonas infections in the burn ICU in an Urban public hospital. Journal of Investigative Medicine, 2015. 63(2): p. 473.	British Library On Demand unable to supply full text of article
Kasubeck, V., et al., Piperacillin-vancomycin effectiveness by PK/PD approach in septic burn patients with renal failure receiving the empiric dose regimen recommended. Critical Care, 2017. 21(2 Supplement 1).	Conference abstract
Kealey, G.P., et al., Prospective comparison of two management strategies of central venous catheters in burn	British Library On Demand unable to supply full text of article

Citation	Reason for exclusion
patients. Journal of Trauma - Injury, Infection and Critical Care, 1995. 38(3): p. 344-349.	
Keller, M., A. McMillion, and A. Ammon, Battling the bugs: Reducing hospital-acquired infections through interprofessional collaboration. Journal of Burn Care and Research, 2018. 39(Supplement 1): p. S122.	Conference abstract
Kenjale, H., C.K. Craig, and J.H. Holmes, A daily goals checklist reduces CLABSI rates in the burn ICU. Journal of Burn Care and Research, 2011. 32(SUPPL. 2): p. S120.	Conference abstract
Kim, J.J., et al., Successful control of a methicillin-resistant Staphylococcus aureus outbreak in a burn intensive care unit by addition of universal decolonization with intranasal mupirocin to basic infection prevention measures. American Journal of Infection Control, 2019. 47(6): p. 661-665.	Focus is infection prevention and control measures targeting meticillin-resistant *Staphylococcus aureus*
Kimura, A., et al., Trimethoprim-sulfamethoxazole for the prevention of methicillin-resistant Staphylococcus aureus pneumonia in severely burned patients. The Journal of trauma, 1998. 45(2): p. 383-7.	Focus is infection prevention and control measures targeting meticillin-resistant *Staphylococcus aureus*
Kooistra-Smid, A.M.D., et al., Prevention of Staphylococcus aureus burn wound colonization by nasal mupirocin. Burns, 2008. 34(6): p. 835-839.	Focus is infection prevention and control measures targeting meticillin-resistant *Staphylococcus aureus*
Kurmis, R., A. Parker, and J. Greenwood, The use of immunonutrition in burn injury care: Where are we? Journal of Burn Care and Research, 2010. 31(5): p. 677-691.	Systematic review - references checked for relevant articles
Ladhani, H.A., C.J. Yowler, and J.A. Claridge, Burn Wound Colonization, Infection, and Sepsis. Surgical Infections, 2021. 22(1): p. 44-48.	British Library On Demand unable to supply full text of article
Landy, J.J., TREATMENT OF THE BURNED PATIENT: USE OF THE GERMFREE PLASTIC ISOLATOR AS A BARRIER AGAINST HOSPITAL PATHOGENS. Southern medical journal, 1963. 56: p. 1084-8.	British Library On Demand unable to supply full text of article
Lawrence, J.C., The treatment of small burns with chlorhexidine-medicated tulle gras. Burns, 1977. 3(4): p. 239-244.	British Library On Demand unable to supply full text of article
Lawrence, J.C., J.S. Cason, and A. Kidson, Evaluation of phenoxetol-chlorhexidine cream as a prophylactic antibacterial agent in burns. Lancet, 1982. 1(8280): p. 1037-1040.	British Library On Demand unable to supply full text of article
LeBlanc, A., et al., Improving quality for burn patients in a general intensive care unit. Journal of Burn Care and Research, 2018. 39(Supplement 1): p. S216.	Conference abstract
Lee, J.J., et al., Infection control in a burn center. Journal of Burn Care and Rehabilitation, 1990. 11(6): p. 575-580.	British Library On Demand unable to supply full text of article
Legrand, M. and M. Lafaurie, Use of prophylactic antibiotics in mechanically ventilated patients with burn injuries. Clinical Infectious Diseases, 2016. 62(11): p. 1464-1465.	Letter focused on interpretation of published antibiotic prophylaxis study
Leseva, M., et al., Nosocomial infections in burn patients: etiology, antimicrobial resistance, means to control. Annals of burns and fire disasters, 2013. 26(1): p. 5-11.	Descriptive study

Citation	Reason for exclusion
Levenson, C., et al., Preventing postoperative burn wound aspergillosis. The Journal of burn care & rehabilitation, 1991. 12(2): p. 132-5.	British Library On Demand unable to supply full text of article
Levenson, S.M., et al., The use of whole and partial body isolators for the care of severely burned patients. Annals of the New York Academy of Sciences, 1968. 150(3): p. 1009-11.	British Library On Demand unable to supply full text of article
Lilly, H.A., E.J. Lowbury, and J.S. Cason, Trial of a laminar air-flow enclosure for the control of infection in a burns operating theatre. Burns, including thermal injury, 1984. 10(5): p. 309-12.	British Library On Demand unable to supply full text of article
Ling, M.L., et al., The impact of enhanced strategy on the effectiveness of environmental disinfection at high risk areas. Journal of Microbiology, Immunology and Infection, 2015. 48(2 SUPPL. 1): p. S53.	Conference abstract
Lowbury, E.J., J.R. Babb, and P.M. Ford, Protective isolation in a burns unit: the use of plastic isolators and air curtains. The Journal of hygiene, 1971. 69(4): p. 529-46.	Focus is isolation techniques, whereas single-room isolation is now the established standard
Luther, H., et al., Comparative study of two systems of delivering supplemental protein with standardized tube feedings. The Journal of burn care & rehabilitation, 2003. 24(3): p. 167-166.	No clinical outcomes reported
Machado, A.S., et al., Clinical Outcome and Antimicrobial Therapeutic Drug Monitoring for the Treatment of Infections in Acute Burn Patients. Clinical therapeutics, 2017. 39(8): p. 1649-1657.e3.	Infection prevention and control not primary aim of the study
Mackie, D.P., et al., Prevention of infection in burns: Preliminary experience with selective decontamination of the digestive tract in patients with extensive injuries. Journal of Trauma, 1992. 32(5): p. 570-576.	British Library On Demand unable to supply full text of article
Maclean, M., et al., Environmental decontamination of a hospital isolation room using high-intensity narrow-spectrum light. Journal of Hospital Infection, 2010. 76(3): p. 247-251.	Focus is environmental contamination
Marik, P.E. and G.P. Zaloga, Immunonutrition in critically ill patients: A systematic review and analysis of the literature. Intensive Care Medicine, 2008. 34(11): p. 1980-1990.	Systematic review - references checked for relevant articles
Marren, K., et al., Do neutral pressure needleless connectors decrease central venous catheter occlusions requiring tissue plasminogen activator administration as compared to positive pressure needleless connectors in pediatric burn patients? Journal of Burn Care and Research, 2016. 37(SUPPL. 1): p. S142.	Conference abstract
Martino, A.L., et al., Successful outcomes associated with implementing the use of alcohol impregnated port protectors in a burn unit. Journal of Burn Care and Research, 2014. 35(SUPPL. 1): p. S86.	Conference abstract
Marwa, N.P. and E.A.M. Tarimo, Provision of care to hospitalized pediatric burn patients: A qualitative study	Qualitative study focusing on nurses' perceptions of burn care

Citation	Reason for exclusion
among nurses at Muhimbili National Hospital, Dar es Salaam, Tanzania. BMC Nursing, 2019. 18(1): p. 8.	
Matsumura, H., et al., Effective control of methicillin-resistant Staphylococcus aureus in a burn unit. Burns, 1996. 22(4): p. 283-286.	Focus is infection prevention and control measures targeting meticillin-resistant *Staphylococcus aureus*
McDonnell, J., et al., The path to eradicating ventilator associated pneumonia (VAP) in a burn center. Journal of Burn Care and Research, 2011. 32(SUPPL. 2): p. S122.	Conference abstract
McGill, V., et al., Use of fibrin sealant in thermal injury. The Journal of burn care & rehabilitation, 1997. 18(5): p. 429-34.	Infection prevention and control not primary aim of the study
McManus, A.T., et al., A decade of reduced gram-negative infections and mortality associated with improved isolation of burned patients. Archives of Surgery, 1994. 129(12): p. 1306-1309.	Focus is isolation techniques, whereas single-room isolation is now the established standard
McWilliams, T.L., et al., The implementation of an infection control bundle within a Total Care Burns Unit. Burns, 2021. 47(3): p. 569-575.	British Library On Demand unable to supply full text of article
Miller-Willis, K.L., V. Joe, and M. Thomas, Shifting to 1% chlorhexidine gluconate burn wound bathing: And evidence-informed change project. Journal of Burn Care and Research, 2019. 40(Supplement 1): p. S226.	Conference abstract
Mosier, M.J. and T.N. Pham, American burn association practice guidelines for prevention, diagnosis, and treatment of ventilator-associated pneumonia (VAP) in burn patients. Journal of Burn Care and Research, 2009. 30(6): p. 910-928.	Guidance article - references checked for relevant articles
Mousa, H.A., Fungal infection of burn wounds in patients with open and occlusive treatment methods. Eastern Mediterranean health journal = La revue de sante de la Mediterranee orientale = al-Majallah al-ihhiyah li-sharq al-mutawassi, 1999. 5(2): p. 333-336.	Focus is treatment (rather than prevention) of infection
Munoz-Price, L.S., et al., Reduction in acinetobacter infections associated with reduction of environmental contamination of a trauma/burn intensive care unit (ICU). Surgical Infections, 2012. 13(SUPPL. 1): p. S16.	Conference abstract
Muthotho, J.N., et al., Control of spread of Methicillin Resistant Staphylococcus aureus (MRSA) in Burns Units. African journal of health sciences, 1995. 2(1): p. 232-235.	Focus is infection prevention and control measures targeting meticillin-resistant *Staphylococcus aureus*
Nherera, L., et al., Silver delivery approaches in the management of partial thickness burns: A systematic review and indirect treatment comparison. Wound Repair and Regeneration, 2017. 25(4): p. 707-721.	Systematic review - references checked for relevant articles
Patel, M., et al., Successful control of nosocomial transmission of the USA300 clone of community-acquired meticillin-resistant Staphylococcus aureus in a UK paediatric burns centre. Journal of Hospital Infection, 2013. 84(4): p. 319-322.	Descriptive study of an outbreak
Perez-Torres, D., et al., Selective digestive decontamination in critically ill burn patients: Does it modify the incidence of	Conference abstract

Citation	Reason for exclusion
infections, type of microorganisms and use of antimicrobial agents? Intensive Care Medicine Experimental, 2020. 8(SUPPL 2).	
Periti, P., et al., Teicoplanin--its role as systemic therapy of burn infections and as prophylaxis for orthopaedic surgery. Italian Study Groups for Antimicrobial Prophylaxis in Orthopaedic Surgery and Burns. The European journal of surgery. Supplement. : = Acta chirurgica. Supplement, 1992(567): p. 3-8.	British Library On Demand unable to supply full text of article
Piel, P., et al., Antibiotic prophylaxis in patients undergoing burn wound excision. Journal of Burn Care and Rehabilitation, 1985. 6(5): p. 422-424.	British Library On Demand unable to supply full text of article
Potenza, B.M., et al., Optimal CVP line care: The jury is still out for Burn care. Journal of Burn Care and Research, 2011. 32(SUPPL. 2): p. S51.	Conference abstract
Raes, K., et al., Isolation measures for prevention of nosocomial infections in burn patients: A systematic review and meta-analysis. Intensive Care Medicine, 2014. 40(1 SUPPL. 1): p. S276.	Conference abstract
Raes, K., et al., Protective isolation precautions for the prevention of nosocomial colonisation and infection in burn patients: A systematic review and meta-analysis. Intensive & critical care nursing, 2017. 42: p. 22-29.	Systematic review - references checked for relevant articles
Ramos, G., et al., Systemic antimicrobial prophylaxis in burn patients: systematic review. The Journal of hospital infection, 2017. 97(2): p. 105-114.	Systematic review - references checked for relevant articles
Ransjo, U., Isolation care of infection-prone burn patients. Scandinavian Journal of Infectious Diseases, 1978. SUPP.11: p. 1-46.	British Library On Demand unable to supply full text of article
Ransjo, U., Attempts to control clothes-borne infection in a burn unit. 3. An open-roofed plastic isolator or plastic aprons to prevent contact transfer of bacteria. Journal of Hygiene, 1979. 82(3): p. 385-395.	Focus is contamination of clothing
Roberts, S.A., R. Findlay, and S.D.R. Lang, Investigation of an outbreak of multi-drug resistant Acinetobacter baumannii in an intensive care burns unit. Journal of Hospital Infection, 2001. 48(3): p. 228-232.	Focus is infection control in the context of an outbreak
Rogers, J.C., Infection prevention for burn patients: special precautions in a burn center and for patients in intensive care. QRB. Quality review bulletin, 1979. 5(7): p. 26-29.	British Library On Demand unable to supply full text of article
Rood, J., C. Hendrickson, and W.J. Mohr, Maintaining low healthcare associated device driven infections in a regional burn center. Journal of Burn Care and Research, 2019. 40(Supplement 1): p. S202.	Conference abstract
Rosanova, M.T., D. Stamboulian, and R. Lede, Systematic review: Which topical agent is more efficacious in the prevention of infections in burn patients? Archivos Argentinos de Pediatria, 2012. 110(4): p. 298-303.	Main text of article not in English
Rubio-Regidor, M., et al., Digestive decontamination in burn patients: A systematic review of randomized clinical trials	Systematic review - references checked for relevant articles

Citation	Reason for exclusion
and observational studies. Burns : journal of the International Society for Burn Injuries, 2018. 44(1): p. 16-23.	
Safdar, N., et al., Effectiveness of preemptive barrier precautions in controlling nosocomial colonization and infection by methicillin-resistant Staphylococcus aureus in a burn unit. American Journal of Infection Control, 2006. 34(8): p. 476-483.	Focus is infection prevention and control measures targeting meticillin-resistant *Staphylococcus aureus*
Sayed, M.A., S. Jabeen, and A. Soueid, Effectiveness of burns wound cleansing by comparison of prewash and post wash swab reports. British Journal of Surgery, 2021. 108(SUPPL 6).	Conference abstract
Sheridan, R.L., et al., Control of methicillin-resistant Staphylococcus aureus in a pediatric burn unit. American Journal of Infection Control, 1994. 22(6): p. 340-345.	Descriptive study
Shirani, Z.S., A.T. McManus, and G.M. Vaughan, Effects of environment on infection in burn patients. Archives of Surgery, 1986. 121(1): p. 31-36.	British Library On Demand unable to supply full text of article
Shoghi, M. and F. Delfani, Burn care strategy in the COVID-19 pandemic: A narrative review study. International Journal of Burns and Trauma, 2021. 11(4): p. 289-295.	Narrative review - references checked for relevant articles
Silvestri, L., H.K. Van Saene, and A.J. Petros, Selective digestive tract decontamination in critically ill patients. Expert Opinion on Pharmacotherapy, 2012. 13(8): p. 1113-1129.	Narrative review - references checked for relevant articles
Slaviero, L., et al., Antiseptics for burns: A review of the evidence. Annals of Burns and Fire Disasters, 2018. 31(3): p. 198-203.	Systematic review - references checked for relevant articles
Slee, L.L., The impact of reusable isolation gowns on infection rates in a burn unit: Clean, or contraindicated? Journal of Burn Care and Research, 2012. 33(2 SUPPL. 1): p. S151.	Conference abstract
Smith, L.C., et al., A novel nursing approach in reducing catheter-associated urinary tract infections in a regional burn center. Journal of Burn Care and Research, 2021. 42(SUPPL 1): p. S137.	Conference abstract
Subrahmanyam, M., A prospective randomised clinical and histological study of superficial burn wound healing with honey and silver sulfadiazine. Burns, 1998. 24(2): p. 157-161.	Included in Barajas-Nava 2013 Cochrane review
Tan, H.B., et al., Immunonutrition as an adjuvant therapy for burns. Cochrane Database of Systematic Reviews, 2014(12).	Systematic review - references checked for relevant articles
Taylor, C., et al., Incorporating evidenced based practice into an international mentorship model: A pilot burn nursing experience. Journal of Burn Care and Research, 2015. 36(SUPPL. 1): p. S247.	Conference abstract
Taylor, S., et al., Can the utilization of video technology during wound rounds decrease infection rates in a burn unit? Journal of Burn Care and Research, 2016. 37(SUPPL. 1): p. S262.	Conference abstract
Taylor, S. and C. Scipione, Sustaining quality in burn patients through best practice in central line associated bloodstream	Conference abstract

Citation	Reason for exclusion
infection (CLABSI) prevention. Journal of Burn Care and Research, 2014. 35(SUPPL. 1): p. S163.	
Tchanque-Fossuo, C.N., et al., Triple drug therapy: A novel alternative in the management of burn wounds of indeterminate depth. Journal of Burn Care and Research, 2012. 33(2 SUPPL. 1): p. S143.	Conference abstract
Teare, L., et al., Outbreak of Panton-Valentine leucocidin-positive meticillin-resistant Staphylococcus aureus in a regional burns unit. The Journal of hospital infection, 2010. 76(3): p. 220-4.	Focus is infection control in the context of an outbreak
Tejiram, S., et al., Screening nasal swabs for methicillin resistant Staphylococcus aureus: A regional burn center's experience. Burns, 2017. 43(4): p. 771-779.	Focus is infection prevention and control measures targeting meticillin-resistant *Staphylococcus aureus*
Thomas, M., et al., The challenge of maintaining zero preventable infections. Journal of Burn Care and Research, 2019. 40(Supplement 1): p. S129.	Conference abstract
Thomas, S., Hydrocolloid dressings in the management of acute wounds: a review of the literature. International wound journal, 2008. 5(5): p. 602-13.	Narrative review - references checked for relevant articles
Tissot, F., et al., New genotyping method discovers sustained nosocomial Pseudomonas aeruginosa outbreak in an intensive care burn unit. Journal of Hospital Infection, 2016. 94(1): p. 2-7.	Focus is genotyping of clinical and environmental isolates
Tredget, E.E., et al., A matched-pair, randomized study evaluating the efficacy and safety of acticoat silver-coated dressing for the treatment of burn wounds. Journal of Burn Care and Rehabilitation, 1998. 19(6): p. 531-537.	British Library On Demand unable to supply full text of article
Tredget, E.E., et al., Pseudomonas infections in the thermally injured patient. Burns, 2004. 30(1): p. 3-26.	Narrative review - references checked for relevant articles
Turner, A.G., M.M. Higgins, and J.G. Craddock, Disinfection of immersion tanks (Hubbard) in a hospital burn unit. Archives of environmental health, 1974. 28(2): p. 101-4.	British Library On Demand unable to supply full text of article
Valentino, L. and M.V. Torregrossa, Risk of bacillus cereus and Pseudomonas aeruginosa nosocomial infections in a burns centre: The microbiological monitoring of water supplies for a preventive strategy. Water Science and Technology, 1995. 31(5-6): p. 37-40.	Not a comparative study
Van Der Reijden, W.A., et al., Evaluation of a monitoring system for nosocomial pathogens in a burn centre by three molecular typing methods. Clinical Microbiology and Infection, 2012. 18(SUPPL. 3): p. 370.	Conference abstract
van Duin, D., et al., Reduction in central line-associated bloodstream infections in patients with burns. Infection Control and Hospital Epidemiology, 2014. 35(8): p. 1066-1068.	No specific interventions evaluated
van Langeveld, I., et al., Multiple-Drug Resistance in Burn Patients: A Retrospective Study on the Impact of Antibiotic Resistance on Survival and Length of Stay. Journal of burn	Focus is identification of risk factors for complications such as renal failure based on infection status

Citation	Reason for exclusion
care & research : official publication of the American Burn Association, 2017. 38(2): p. 99-105.	
Van Rijn, R.R., E.C. Kuijper, and R.W. Kreis, Seven-year experience with a 'quarantine and isolation unit' for patients with burns. A retrospective analysis. Burns, 1997. 23(4): p. 345-348.	Not a comparative study
Van Saene, H.K.F. and J.P.A. Nicolai, The prevention of wound infections in burn patients. Scandinavian Journal of Plastic and Reconstructive Surgery, 1979. 13(1): p. 63-67.	British Library On Demand unable to supply full text of article
Vandenberg, V.B., AWBAT: early clinical experience. Eplasty, 2010. 10: p. e23.	Not a comparative study
Vauchel, T., et al., Impact of an Acinetobacter baumannii outbreak on kidney events in a burn unit: A targeted machine learning analysis. American Journal of Infection Control, 2019. 47(4): p. 435-438.	Focus is colistin as a risk factor for renal complications
Venable, A. and S. Dissanaike, Is automated electronic surveillance for healthcare-associated infections accurate in the burn unit? Journal of Burn Care and Research, 2013. 34(6): p. 591-597.	British Library On Demand unable to supply full text of article
Venable, A., et al., Is automated electronic surveillance for healthcare associated infections accurate in the burn unit? Journal of Burn Care and Research, 2013. 34(2 SUPPL. 1): p. S132.	Conference abstract
Vickers, M.L., et al., Modifiable risk factors for multidrug-resistant Gram-negative infection in critically ill burn patients: a systematic review and meta-analysis. ANZ journal of surgery, 2019. 89(10): p. 1256-1260.	Systematic review - references checked for relevant articles
Villanueva, E., et al., Hyperbaric oxygen therapy for thermal burns. Cochrane Database of Systematic Reviews, 2004(2).	Systematic review - references checked for relevant articles
Vinaik, R., et al., Management and prevention of drug resistant infections in burn patients. Expert Review of Anti-Infective Therapy, 2019. 17(8): p. 607-619.	Narrative review - references checked for relevant articles
Wahl, W.L., et al., Does bronchoalveolar lavage enhance our ability to treat ventilator-associated pneumonia in a trauma-burn intensive care unit? The Journal of trauma, 2003. 54(4): p. 633-9.	Focus is bronchoalveolar lavage for recognition of ventilator-associated pneumonia
Wahl, W.L., et al., Duration of antibiotic therapy for ventilator-associated pneumonia in burn patients. Journal of Burn Care and Research, 2009. 30(5): p. 801-806.	Infection prevention and control not primary aim of the study
Wang, C., et al., Efficacy of Infection Control Measures in Managing Outbreaks of Multidrug-Resistant Organisms in Burn Units. Annals of plastic surgery, 2021. 86(4S Suppl 4): p. S454-S457.	British Library On Demand unable to supply full text of article
Wasserman, D., et al., Interferon-gamma in the prevention of severe burn-related infections: A European phase III multicenter trial. Critical Care Medicine, 1998. 26(3): p. 434-439.	Focus is immunology (Ioannovich 1996 reported the study rationale/design; Wasserman 1998 reported the results)
Waymack, J.P., et al., A prospective trial of prophylactic intravenous immune globulin for the prevention of	British Library On Demand unable to supply full text of article

Citation	Reason for exclusion
infections in severely burned patients. Burns : journal of the International Society for Burn Injuries, 1989. 15(2): p. 71-6.	
Weber, J.M., et al., Effectiveness of bacteria-controlled nursing units in preventing cross-colonization with resistant bacteria in severely burned children. Infection Control and Hospital Epidemiology, 2002. 23(9): p. 549-551.	Focus is isolation techniques, whereas single-room isolation is now the established standard
Wibbenmeyer, L., et al., Effectiveness of universal screening for vancomycin-resistant enterococcus and methicillin-resistant staphylococcus aureus on admission to a burn-trauma step-down unit. Journal of Burn Care and Research, 2009. 30(4): p. 648-656.	No specific interventions evaluated
Wiggins, B., et al., Quality improvement in infection prevention practices. Journal of Burn Care and Research, 2011. 32(SUPPL. 2): p. S78.	Conference abstract
Xu, W., The curative effect and safety evaluation of nanometer silver used on II degree burn wound. Wound Repair and Regeneration, 2009. 17(4): p. A61.	British Library On Demand unable to supply full text of article
Yang, B., et al., Beneficial effects of silver foam dressing on healing of wounds with ulcers and infection control of burn patients. Pakistan Journal of Medical Sciences, 2015. 31(6): p. 1334-1339.	Focus is treatment (rather than prevention) of infection
Yogeesha Babu, K.V., et al., Study of imipenem resistant metallo- beta-lactamase positive Pseudomonas aeruginosa from burns wound infections, environmental sources and impact of infection control measures in a burns care center. Journal of Pure and Applied Microbiology, 2011. 5(2): p. 695-703.	British Library On Demand unable to supply full text of article
Yun, H.C., et al., Comparison of PCR/electron spray ionization-time-of-flight-mass spectrometry versus traditional clinical microbiology for active surveillance of organisms contaminating high-use surfaces in a burn intensive care unit, an orthopedic ward and healthcare workers. BMC infectious diseases, 2012. 12: p. 252.	Focus is surveillance of micro-organisms contaminating eqipment/surfaces and health professionals' hands
Zhang, G., et al., Efficacy and safety of blood purification in the treatment of deep burns: A systematic review and meta-.analysis. Medicine, 2021. 100(5): p. e23968.	Systematic review - references checked for relevant articles

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Appendix F – Included studies

Table F.1: Characteristics of included studies

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
Atukorala 1998[25] Sri Lanka October 1994 and July 1997	Uncontrolled before–after study	Patients in a burns unit Burn severity and surgical management techniques not reported	Multimodal intensification of infection control measures (more infection control nurses; education programmes for all healthcare workers; increased emphasis on hand hygiene; more stringent clinical waste disposal procedures; implementation of published clinical guidelines for antibiotic use; precautions related to venous cannula sites and urinary catheter use)	Baseline infection control measures	Prevalence of hospital-acquired infection Prevalence of burn wound infection	Study conducted via prevalence surveys at two timepoints; interventions and surveys were hospital-wide, but data extracted are specific to the burns unit
Baier 2019[26] Germany January 2012 to December 2017	Uncontrolled before–after study	Patients in a tertiary referral burns intensive care unit Adults with severe burns; surgical management techniques not reported	Universal decolonization of intact skin and nasopharyngeal mucosa (octenidine)	No universal decolonization of intact skin and nasopharyngeal mucosa	Acquisition of MDRB Incidence of CLABSI Duration of hospital stay	May to December 2015 excluded from analysis owing to outbreak control measures being in use

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
Barajas-Nava 2013[27] China, Germany, India, Iran, Japan, Mexico, South Africa, Spain, Switzerland, Thailand, and USA Various study dates (articles published from 1968 to 2010)	Systematic review of randomized controlled trials	Patients with burns in any hospital setting (paediatric and adult patients, 15 studies; paediatric patients only, 10 studies; adult patients only, 11 studies) Partial-thickness and superficial burns (27 studies), full-thickness burns (five studies), burn thickness not reported (four studies); surgical management techniques not reported	Topical antibiotic prophylaxis (26 studies), or systemic antibiotic prophylaxis (seven studies), or non-absorbable antibiotics (selective decontamination of the digestive tract; two studies), or local airway antibiotic prophylaxis (one study)	Placebo, or no treatment, or usual care, or an alternative intervention (including non-pharmacological interventions)	Burn wound infection Invasive infections Infection-related mortality Duration of hospital stay	Some studies included in the published review did not report outcomes relevant to development of the guidance
Brown 2016[28] New Zealand October 2009 to March 2013	Randomized controlled trial	Patients with partial-thickness burns in a paediatric emergency department Surgical management techniques not reported	Silver sodium carboxymethyl cellulose (Aquacel Ag) dressing	Nanocrystalline silver-coated polyethylene (Acticoat) dressing	Burn wound infection	Published after Storm-Versloot 2010[54] and Wasiak 2013[59]
Cavalcante 2003[29]	Case–control study	Patients in a burns centre	Exposure to potential risk factors for acquisition of imipenem-resistant	Reduced exposure to potential risk factors for	Acquisition of imipenem-resistant	

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
Brazil November 2008 to December 2009		First-degree burns (3%), second-degree burns (75%), third-degree burns 22%; surgical management techniques not reported	*Acinetobacter baumannii* (such as transfer from another hospital, colonization pressure in the burns centre, need for mechanical ventilation, previous surgical procedures, previous administration of antibiotics, and use of central venous or urinary catheters)	acquisition of imipenem-resistant *Acinetobacter baumannii*	*Acinetobacter baumannii*	
Cerda 2007[30] Spain January 1995 to February 2004	Uncontrolled before–after study	Patients in an intensive care burns unit Burn severity and surgical management techniques not reported	Enteral vancomycin	Baseline infection control measures	Acquisition of GISA, MRSA and VRE	
Dube 1993[31] USA July 1984 to June 1991	Uncontrolled before–after study	Patients in a burns unit Burn severity and surgical management techniques not reported	Topical nystatin for skin grafts	No topical nystatin	Acquisition of yeasts and *Candida rugosa* Incidence of fungaemia	
Ho 2017[32] Canada	Uncontrolled before–after study	Patients in a tertiary burns unit	Universal contact precautions	No universal contact precautions	Acquisition of antibiotic-resistant organisms, including	

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
January 2006 to December 2010		Burn severity not reported; assessment for early excision and grafting of deep dermal or full-thickness burns performed during reassessment of burn wounds 48–72 hours after injury, with surgical procedures performed on next available operative day			carbapenem-resistant *Acinetobacter* and *Pseudomonas* spp., ESBL *Escherichia coli*, MRSA, and VRE	
Hoogewerf 2020[33] China, Egypt, Germany, Greece, Singapore, The Netherlands, and USA Various study dates (articles published from 1991 to 2017)	Systematic review of randomized controlled trials	Patients with facial burns in any care setting Burn severity and surgical management techniques not reported	Topical antimicrobial agents, or topical non-antimicrobial agents, or synthetic/biological dressings ('skin substitutes'), or wound preparation agents/antiseptics, or other topical treatments (e.g. honey)	Placebo, or no treatment, or an alternative intervention	Burn wound infection Pain Patient satisfaction Quality of life Duration of hospital stay	Some studies included in the published review did not report outcomes relevant to development of the guidance; treatment contrasts already extracted from Barajas-Nava 2013,[27] Storm-Versloot 2010,[54] Wasiak 2013,[59] and Norman 2017[42] were not

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
						extracted here to prevent double counting of evidence
Huang 2017[34] Taiwan June to July 2015	Case–control study	Patients in intensive care burns units Burn severity and surgical management techniques not reported	Exposure to antibiotics (particularly carbapenem and non-carbapenem beta-lactam)	Reduced exposure to antibiotics	Acquisition of multidrug-resistant *Acinetobacter baumannii*	Focus is antimicrobial stewardship
Ichida 1993[35] USA January 1983 to December 1985	Uncontrolled before–after study	Patients in a burns unit Moderate/major burns (severity accounted for in statistical analysis); surgical management techniques not reported (days until first wound excision accounted for in statistical analysis)	Total body bathing using chlorhexidine gluconate	Routine bathing (initial surface decontamination using povidone-iodine followed by regular bathing with soap)	Acquisition of micro-organisms, including *Candida* and *Enterococcus* spp., *Pseudomonas aeruginosa*, and *Staphylococcus aureus*	
Keshavarzi 2022[36] Iran	Randomized controlled trial	Adult patients with second-degree burns in a burn and wound healing hospital	Silver sulfadiazine ointment	Great Plantain (*Plantago major*) ointment	Burn wound infection Pain	Published after Barajas-Nava 2013,[27] Norman 2017,[42] and Storm-Versloot 2010[54]

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
Study dates not reported (study duration 9 months)		Surgical management techniques not reported				
Lindford 2015[37] Finland 1998 to 2012	Uncontrolled before–after study	Patients in a burns intensive care unit Patients with third-degree burns; surgical management techniques not reported	Multimodal intensification of infection control measures (particularly changes to showering facilities and other hygiene measures, including reduced burn wound hydrotherapy)	Baseline infection control measures	Acquisition of multidrug-resistant *Acinetobacter* spp.	
Martino 2017[38] USA July 2011 to December 2013	Uncontrolled before–after study	Patients in a burns intensive care unit Burn severity and surgical management techniques not reported	Alcohol-impregnated central venous line port protectors	Standard isopropyl alcohol swab cleaning procedures	Incidence of CLABSI	
May 2000[39] USA 1998 to 1999	Controlled before–after study	Patients in burns/trauma, medical and surgical intensive care units Burn severity and surgical management	Limiting broad-spectrum cephalosporin use in the burns/trauma intensive care unit, but not in the medical and surgical intensive care units	Not limiting broad-spectrum cephalosporin use in the burns/trauma intensive care unit, nor in the medical and surgical intensive care units	Incidence of MRSA and VRE infections Duration of hospital stay	Burns and trauma patients combined

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
		techniques not reported				
Neely 2003[40] USA December 1996 to December 2001	Uncontrolled before–after study	Patients in a burns hospital Burn severity and surgical management techniques not reported	Enhanced infection control measures related to reusable infectious waste containers (such as disinfecting container lids and improved hand hygiene)	Baseline infection control measures	Incidence of hospital-acquired infection	
Neely 2006[41] USA Study dates not reported (study duration 2 years)	Uncontrolled before–after study	Paediatric patients receiving acute care in a burns hospital Burn severity and surgical management techniques not reported	Increased hang time of enteral feeding administration sets	Standard hang time of enteral feeding administration sets	Incidence of hospital-acquired infection	
Norman 2017[42] Brazil, Canada, China, Germany, Greece, India, Iran, Pakistan,	Systematic review of randomized controlled trials	Patients with burns in any care setting Burn severity and surgical management techniques not reported	Topical antiseptic agents	Placebo, or no treatment, or usual care, or an alternative intervention (including non-pharmacological interventions)	Incidence of new burn wound infections Incidence of septicaemia Infection-related mortality	Published review covers wounds infected at baseline; associated data not extracted here; some studies included in the published review

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
Singapore, Thailand, The Netherlands, The Philippines, and USA Various study dates (articles published from 1981 to 2015)					Pain Health-related quality of life	did not report outcomes relevant to development of the guidance; treatment contrasts already extracted from Barajas-Nava 2013,[27] Storm-Versloot 2010,[54] and Wasiak 2013[59] were not extracted here to prevent double counting of evidence
O'Mara 2007[43] USA 9-month period during 2005 and 2006 (no further details reported)	Prospective cohort study	Critically ill paediatric and adult patients in two burns units Burn severity not fully reported; surgical management techniques not reported	Placement of central venous catheters by new site access	Placement of central venous catheters by guidewire exchange	Incidence of CRBSI	Paediatric and adult patients differed in characteristics such as burn size/severity, venous site of catheter placement, and proximity of lines to burn wounds
Ozkurt 2012[44]	Uncontrolled before–after study	Paediatric and adult patients in a burns centre	Multimodal intensification of infection control	Baseline infection control measures	Incidence of hospital-acquired infection	Mortality also reported but unclear whether

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
Turkey 2003 to 2008		Burn severity not reported; early debridement and grafting sometimes performed	measures introduced sequentially (education programmes for all healthcare workers; increased emphasis on hand hygiene; more frequent cleaning/disinfection of the environment; increased bed capacity overall and fewer shared patient rooms; increased emphasis on antibiotic stewardship; discontinuation of hydrotherapy tank use; improved air conditioning; appointment of more experienced healthcare professionals; changes to surgical procedures)		Duration of hospital stay	this was infection-related
Popp 2014[45] USA January 2010 to June 2012	Uncontrolled before–after study	Adult patients with partial- or full-thickness burns in a burns centre Surgical management techniques not reported	Total body bathing using chlorhexidine gluconate	Routine bathing (using soap and water)	Incidence of CAUTI, CLABSI, and VAP	

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
Ramos 2002[46] Argentina 1998 to 1999	Prospective cohort study	Patients requiring central venous catheterization in a burns unit Burn severity and surgical management techniques not reported	Central venous catheter insertion near an open burn wound	Central venous catheter insertion far from an open burn wound	Incidence of catheter-related bacteraemia	
Ransjo 1979[47] Sweden September 1973 to May 1976	Controlled trial	Patients in a burns unit Burn severity and surgical management techniques not reported	Modified clothing routines for healthcare professionals (cotton ward suit covered by a cotton operating gown worn at every close-nursing contact and both changed after each contact episode, or cotton ward suit worn all day and covered by a cotton operating gown at every close-nursing contact with the gown changed after each contact episode, or cotton ward suit worn all day and covered by a semi-disposable polyethylene fibre coverall at every close-	Standard clothing routine for healthcare professionals (cotton ward suit worn all day and covered by the same cotton operating gown at every patient contact)	Incidence of colonization with *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and Streptococcus groups A, B, C, F, and G	

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
			nursing contact with the coverall changed after each contact episode)			
Rashaan 2019[48] and Rashaan 2020[49] The Netherlands February 2014 to September 2015	Randomized controlled trial	Adult patients with partial-thickness burns in two burns centres Burns wounds were evaluated at 10–14 days post-burn and those not expected to heal within 21 days were excised and skin grafted	Silver sulfadiazine cream	Enzyme alginogel	Burn wound colonization Burn wound infection Pain Anxiety Health-related quality of life Duration of hospital stay	Published after Storm-Versloot 2010[54]; Rashaan 2020[49] focused on health-related quality of life, whereas the remaining outcomes were reported in Rashaan 2019[48]
Rashid 2005[50] UK January to December 2001	Prospective cohort study	Paediatric patients in a burns unit Burn severity and surgical management techniques not reported	Systemic antibiotic prophylaxis (flucloxacillin, co-amoxiclav, or clarithromycin) at time of referral to the burns unit	No systemic antibiotic prophylaxis at time of referral to the burns unit	Incidence of toxic shock syndrome	
Remington 2016[51] USA	Uncontrolled before–after study	Patients with central venous access in a burns/trauma intensive care unit	Multimodal intensification of infection control measures aimed at reducing CLABSI and	Baseline infection control measures	Incidence of CLABSI	Burns and trauma patients combined

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
April 2011 to March 2015		Burn severity and surgical management techniques not reported	introduced sequentially (such as a line insertion checklist, daily assessment of need for central access, use of alcohol-impregnated caps, and enhanced nursing care documentation)			
Sheridan 1997[52] USA Study dates not reported	Controlled trial	Paediatric patients in a burns unit Burn severity not reported; full-thickness burns were excised and usually sheet-autografted within 5 days of injury	Once-daily dressing changes	Twice-daily dressing changes	Incidence of burn wound infection Incidence of invasive infections (bacteraemia, pneumonia, and UTI)	
Simor 2002[8] Canada December 1998 to March 2000	Case–control study	Patients in a burns centre Burn severity and surgical management techniques not reported	Exposure to potential risk factors for acquisition of *Acinetobacter baumannii* (such as receiving blood products, undergoing a procedure in the hydrotherapy room, and duration of mechanical ventilation)	Reduced exposure to potential risk factors for acquisition of *Acinetobacter baumannii*	Acquisition of multidrug-resistant *Acinetobacter baumannii*	
Sood 2017[53]	Interrupted time series	Patients in a burns centre	Multimodal intensification of infection control	Baseline infection control measures	Incidence of CLABSI	

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
USA January 2011 to December 2016		Burn severity and surgical management techniques not reported (although it was reported that severely burned patients underwent frequent visits to the operating theatre)	measures aimed at reducing CLABSI and introduced sequentially (such as development of new blood culture procurement procedures, implementation of chlorhexidine bathing/dressings, use of alcohol-impregnated caps, and routine central venous catheter changes)			
Storm-Versloot 2010[54] Canada, China, Germany, India, Pakistan, Tanzania, Thailand, The Philippines, and USA Various study dates (articles published	Systematic review of randomized controlled trials	Patients with burns in any care setting Partial-thickness and superficial burns (14 studies), full-thickness burns (six studies); surgical management techniques not reported	Silver-containing wound dressings and topical agents	Wound dressings and topical agents not containing silver, or alternative silver-containing wound dressings and topical agents	Burn wound infection Pain Patient satisfaction Health-related quality of life Duration of hospital stay	Published review covers non-burns wounds; associated data not extracted here; some burn wound studies included in the published review did not report outcomes relevant to development of the guidance; treatment contrasts already extracted from Barajas-Nava 2013[27] were not

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
from 1984 to 2007)						extracted here to prevent double counting of evidence
Tao 2015[55] China February to August 2013	Controlled trial	Patients with major burns requiring central venous catheter cannulation in a burns intensive care unit Burn severity and surgical management techniques not reported	Thrice-daily topical mupirocin at the central venous catheter exit site and disinfection with povidone iodine, or once-daily topical mupirocin at the central venous catheter exit site and disinfection with povidone iodine	Thrice-daily disinfection with povidone iodine, or once-daily disinfection with povidone iodine	Incidence of skin colonization and CLABSI	
Tredget 1992[56] Canada April 1988 to May 1990	Uncontrolled before–after study	Patients in a burns centre Burn severity not reported; surgical debridement usually started after 48 hours of fluid resuscitation and within 1 week of hospitalization	Discontinuation of hydrotherapy	Routine hydrotherapy	Acquisition of *Pseudomonas* spp. Incidence of bacteraemia Infection-related mortality Duration of hospital stay	
Ugburo 2004[57] Nigeria	Randomized controlled trial	Patients with major burns in a teaching hospital	Systemic antibiotic prophylaxis (ampicillin and cloxacillin, or	No systemic chemoprophylaxis	Incidence of colonization and infection with coliforms, *Escherichia*	Excluded from Barajas-Nava 2013[27] because the study did not

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
January to December 1996		Surgical management techniques not reported	gentamicin and erythromycin)		*coli*, *Klebsiella aerogenes*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Staphylococcus epidermidis*	provide information in a form suited to the published review
Wang 2020[58] China April 2017 to July 2018	Randomized controlled trial	Patients with burns requiring plastic surgery in a teaching hospital Burn severity and surgical management techniques not reported	Enhanced nursing quality management	Routine nursing management	Incidence of hospital-acquired infection Anxiety or depression Duration of hospital stay	
Wasiak 2013[59] Study countries not reported Various study dates (articles published from 1980 to 2010)	Systematic review of randomized controlled trials	Patients with superficial or partial-thickness burns in any care setting Surgical management techniques not reported	Wound dressings used individually or in combination (hydrocolloid dressings, polyurethane film dressings, hydrogel dressings, silicone-coated nylon dressings, synthetic/biological dressings ('biosynthetic skin substitute dressings'), antimicrobial	An alternative intervention (or combination of interventions)	Incidence of infection Pain associated with application/removal of the dressing Patient perception (satisfaction with application/removal of the dressing) Quality of life	Some studies included in the published review did not report outcomes relevant to development of the guidance; treatment contrasts already extracted from Barajas-Nava 2013[27] and

Citation, country and study dates	Study design	Population/setting	Intervention	Comparator	Clinical outcomes	Reviewer comments
			(silver- and iodine containing) dressing, fibre dressings, and wound dressing pads)		Duration of hospital stay	Storm-Versloot 2010[54] were not extracted here to prevent double counting of evidence
Wisplinghoff 1999[60] Germany January 1990 to December 1992	Case–control study	Severely burned patients in a burns intensive care unit Abbreviated burn severity index ranged from 1 to 16; surgical management techniques not reported	Exposure to potential risk factors for *Acinetobacter baumannii* bloodstream infection (such as need for mechanical ventilation, previous surgical procedures, use of hydrotherapy, previous administration of antibiotics, and use of central venous or urinary catheters)	Reduced exposure to potential risk factors for *Acinetobacter baumannii* bloodstream infection	Incidence of *Acinetobacter baumannii* bloodstream infection	

1 CAUTI catheter-associated urinary tract infection; CLABSI central line-associated bloodstream infection; CRBSI catheter-related bloodstream infection; ESBL extended-
2 spectrum beta lactamase-producing; GISA *Staphylococcus aureus* with intermediate sensitivity to glycopeptides; MDRB multidrug-resistant bacteria; MRSA meticillin-
3 resistant *Staphylococcus aureus*; UTI urinary tract infection; VAP ventilator-associated pneumonia; VRE vancomycin-resistant enterococcus

Appendix G – Methodological quality of included studies

Table G.1: Systematic reviews and meta-analyses*

Citation	Clear question and inclusion/exclusion criteria reported	Comprehensive literature search	At least two people selected studies	At least two people extracted data	Publication status not used as inclusion criterion	Excluded studies reported	Relevant characteristics of included studies reported	Scientific quality of included studies assessed and reported	Scientific quality of included studies used appropriately	Appropriate methods used to combine individual study findings	Likelihood of publication bias assessed appropriately	Conflicts of interest declared	Overall rating
Barajas-Nava 2013[27]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High quality
Hoogewerf 2020[33]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High quality
Norman 2017[42]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	High quality
Storm-Versloot 2010[54]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Yes	Yes	High quality
Wasiak 2013[59]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Not applicable	Yes	High quality

* Scottish Intercollegiate Guidelines Network (SIGN) methodology checklists 1 (systematic reviews and meta-analyses), 2 (randomized controlled trials), 3 (cohort studies) and 4 (case–control studies), https://www.sign.ac.uk/what-we-do/methodology/checklists/

Table G.2: Controlled trials*

Citation	Appropriate and clear question	Random assignment	Adequate concealment	Subject and investigators blinded	Groups similar at start	Groups differ only in treatment	Standard, valid and reliable outcome measurement	Dropout percentage	Intention to treat analysis	Results comparable across sites	Overall rating
Brown 2016[28]	Yes	Yes	Yes	No	Yes	Yes	Yes	9%	No	Does not apply	Acceptable
Keshavarzi 2022[36]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	0%	Yes	Does not apply	Acceptable
Ransjo 1979[47]	Yes	No	No	No	Yes	Yes	Yes	Can't say	Does not apply	Does not apply	Low quality
Rashaan 2019[48] and Rashaan 2020[49]	Yes	Yes	No	No	Yes	Yes	Yes	8%	Yes	Can't say	Acceptable
Sheridan 1997[52]	Yes	No	No	No	Yes	Can't say	Yes	Can't say	Does not apply	Does not apply	Low quality
Tao 2015[55]	Yes	No	Can't say	Can't say	Yes	Yes	Yes	11%	No	Does not apply	Low quality
Ugburo 2004[57]	Yes	Yes	Can't say	Can't say	Yes	Yes	Yes	Can't say	Can't say	Does not apply	Low quality
Wang 2020[58]	Yes	Yes	Can't say	Can't say	Yes	Yes	Yes	Can't say	Can't say	Does not apply	Low quality

* Scottish Intercollegiate Guidelines Network (SIGN) methodology checklists 1 (systematic reviews and meta-analyses), 2 (randomized controlled trials), 3 (cohort studies) and 4 (case–control studies), https://www.sign.ac.uk/what-we-do/methodology/checklists/

Table G.3: Controlled before–after studies*

Citation	Random sequence generation	Allocation concealment	Baseline outcome measurements similar	Baseline characteristics similar	Incomplete outcome data	Knowledge of allocation prevented	Protection against contamination	Selective outcome reporting	Other risks of bias
May 2000[39]	Unclear risk	Unclear risk	Unclear risk	Unclear risk	Unclear risk	Unclear risk	Unclear risk	Low risk	Unclear risk

* Cochrane Effective Practice and Organisation of Care (EPOC) resources for review authors, Risk of bias, Suggested risk of bias criteria for EPOC reviews (controlled before–after studies and interrupted time series), https://epoc.cochrane.org/resources/epoc-resources-review-authors

Table G.4: Interrupted time series*

Citation	Intervention independent of other changes	Shape of intervention effect pre-specified	Intervention unlikely to affect data collection	Knowledge of allocation prevented	Incomplete outcome data	Selective outcome reporting	Other risks of bias
Sood 2017[53]	Unclear risk	Unclear risk	Unclear risk	Unclear risk	Unclear risk	Low risk	Unclear risk

* Cochrane Effective Practice and Organisation of Care (EPOC) resources for review authors, Risk of bias, Suggested risk of bias criteria for EPOC reviews (controlled before–after studies and interrupted time series), https://epoc.cochrane.org/resources/epoc-resources-review-authors

Table G.5: Quasi-experimental (uncontrolled before–after) studies*

Citation	Cause and effect order clear	Participants included in comparisons similar	Participants included in comparisons receiving similar treatment/care	Control group	Multiple outcome measurements both before and after	Follow up complete/explained	Outcome measurement consistent	Outcome measurement reliable	Statistical analysis appropriate
Atukorala 1998[25]	Yes	Unclear	Yes	No	No	Unclear	Yes	Yes	Yes
Baier 2019[26]	Yes	Unclear	Yes	No	No	Yes	Yes	Yes	Yes
Cerda 2007[30]	Yes	Yes	Yes	No	No	Unclear	Yes	Yes	Yes

Dube 1993[31]	Yes	Unclear	Yes	No	No	Unclear	Yes	Yes	Yes
Ho 2017[32]	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Ichida 1993[35]	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Lindford 2015[37]	Yes	Unclear	Yes	No	Yes	Unclear	Yes	Yes	Yes
Martino 2017[38]	Yes	Yes	Yes	No	Yes	Unclear	Yes	Yes	Yes
Neely 2003[40]	Yes	Unclear	Unclear	No	No	Unclear	Yes	Yes	Yes
Neely 2006[41]	Yes	Unclear	Yes	No	No	Unclear	Yes	Yes	Yes
Ozkurt 2012[44]	Yes	Unclear	Yes	No	Yes	Unclear	Yes	Yes	Yes
Popp 2014[45]	Yes	Yes	Yes	No	Yes	Unclear	Yes	Yes	Yes
Remington 2016[51]	Yes	Yes	Unclear	No	No	Unclear	Yes	Yes	Yes
Tredget 1992[56]	Yes	Yes	Yes	No	No	Unclear	Yes	Yes	Unclear

* Joanna Briggs Institute (JBI) critical appraisal tools, Checklist for Quasi-Experimental Studies, https://jbi.global/critical-appraisal-tools

Table G.6: Cohort studies*

Citation	Appropriate and clear question	Groups selected from comparable source populations	Group participation rates reported	Outcome present at enrolment considered and taken into account	Dropout percentage	Comparison of participants with full follow-up and dropouts	Clearly defined outcomes	Outcome assessment blinded to exposure status	Recognized outcome assessment could be influenced by knowledge of exposure status	Exposure assessment reliable	Validity and reliability of outcome assessment method demonstrate using external sources	Exposure level or prognostic factor assessed more than once	Main potential confounders identified and taken into account	Confidence intervals reported	Overall rating
O'Mara 2007[43]	Yes	Yes	No	Can't say	Can't say	No	Yes	Can't say	Can't say	Yes	No	No	Can't say	No	Acceptable
Ramos 2002[46]	Yes	Yes	No	Can't say	Can't say	No	Yes	Can't say	Can't say	Yes	No	No	Can't say	Yes	Acceptable
Rashid 2005[50]	Yes	Can't say	No	Can't say	Can't say	No	Yes	Can't say	Can't say	Yes	No	No	Can't say	No	Acceptable

* Scottish Intercollegiate Guidelines Network (SIGN) methodology checklists 1 (systematic reviews and meta-analyses), 2 (randomized controlled trials), 3 (cohort studies) and 4 (case–control studies), https://www.sign.ac.uk/what-we-do/methodology/checklists/

Table G.7: Case–control studies*

Citation	Appropriate and clear question	Cases and controls from comparable populations	Consistent exclusion criteria for cases and controls	Percentages of cases and controls who participated	Similarities/differences between participants and non-participants explored	Cases clearly defined and differentiated from controls	Clear that controls are non-cases	Measures taken to prevent knowledge of primary exposure influencing case ascertainment	Standard, valid and reliable measurement of exposure status	Main potential confounders identified and taken into account	Confidence intervals reported	Overall rating
Cavalcante 2003[29]	Yes	No	Can't say	Cases: can't say Controls: can't say	Yes	Yes	Yes	Can't say	Yes	Yes	Yes	Acceptable
Huang 2017[34]	Ye	Yes	Can't say	Cases: can't say Controls: can't say	Yes	Yes	Yes	Can't say	Yes	Yes	Yes	Acceptable
Simor 2002[8]	Yes	Yes	Can't say	Cases: can't say Controls: can't say	Yes	Yes	Yes	Can't say	Yes	Yes	Yes	Acceptable
Wisplinghoff 1999[60]	Yes	Yes	Can't say	Cases: can't say Controls: can't say	Yes	Yes	Yes	Can't say	Yes	Yes	Yes	Acceptable

* Scottish Intercollegiate Guidelines Network (SIGN) methodology checklists 1 (systematic reviews and meta-analyses), 2 (randomized controlled trials), 3 (cohort studies) and 4 (case–control studies), https://www.sign.ac.uk/what-we-do/methodology/checklists/

Appendix H – GRADE tables

Blue shading in the GRADE tables indicates statistically significant relative or absolute effects.

Table H.1: Topical antibiotic prophylaxis – neomycin, bacitracin, and polymyxin B versus inactive control (no intervention or placebo)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
2 (Fisher 1968 and Livingston 1990 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[a] No serious inconsistency[b] No serious indirectness Very serious imprecision[c] Other considerations: none	NR/51	NR/48	OR=0.75 (0.32 to 1.73)	NR	Very low
Incidence of sepsis							
1 (Livingston 1990 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	4/18	0/15	RR=7.58 (0.44 to 130.38)	NR	Very low
Incidence of bacteraemia							
1 (Fisher 1968 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	2/33	5/33	RR=0.4 (0.08 to 1.92)	NR	Very low
Infection-related mortality							
1 (Livingston 1990 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	4/18	0/15	RR=7.58 (0.44 to 130.38)	NR	Very low

Duration of hospital stay (days)							
1 (Livingston 1990 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[d] Other considerations: none	18	15	-	MD=3.67 lower (9.46 lower to 2.12 higher)	Very low

CI confidence interval; MD mean difference; NR not reported; OR odds ratio; RR risk ratio; SD standard deviation

[a] Barajas-Nava 2013[27] reported high risk of bias for Fisher 1968 and Livingston 1990

[b] Barajas-Nava 2013[27] reported I^2=0% (no important heterogeneity)

[c] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[d] 95% CI for absolute effect crosses the lower (-4.35) default threshold for imprecision (based on SD of 8.7 in the control group)

Table H.2: Topical antibiotic prophylaxis – silver sulfadiazine versus dressings (including synthetic/biological dressings)

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
11 (Barret 2000, Bugmann 1998, Caruso 2006, Gerding 1988, Gerding 1990, Gong 2009, Gotschall 1998, Hosseini 2009, Muangman 2006, Noordenbos 1999, and Tayade 2006 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[a] No serious inconsistency[b] No serious indirectness Serious imprecision[c] Other considerations: none	NR/321	NR/338	OR=1.87 (1.09 to 3.19)	NR	Very low
Duration of hospital stay (days)							
3 (Barret 2000, Hosseini 2009, and Muangman 2006 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[a] Serious inconsistency[d] No serious indirectness No serious imprecision[e] Other considerations: none	72	74	-	MD=2.11 higher (1.93 to 2.28 higher)	Very low

CI confidence interval; MD mean difference; NR not reported; OR odds ratio; SD standard deviation

[a] Barajas-Nava 2013[27] reported unclear risk of bias for Bugmann 1998 and Muangman 2006, and high risk of bias for Barret 2000, Caruso 2006, Gerding 1988, Gerding

1990, Gong 2009, Gotschall 1998, Hosseini 2009, Noordenbos 1999, and Tayade 2006

[b] Barajas-Nava 2013[27] reported I^2=0% (no important heterogeneity)

[c] 95% CI for relative effect crosses the upper (1.25) default threshold for imprecision

[d] Barajas-Nava 2013[27] reported I^2=36% (moderate heterogeneity)

[e] 95% CI for absolute effect does not cross the lower (-2.3) or upper (2.3) default thresholds for imprecision (based on median SD of 4.6 in the control groups)

Table H.3: Topical antibiotic prophylaxis – silver sulfadiazine versus any topical preparation of natural products (traditional medicine)

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
4 (Ang 2001, Khorasani 2009, Moharamzad 2010, and Subrahmanyam 1998 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[a] No serious inconsistency[b] No serious indirectness Very serious imprecision[c] Other considerations: none	NR/168	NR/168	OR=1.05 (0.54 to 2.06)	NR	Very low
Incidence of bacteraemia							
1 (Ang 2001 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	3/58	4/54	OR=0.7 (0.16 to 2.98)	NR	Very low
Incidence of pneumonia							
1 (Ang 2001 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	1/58	0/54	OR=2.8 (0.12 to 67.21)	NR	Very low
Incidence of UTI							

1 (Ang 2001 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	1/58	2/54	OR=0.47 (0.04 to 4.99)	NR	Very low
Infection-related mortality							
1 (Ang 2001 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	1/58	0/54	OR=2.8 (0.12 to 67.21)	NR	Very low

CI confidence interval; NR not reported; OR odds ratio; UTI urinary tract infection

[a] Barajas-Nava 2013[27] reported unclear risk of bias for Moharamzad 2010, and high risk of bias for Ang 2001 and Subrahmanyam 1998; overall risk of bias was not reported for Khorasani 2009

[b] Barajas-Nava 2013[27] reported I^2=0% (no important heterogeneity)

[c] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.4: Topical antibiotic prophylaxis – antibiotic prophylaxis versus other treatments

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
7 (Desai 1991, Fisher 1968, Glat 2009, Hauser 2007, Livingston 1990, Maya 1986, and Mohammadi 2009 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[a] No serious inconsistency[b] No serious indirectness Serious imprecision[c] Other considerations: none	NR/198	NR/202	OR=1.51 (0.94 to 2.42)	NR	Very low
Incidence of sepsis							
2 (Livingston 1990 and Mohammadi 2009 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[a] No serious inconsistency[b] No serious indirectness	NR/79	NR/82	RR=4.31 (1.61 to 11.49)	NR	Low

		No serious imprecision Other considerations: none					
Incidence of bacteraemia							
1 (Fisher 1968 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[d] Other considerations: none	2/33	3/33	OR=0.67 (0.12 to 3.73)	NR	Very low
Incidence of pneumonia							
1 (Livingston 1990 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[d] Other considerations: none	0/18	1/19	OR=0.35 (0.02 to 8.09)	NR	Very low
Infection-related mortality							
1 (Livingston 1990 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[d] Other considerations: none	4/18	1/19	OR=4.22 (0.52 to 34.28)	NR	Very low
Duration of hospital stay (days)[e]							
1 (Desai 1991 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[f] Other considerations: none	7	8	-	MD=12 lower (6.48 to 17.52 lower)	Low
1 (Livingston 1990 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[g] Other considerations: none	18	19	-	MD=3.03 higher (2.01 lower to 8.07 higher)	Very low
1 (Maya 1986 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency	20	20	-	MD=4.41 lower	Very low

		No serious indirectness Serious imprecision[h] Other considerations: none				(0.65 to 8.17 lower)	
1 (Mohammadi 2009 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[i] Other considerations: none	61	63	-	MD=9.77 higher (7.29 to 12.25 higher)	Low

CI confidence interval; MD mean difference; NR not reported; OR odds ratio; RR risk ratio; SD standard deviation

[a] Barajas-Nava 2013[27] reported high risk of bias for Desai 1991, Fisher 1968, Glat 2009, Hauser 2007, Livingston 1990, Maya 1986, and Mohammadi 2009

[b] Barajas-Nava 2013[27] reported I^2=0% (no important heterogeneity)

[c] 95% CI for relative effect crosses the upper (1.25) default threshold for imprecision

[d] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[e] Barajas-Nava 2013[27] reported I^2=96% (considerable heterogeneity) for a meta-analysis of Desai 1991, Livingston 1990, Maya 1986, and Mohammadi 2009; based on this the results for the four studies were reported separately

[f] 95% CI for absolute effect does not cross the lower (-2.95) or upper (2.95) default thresholds for imprecision (based on SD of 5.9 in the control group)

[g] 95% CI for absolute effect crosses the upper (3.75) default threshold for imprecision (based on SD of 7.5 in the control group)

[h] 95% CI for absolute effect crosses the lower (-3.35) default threshold for imprecision (based on SD of 6.7 in the control group)

[i] 95% CI for absolute effect does not cross the lower (-2.5) or upper (2.5) default thresholds for imprecision (based on SD of 5 in the control group)

Table H.5: Systemic antibiotic prophylaxis – general use – antibiotic prophylaxis versus control/placebo

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection[a]							
1 (Durtschi 1982 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	11/25	7/26	RR=1.63 (0.75 to 3.54)	NR	Very low

1 (Munster 1986 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	1/15	5/13	RR=0.17 (0.02 to 1.30)	NR	Very low
Incidence of sepsis							
2 (Durtschi 1982 and Munster 1986 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[b] No serious inconsistency[d] No serious indirectness Very serious imprecision[c] Other considerations: none	3/40	7/39	RR=0.43 (0.12 to 1.61)	NR	Very low
Incidence of bacteraemia							
1 (Durtschi 1982 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	1/25	0/26	RR=3.12 (0.13 to 73.06)	NR	Very low
Incidence of pneumonia							
1 (Kimura 1998 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[b] No serious inconsistency No serious indirectness No serious imprecision Other considerations: none	2/21	10/19	RR=0.18 (0.05 to 0.72)	NR	Moderate
Incidence of UTI							
1 (Durtschi 1982 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	0/25	1/26	RR=0.35 (0.01 to 8.12)	NR	Very low
Infection-related mortality							
2 (Durtschi 1982 and Munster 1986 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[b] No serious inconsistency[d] No serious indirectness	1/40	5/39	RR=0.27 (0.05 to 1.58)	NR	Very low

		Very serious imprecision[c] Other considerations: none					
Duration of hospital stay (days)[e]							
1 (Durtschi 1982 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[e] No serious inconsistency No serious indirectness Serious imprecision[f] Other considerations: none	25	26	-	MD=0.8 higher (1.47 lower to 3.07 higher)	Very low

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation; UTI urinary tract infection

[a] Barajas-Nava 2013[27] reported I^2=78% (considerable heterogeneity) for a meta-analysis of Durtschi 1982 and Munster 1986; based on this the results for the two studies were reported separately

[b] Barajas-Nava 2013[27] reported unclear risk of bias for Durtschi 1982 and Kimura 1998, and high risk of bias for Munster 1986

[c] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[d] Barajas-Nava 2013[27] reported I^2=0% (no important heterogeneity)

[e] Barajas-Nava 2013[27] reported high risk of bias for Durtschi 1982

[f] 95% CI for absolute effect crosses the upper (2.05) default threshold for imprecision (based on SD of 4.1 in the control group)

Table H.6: Systemic antibiotic prophylaxis – perioperative use – antibiotic prophylaxis versus control/placebo

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection[a]							
1 (Alexander 1982 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[b] No serious inconsistency No serious indirectness Serious imprecision[c] Other considerations: none	1/127	7/122	RR=0.14 (0.02 to 1.10)	NR	Very low
1 (Rodgers 1997 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[d]	2/10	1/10	RR=2 (0.21 to 18.69)	NR	Very low

		Other considerations: none					
Incidence of bacteraemia							
2 (Alexander 1982 and Rodgers 1997 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[b] No serious inconsistency[e] No serious indirectness Very serious imprecision[d] Other considerations: none	4/45	3/44	RR=1.32 (0.31 to 5.60)	NR	Very low
Duration of hospital stay (days)[e]							
1 (Alexander 1982 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[f] No serious inconsistency No serious indirectness No serious imprecision[g] Other considerations: none	127	122	-	MD=1.28 lower (2.64 lower to 0.08 higher)	Moderate

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation

[a] Barajas-Nava 2013[27] reported I^2=67% (substantial heterogeneity) for a meta-analysis of Alexander 1982 and Rodgers 1997; based on this the results for the two studies were reported separately

[b] Barajas-Nava 2013[27] reported high risk of bias for Alexander 1982 and Rodgers 1997

[c] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

[d] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[e] Barajas-Nava 2013[27] reported I^2=0% (no important heterogeneity)

[f] Barajas-Nava 2013[27] reported unclear risk of bias for Alexander 1982

[g] 95% CI for absolute effect does not cross the lower (-3.2) or upper (3.2) default thresholds for imprecision (based on median SD of 6.4 in the control group)

Table H.7: Systemic antibiotic prophylaxis – perioperative use – cephazolin versus another antibiotic

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
2 (Miller 1987 and Rodgers 1997 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[a] No serious inconsistency[b] No serious indirectness Very serious imprecision[c]	9/27	7/24	RR=0.99 (0.49 to 2.01)	NR	Very low

		Other considerations: none					
Incidence of bacteraemia							
1 (Rodgers 1997 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	2/3	1/1	RR=0.83 (0.28 to 2.51)	NR	Very low
Incidence of pneumonia							
1 (Miller 1987 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	0/24	1/23	RR=0.32 (0.01 to 7.48)	NR	Very low
Incidence of UTI							
1 (Miller 1987 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	1/24	0/23	RR=2.88 (0.12 to 67.29)	NR	Very low

CI confidence interval; NR not reported; RR risk ratio; UTI urinary tract infection

[a] Barajas-Nava 2013[27] reported high risk of bias for Miller 1987 and Rodgers 1997

[b] Barajas-Nava 2013[27] reported I^2=0% (no important heterogeneity)

[c] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.8: Non-absorbable antibiotic prophylaxis (selective decontamination of the digestive tract) – non-absorbable antibiotic prophylaxis versus placebo

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of sepsis							
1 (Barret 2001 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	4/11	2/12	RR=2.18 (0.49 to 9.65)	NR	Very low
Incidence of pneumonia							
1 (Barret 2001 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	1/11	0/12	RR=3.25 (0.15 to 72.36)	NR	Very low
Duration of hospital stay (days)[e]							
1 (Barret 2001 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[c] Other considerations: none	11	12	-	MD=7 higher (3.28 to 10.72 higher)	Moderate

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation

[a] Barajas-Nava 2013[27] reported unclear risk of bias for Barret 2001

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[c] 95% CI for absolute effect does not cross the lower (-2) or upper (2) default thresholds for imprecision (based on SD of 4 in the control group)

Table H.9: Non-absorbable antibiotic prophylaxis (selective decontamination of the digestive tract) – non-absorbable antibiotic prophylaxis plus cefotaxime versus placebo

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (De La Cal 2005 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	10/53	11/54	RR=0.93 (0.43 to 2.00)	NR	Very low
Incidence of bacteraemia							
1 (De La Cal 2005 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	19/53	17/54	RR=1.14 (0.67 to 1.94)	NR	Very low
Incidence of pneumonia							
1 (De La Cal 2005 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[c] Other considerations: none	18/53	26/54	RR=0.71 (0.44 to 1.12)	NR	Low
Incidence of UTI							
1 (De La Cal 2005 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[c] Other considerations: none	6/53	14/54	RR=0.44 (0.18 to 1.05)	NR	Low
Duration of hospital stay (days)							

1 (De La Cal 2005 cited by Barajas-Nava 2013)[27]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[d] Other considerations: none	53	54	-	MD=1.7 lower (15.82 lower to 12.42 higher)	Low

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation; UTI urinary tract infection

[a] Barajas-Nava 2013[27] reported unclear risk of bias for De La Cal 2005

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[c] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

[d] 95% CI for absolute effect crosses the lower (-13.15) default threshold for imprecision (based on SD of 26.3 in the control group)

Table H.10: Local antibiotic prophylaxis – administered via the airway

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of sepsis							
1 (Levine 1978 cited by Barajas-Nava 2013)[27]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	9/12	13/18	RR=1.04 (0.67 to 1.60)	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

[a] Barajas-Nava 2013[27] reported high risk of bias for Levine 1978

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

1 Table H.11: Any type of antibiotic prophylaxis versus inactive control (no intervention or placebo)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
7 (Alexander 1982, De La Cal 2005, Durtschi 1982, Fisher 1968, Livingston 1990, Munster 1986, and Rodgers 1997 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[a] Serious inconsistency[b] No serious indirectness Very serious imprecision[c] Other considerations: none	41/281	49/273	RR=0.84 (0.51 to 1.39)	NR	Very low
Incidence of sepsis							
5 (Barret 2001, Durtschi 1982, Levine 1978, Livingston 1990, and Munster 1986 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[a] No serious inconsistency[d] No serious indirectness Very serious imprecision[c] Other considerations: none	20/81	22/84	RR=1.06 (0.54 to 2.10)	NR	Very low
Incidence of bacteraemia							
5 (Alexander 1982, De La Cal 2005, Durtschi 1982, Fisher 1968, and Rodgers 1997 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[a] No serious inconsistency[e] No serious indirectness Very serious imprecision[c] Other considerations: none	26/156	25/157	RR=1.08 (0.67 to 1.72)	NR	Very low
Incidence of pneumonia							
3 (Barret 2001, De La Cal 2005, and Kimura 1998 cited by Barajas-Nava 2013)[27]	Randomized trials	Serious risk of bias[a] Serious inconsistency[f] No serious indirectness Very serious imprecision[c] Other considerations: none	21/85	49/85	RR=0.54 (0.17 to 1.74)	NR	Very low
Incidence of UTI							

2 (De La Cal 2005 and Durtschi 1982 cited by Barajas-Nava 2013)[27]	Randomized trials	Serious risk of bias[a] No serious inconsistency[e] No serious indirectness Serious imprecision[g] Other considerations: none	6/78	15/80	RR=0.43 (0.18 to 1.00)	NR	Low
Infection-related mortality							
2 (Durtschi 1982 and Munster 1986 cited by Barajas-Nava 2013)[27]	Randomized trials	Very serious risk of bias[a] No serious inconsistency[e] No serious indirectness Very serious imprecision[c] Other considerations: none	1/40	5/39	RR=0.27 (0.05 to 1.58)	NR	Very low

CI confidence interval; NR not reported; RR risk ratio; UTI urinary tract infection

[a] Barajas-Nava 2013[27] reported unclear risk of bias for Barret 2001, De La Cal 2005, Durtschi 1982, and Kimura 1998 and high risk of bias for Alexander 1982, Fisher 1968, Levine 1978, Livingston 1990, Munster 1986, and Rodgers 1997

[b] Barajas-Nava 2013[27] reported I^2=38% (moderate heterogeneity)

[c] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[d] Barajas-Nava 2013[27] reported I^2=25% (no important heterogeneity)

[e] Barajas-Nava 2013[27] reported I^2=0% (no important heterogeneity)

[f] Barajas-Nava 2013[27] reported I^2=56% (substantial heterogeneity)

[g] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

Table H.12: Topical silver-containing agents versus topical agents not containing silver – silver sulfadiazine versus no silver – silver sulfadiazine cream versus biosynthetic dressing (Biobrane)

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Pain score							
2 (Gerding 1988 and Gerding 1990 cited by Storm-Versloot 2010)[54]	Randomized trials	Very serious risk of bias[a] No serious inconsistency[b] No serious indirectness Serious imprecision[c] Other considerations: none	49	57	-	MD=1.41 higher (0.99 to 1.83 higher)	Very low

CI confidence interval; MD mean difference; NR not reported; SD standard deviation

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for Gerding 1988 and Gerding 1990

[b] Storm-Versloot 2010[54] reported I^2=0% (no important heterogeneity)

[c] 95% CI for absolute effect crosses the upper (1.275) default threshold for imprecision (based on median SD of 2.55 in the control groups)

Table H.13: Topical silver-containing agents versus topical agents not containing silver – silver sulfadiazine versus no silver – silver sulfadiazine cream with chlorhexidine-impregnated gauze (Bactigras) versus hydrocolloid dressing (Duoderm Hydroactive)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Afilalo 1992 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	1/24	2/24	NR	RD=0.04 lower (0.18 lower to 0.09 higher)	Very low

CI confidence interval; NR not reported; RD risk difference

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for Afilalo 1992

[b] Imprecision could not be quantified for results reported as RD

Table H.14: Topical silver-containing agents versus topical agents not containing silver – silver sulfadiazine versus no silver – silver sulfadiazine cream versus hydrocolloid dressing (Duoderm Hydroactive)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Wyatt 1990 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	0/20	0/22	NR	RD=0 higher (0.09 lower to 0.09 higher)	Very low

Pain score							
1 (Wyatt 1990 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[c] Other considerations: none	20	22	-	MD=1.19 higher (0.56 to 1.82 higher)	Low

CI confidence interval; MD mean difference; NR not reported; RD risk difference; SD standard deviation

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for Wyatt 1990

[b] Imprecision could not be quantified for results reported as RD

[c] 95% CI for absolute effect does not cross the lower (-0.05) or upper (0.05) default thresholds for imprecision (based on SD of 0.1 in the control group)

Table H.15: Topical silver-containing agents versus topical agents not containing silver – silver sulfadiazine versus no silver – silver sulfadiazine cream versus honey

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Absence of pain – at week 1							
1 (Mashhood 2006 cited by Storm-Versloot 2010)[54]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	4/25	9/25	NR	RD=0.2 lower (0.44 lower to 0.04 higher)	Low
Absence of pain – at week 2							
1 (Mashhood 2006 cited by Storm-Versloot 2010)[54]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	11/25	20/25	NR	RD=0.36 lower (0.11 to 0.61 to lower)	Low
Absence of pain – at week 3							
1 (Mashhood 2006 cited by Storm-Versloot 2010)[54]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness	18/25	25/25	NR	RD=0.28 lower	Low

		Serious imprecision[b] Other considerations: none				(0.1 to 0.46 lower)	
Absence of pain – at week 4							
1 (Mashhood 2006 cited by Storm-Versloot 2010)[54]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	25/25	25/25	NR	RD=0 higher (0.07 lower to 0.07 higher)	Low

CI confidence interval; NR not reported; RD risk difference

[a] Storm-Versloot 2010[54] reported no items as having high risk of bias and at least one item as having unclear risk of bias for Mashhood 2006

[b] Imprecision could not be quantified for results reported as RD

Table H.16: Topical silver-containing agents versus topical agents not containing silver – silver sulfadiazine versus no silver – silver sulfadiazine cream versus liposome hydrogel containing polyvinyl-pyrrolidone iodine

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Homann 2007 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	0/43	0/43	NR	RD=0 higher (0.04 lower to 0.04 higher)	Very low
Presence of burn wound pain							
1 (Homann 2007 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	5/43	6/43	NR	RD=0.02 lower (0.16 lower to 0.12 higher)	Very low

CI confidence interval; NR not reported; RD risk difference

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for Homann 2007

[b] Imprecision could not be quantified for results reported as RD

Table H.17: Topical silver-containing agents versus topical agents not containing silver – silver sulfadiazine versus no silver – silver sulfadiazine cream versus collagenase ointment applied with polymyxin B sulfate/bacitrin (Santyl)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Hansbrough 1995 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	11/79	12/79	NR	RD=0.01 lower (0.12 lower to 0.1 higher)	Very low
Presence of burn wound pain							
1 (Hansbrough 1995 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	9/79	24/79	NR	RD=0.19 lower (0.31 to 0.07 lower)	Very low

CI confidence interval; NR not reported; RD risk difference

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for Hansbrough 1995

[b] Imprecision could not be quantified for results reported as RD

Table H.18: Topical silver-containing agents versus topical agents not containing silver – silver sulfadiazine versus no silver – silver sulfadiazine cream/chlorhexidine (Silverex) versus diphenyldantoin (Phenytoin)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Carneiro 2002 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency Very serious indirectness[b]	15/32	3/32	NR	RD=0.38 higher	Very low

		Serious imprecision[c] Other considerations: none				(0.17 to 0.58 higher)	
Presence of moderate or severe burn wound pain							
1 (Carneiro 2002 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[c] Other considerations: none	17/32	7/32	NR	RD=0.31 higher (0.09 to 0.54 higher)	Very low

CI confidence interval; NR not reported; RD risk difference

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for Carneiro 2002

[b] Storm-Versloot 2010[54] reported that infection rates were based on positive bacterial cultures and not clinical infection

[c] Imprecision could not be quantified for results reported as RD

Table H.19: Silver-containing dressings versus dressings not containing silver – silver versus no silver – nanocrystalline silver coated dressing (Acticoat) versus hydrophilic polyurethane dressing (Allevyn)

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Innes 2001 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	0/16	0/16	NR	RD=0 higher (0.11 lower to 0.11 higher)	Very low

CI confidence interval; NR not reported; RD risk difference

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for Innes 2001

[b] Imprecision could not be quantified for results reported as RD

Table H.20: Silver-containing dressings versus dressings not containing silver – silver versus no silver – silver nitrate (0.5%) compared with Ringer's lactate

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Livingston 1990 cited by Storm-Versloot 2010)[54]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	2/19	8/15	NR	RD=0.43 lower (0.14 to 0.72 lower)	Low

CI confidence interval; NR not reported; RD risk difference

[a] Storm-Versloot 2010[54] reported no items as having high risk of bias and at least one item as having unclear risk of bias for Livingston 1990

[b] Imprecision could not be quantified for results reported as RD

Table H.21: Alternative topical preparations of silver – silver versus silver – silver sulfadiazine cream versus nanocrystalline silver-coated dressing (Acticoat)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Pain score							
1 (Muangman 2006 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[b] Other considerations: none	25	25	-	MD=1.00 higher (0.64 to 1.36 higher)	Low

CI confidence interval; MD mean difference; SD standard deviation

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for Muangman 2006

[b] 95% CI for absolute effect does not cross the lower (-0.3) or upper (0.3) default thresholds for imprecision (based on SD of 0.6 in the control group)

Table H.22: Alternative topical preparations of silver – silver versus silver – silver sulfadiazine cream versus synthetic dressing containing silver (Hydron-AgSD)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Fang 1987 cited by Storm-Versloot 2010)[54]	Randomized trial	Serious risk of bias[a] No serious inconsistency Very serious indirectness[b] Serious imprecision[c] Other considerations: none	46/98	32/98	NR	RD=0.14 higher (0.01 to 0.28 higher)	Very low

CI confidence interval; NR not reported; RD risk difference

[a] Storm-Versloot 2010[54] reported no items as having high risk of bias and at least one item as having unclear risk of bias for Fang 1987

[b] Storm-Versloot 2010[54] reported that infection rates were based on positive bacterial cultures and not clinical infection

[c] Imprecision could not be quantified for results reported as RD

Table H.23: Alternative topical preparations of silver – silver versus silver – silver sulfadiazine cream (Flamazine) versus 1% silver sulfadiazine plus 0.2% chlorhexidine digluconate cream (Silvazine)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Inman 1984 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	12/67	10/54	NR	RD=0.01 lower (0.14 lower to 0.13 higher)	Very low
Extreme pain at application							

1 (Inman 1984 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	0/67	1/54	NR	RD=0.02 lower (0.07 lower to 0.03 higher)	Very low

CI confidence interval; NR not reported; RD risk difference

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for Inman 1984

[b] Imprecision could not be quantified for results reported as RD

Table H.24: Alternative topical preparations of silver – silver versus silver – silver sulfadiazine cream versus silver sulfadiazine cream containing cerium nitrate

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (De Gracia 2001 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	3/30	0/30	NR	RD=0.10 higher (0.02 lower to 0.22 higher)	Very low
Duration of hospital stay (days)							
1 (De Gracia 2001 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	30	30	-	MD=7.4 higher (1.69 lower to 16.49 higher)	Very low

CI confidence interval; MD mean difference; NR not reported; RD risk difference; SD standard deviation

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for De Gracia 2001

[b] Imprecision could not be quantified for results reported as RD

[c] 95% CI for absolute effect crosses the upper (5.7) default threshold for imprecision (based on SD of 11.4 in the control group)

Table H.25: Alternative topical preparations of silver – silver versus silver – silver sulfadiazine cream versus Dimac containing silver sulfadiazine (Sildimac)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Miller 1990 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	2/51	1/51	NR	RD=0.02 higher (0.05 lower to 0.09 higher)	Very low

CI confidence interval; NR not reported; RD risk difference

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for Miller 1990

[b] Imprecision could not be quantified for results reported as RD

Table H.26: Alternative silver-containing dressings including dose comparisons – silver versus silver – nanocrystalline silver-coated dressing (Acticoat) versus fine-mesh gauze with silver nitrate (0.5%)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Tredget 1998 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	1/17	5/17	NR	RD=0.24 lower (0.48 lower to 0.01 higher)	Very low
Pain score							
1 (Tredget 1998 cited by Storm-Versloot 2010)[54]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness	30	30	-	MD=0.28 lower	Very low

		Serious imprecision[c] Other considerations: none				(0.93 lower to 0.37 higher)	

CI confidence interval; MD mean difference; NR not reported; RD risk difference; SD standard deviation

[a] Storm-Versloot 2010[54] reported at least one item as having high risk of bias for Tredget 1998

[b] Imprecision could not be quantified for results reported as RD

[c] 95% CI for absolute effect crosses the lower (-0.65) default threshold for imprecision (based on SD of 1.3 in the control group)

Table H.27: Hydrocolloid dressings – hydrocolloid dressings versus chlorhexidine-impregnated paraffin gauze dressing

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Wright 1993 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	1/37	0/31	RR=2.53 (0.11 to 59.9)	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

[a] Wasiak 2013[59] reported at least one item as having high risk of bias for Wright 1993

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.28: Polyurethane film dressing – polyurethane film dressing versus paraffin gauze dressing

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Poulsen 1991 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	3/30	2/25	RR=1.25 (0.23 to 6.90)	NR	Very low

Patient perception/satisfaction							
1 (Poulsen 1991 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[c] Other considerations: none	27/29	20/25	RR=1.16 (0.93 to 1.45)*	NR	Very low
Presence of moderate or severe burn wound pain							
1 (Poulsen 1991 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	3/30	4/24	RR=0.60 (0.15 to 2.43)*	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

* Calculated by the HIS team

[a] Wasiak 2013[59] reported at least one item as having high risk of bias for Poulsen 1991

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[c] 95% CI for relative effect crosses the upper (1.25) default threshold for imprecision

Table H.29: Polyurethane film dressing – polyurethane film dressing versus chlorhexidine-impregnated paraffin gauze dressing

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Neal 1981 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	1/26	2/25	RR=0.48 (0.05 to 4.98)	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

[a] Wasiak 2013[59] reported at least one item as having high risk of bias for Neal 1981

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.30: Hydrogel dressings – hydrogel dressing versus usual care

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection - *Pseudomonas aeruginosa* infection needing antibiotics							
1 (Grippaudo 2010 cited by Wasiak 2013)[59]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	0/40	1/40	RR=0.33 (0.01 to 7.95)	NR	Very low
Pain score – at end of study							
1 (Guilbaud 1992 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[c] Other considerations: none	49	49	-	MD=1.31 lower (0.25 to 2.37 lower)	Very low

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation

[a] Wasiak 2013[59] reported no items as having high risk of bias and at least one item as having unclear risk of bias for Grippaudo 2010, and at least one item as having high risk of bias for Guilbaud 1992

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[c] 95% CI for absolute effect crosses the lower (-1.35) default threshold for imprecision (based on SD of 2.7 in the control group)

Table H.31: Synthetic/biological dressings – antimicrobial-releasing biosynthetic dressings (Hydron) versus silver sulfadiazine or other agents

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Husain 1983 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	15/50	8/50	RR=1.88 (0.87 to 4.02)	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

[a] Wasiak 2013[59] reported at least one item as having high risk of bias for Husain 1983

[b] 95% CI for relative effect crosses the upper (1.25) default threshold for imprecision

Table H.32: Antimicrobial (silver-containing) dressings – silver sulfadiazine versus silver-impregnated dressings

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Huang 2004 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	16/83	22/83	RR=0.73 (0.41 to 1.28)*	NR	Very low
Pain score[c]							
1 (Opasanon 2010 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[d]	35	30	-	MD=3.85 higher (2.00 lower to 9.7 higher)	Very low

		Other considerations: none					
1 (Varas 2005 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[e] Other considerations: none	10	10	-	MD=4.7 higher (2.36 to 7.04 higher)	Very low

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation

* Calculated by the HIS team

[a] Wasiak 2013[59] reported at least one item as having high risk of bias for Huang 2004, Opasanon 2010, and Varas 2005

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[c] Wasiak 2013[59] reported I^2=81% (considerable heterogeneity) for a meta-analysis of Muangman 2006, Opasanon 2010, and Varas 2005; based on this the results for Opasanon 2010 and Varas 2005 are reported separately here; the results for Muangman 2006 are reported in Table H.21

[d] 95% CI for absolute effect crosses the upper (5.1) default threshold for imprecision (based on SD of 10.2 in the control group)

[e] 95% CI for absolute effect crosses both the lower (-1.35) and upper (1.35) default thresholds for imprecision (based on SD of 2.7 in the control group)

Table H.33: Fibre dressings – silver sulfadiazine versus hydrofibre dressing (Aquacel-Ag)

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Pain score – at dressing change on day 1							
1 (Muangman 2010 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	35	35	-	MD=2.00 higher (0.97 to 3.03 higher)	Very low
Pain score – at dressing change on day 3							
1 (Muangman 2010 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[c] Other considerations: none	35	35	-	MD=3.10 higher (2.18 to 4.02 higher)	Low
Pain score – at dressing change on day 7							

1 (Muangman 2010 cited by Wasiak 2013)[59]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[d] Other considerations: none	35	35	-	MD=2.40 higher (1.62 to 3.18 higher)	Low

CI confidence interval; MD mean difference; SD standard deviation

[a] Wasiak 2013[59] reported at least one item as having high risk of bias for Muangman 2010

[b] 95% CI for absolute effect crosses the upper (1.05) default threshold for imprecision (based on SD of 2.1 in the control group)

[c] 95% CI for absolute effect does not cross the lower (-0.9) or upper (0.9) default thresholds for imprecision (based on SD of 1.8 in the control group)

[d] 95% CI for absolute effect does not cross the lower (-0.7) or upper (0.7) default thresholds for imprecision (based on SD of 1.4 in the control group)

Table H.34: Topical antibiotics versus antiseptics – topical antibiotics versus silver-based antiseptics

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Pain score – at dressing change[a]							
1 (Glat 2009 cited by Norman 2017)[42]	Randomized trial	Very serious risk of bias[b] No serious inconsistency No serious indirectness No serious imprecision[c] Other considerations: none	12	12	-	SMD=2.28 higher (1.22 to 3.35 higher)	Low
1 (Tang 2015 cited by Norman 2017)[42]	Randomized trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Serious imprecision[d] Other considerations: none	82	71	-	SMD=0.5 higher (0.17 to 0.82 higher)	Low
1 (Yarboro 2013 cited by Norman 2017)[42]	Randomized trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Serious imprecision[d] Other considerations: none	12	12	-	SMD=0.98 higher (0.12 to 1.83 higher)	Low

CI confidence interval; SD standard deviation; SMD standardized mean difference

[a] Norman 2017[42] reported I^2=81% (considerable heterogeneity) for a meta-analysis of Glat 2009, Muangman 2010, Tang 2015, and Yarboro 2013; based on this the results for Glat 2009, Tang 2015, and Yarboro 2013 are reported separately here; the results for Muangman 2010 are reported in Table H.33

[b] Norman 2017[42] reported no items as having high risk of bias and at least one item as having unclear risk of bias for Tang 2015 and Yarboro 2013, and at least one item as having high risk of bias for Glat 2009

[c] 95% CI for absolute effect does not cross the lower (-0.5) or upper (0.5) default thresholds for imprecision (based on SD of 1 in the control group)

[d] 95% CI for absolute effect crosses the upper (0.5) default threshold for imprecision (based on SD of 1 in the control group)

Table H.35: Topical antibiotics versus antiseptics – topical antibiotics versus honey or honey-based dressings

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Maghsoudi 2011 cited by Norman 2017)[42]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: none	10/50	0/50	RR=21.00 (1.26 to 348.95)*	NR	Moderate
1 (Malik 2010 cited by Norman 2017)[42]	Randomized trial	Serious risk of bias[a] No serious inconsistency Very serious indirectness[b] No serious imprecision Other considerations: none	29/150	6/150	RR=4.83 (2.07 to 11.30)*	NR	Very low
1 (Zahmatkesh 2015 cited by Norman 2017)[42]	Randomized trial	Serious risk of bias[a] No serious inconsistency Very serious indirectness[b] No serious imprecision Other considerations: none	19/20	1/10	RR=9.50 (1.48 to 61.16)*	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

* Calculated by the HIS team

[a] Norman 2017[42] reported no items as having high risk of bias and at least one item as having unclear risk of bias for Maghsoudi 2011, Malik 2010, and Zahmatkesh 2015

[b] Norman 2017[42] downgraded the evidence from Malik 2010 and Zahmatkesh 2015 twice for indirectness because the reported outcome related to positive swab cultures and not clinical infection

Table H.36: Topical antibiotics versus antiseptics – silver sulfadiazine versus Aloe Vera

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Panahi 2012 cited by Norman 2017)[42]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	0/55	1/56	RR=0.34 (0.01 to 8.15)*	NR	Very low
1 (Shahzad 2013 cited by Norman 2017)[42]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	4/25	3/25	RR=1.33 (0.33 to 5.36)*	NR	Very low
Pain score							
1 (Panahi 2012 cited by Norman 2017)[42]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[c] Other considerations: none	60	60	-	MD=1.14 lower (0.02 to 2.26 lower)	Low

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation

* Calculated by the HIS team

[a] Norman 2017[42] reported no items as having high risk of bias and at least one item as having unclear risk of bias for Panahi 2012, and at least one item as having high risk of bias for Shahzad 2013

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[c] 95% CI for absolute effect crosses the lower (-1.6) default threshold for imprecision (based on SD of 3.2 in the control group)

Table H.37: Alternative antiseptics – chlorhexidine versus povidone iodine

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Han 1989 cited by Norman 2017)[42]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	4/102	4/111	RR=1.09 (0.28 to 4.24)	NR	Very low
Pain score – at rest							
1 (Han 1989 cited by Norman 2017)[42]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[c] Other considerations: none	78	84	-	MD=2.26 higher (2.26 lower to 6.78 higher)	Low
Pain score – at dressing change							
1 (Han 1989 cited by Norman 2017)[42]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[d] Other considerations: none	84	92	-	MD=2.09 higher (2.00 lower to 6.18 higher)	Very low

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation

[a] Norman 2017[42] reported at least one item as having high risk of bias for Han 1989

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[c] 95% CI for absolute effect does not cross the lower (-7.56) or upper (7.56) default thresholds for imprecision (based on SD of 15.11 in the control group)

[d] 95% CI for absolute effect crosses the upper (5.53) default threshold for imprecision (based on SD of 11.06 in the control group)

Table H.38: Antiseptics versus treatments without antimicrobial properties – silver dressings versus non-antimicrobial treatments or no treatment

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Jiao 2015 cited by Norman 2017)[42]	Randomized trial	Serious risk of bias[a] No serious inconsistency Very serious indirectness[b] Serious imprecision[c] Other considerations: none	1/38	8/38	RR=0.13 (0.02 to 0.95)	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

[a] Norman 2017[42] reported no items as having high risk of bias and at least one item as having unclear risk of bias for Jiao 2015

[b] Norman 2017[42] downgraded the evidence from Jiao 2015 twice for indirectness because the reported outcome related to positive swab cultures and not clinical infection

[c] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

Table H.39: Antiseptics versus treatments without antimicrobial properties – honey or honey-based dressings versus non-antimicrobial treatments

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Subrahmanyam 1993b cited by Norman 2017)[42]	Randomized trial	Serious risk of bias[a] No serious inconsistency Very serious indirectness[b] Serious imprecision[c] Other considerations: none	8/46	17/46	RR=0.47 (0.23 to 0.98)	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

[a] Norman 2017[42] reported no items as having high risk of bias and at least one item as having unclear risk of bias for Subrahmanyam 1993b

[b] Norman 2017[42] downgraded the evidence from Subrahmanyam 1993b twice for indirectness because the reported outcome related to positive swab cultures and not clinical infection

[c] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

Table H.40: Antiseptics versus treatments without antimicrobial properties – chlorhexidine (biguanide) versus non-antimicrobial treatments

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Inman 1984 cited by Norman 2017)[42]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	10/54	12/67	RR=1.03 (0.48 to 2.21)	NR	Very low
Infection-related mortality							
1 (Inman 1984 cited by Norman 2017)[42]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	3/54	0/67	RR=8.65 (0.46 to 164.01)*	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

* Calculated by the HIS team

[a] Norman 2017[42] reported at least one item as having high risk of bias for Inman 1984

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.41: Antiseptics versus treatments without antimicrobial properties – iodine-based treatments versus non-antimicrobial treatments/no intervention

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Carayanni 2011 cited by Norman 2017)[42]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	8/107	6/104	RR=1.30 (0.47 to 3.61)	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

[a] Norman 2017[42] reported no items as having high risk of bias and at least one item as having unclear risk of bias for Carayanni 2011

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.42: Antiseptics versus treatments without antimicrobial properties – cerium nitrate and topical antibiotic versus topical antibiotic alone

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of sepsis							
1 (De Gracia 2001 cited by Norman 2017)[42]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	1/30	4/30	RR=0.25 (0.03 to 2.11)	NR	Very low
Pain score							
1 (Oen 2012 cited by Norman 2017)[42]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness	78	76	-	MD=0.60 lower	Low

		No serious imprecision[c] Other considerations: none				(0.50 to 0.70 lower)	

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation

[a] Norman 2017[42] reported no items as having high risk of bias and at least one item as having unclear risk of bias for De Gracia 2001, and at least one item as having high risk of bias for Oen 2012

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[c] 95% CI for absolute effect does not cross the lower (-1.74) or upper (1.74) default thresholds for imprecision (based on SD of 3.49 in the control group)

Table H.43: Facial burns – topical antimicrobial agents versus topical non-antimicrobial agents

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Mabrouk 2012 cited by Hoogewerf 2020)[33]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious impecision[b] Other considerations: none	3/20	8/20	RR=0.38 (0.12 to 1.21)	248 lower per 1000 (352 lower to 84 higher)	Very low
Patient perception/satisfaction							
2 (Hindy 2009 and Mabrouk 2012 cited by .Hoogewerf 2020)[33]	Randomized trials	Very serious risk of bias[a] Serious inconsistency[c] No serious indirectness No serious imprecision Other considerations: none	26/40	24/60	RR=1.55 (1.06 to 2.27)	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

[a] Hoogewerf 2020[33] reported at least one item as having high risk of bias for Hindy 2009 and Mabrouk 2012

[b] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

[c] Hoogewerf 2020[33] reported I^2=64% (substantial heterogeneity)

Table H.44: Facial burns – topical antimicrobial agents versus synthetic/biological dressings

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Pain during facial care							
1 (Demling 2002 cited by Hoogewerf 2020)[33]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[b] Other considerations: none	18	16	-	MD=4.00 higher (2.95 to 5.05 higher)	Low
Background pain							
1 (Demling 2002 cited by Hoogewerf 2020)[33]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[b] Other considerations: none	18	16	-	MD=2.00 higher (0.95 to 3.05 higher)	Low
Pain – superficial burns							
1 (Wang 2015 cited by Hoogewerf 2020)[33]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[c] Other considerations: none	15	15	-	MD=1.20 lower (0.65 to 1.75 lower)	Low
Pain – deep burns							
1 (Wang 2015 cited by Hoogewerf 2020)[33]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[d] Other considerations: none	10	10	-	MD=3.00 lower (2.34 to 3.66 lower)	Low
Duration of hospital stay (days)							

1 (Demling 1999 cited by Hoogewerf 2020)[33]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[e] Other considerations: none	5	5	-	MD= 2.00 higher (1.02 to 2.98 higher)	Low

CI confidence interval; MD mean difference; SD standard deviation

[a] Hoogewerf 2020[33] reported at least one item as having high risk of bias for Demling 1999, Demling 2002, and Wang 2015

[b] 95% CI for absolute effect does not cross the lower (-0.5) or upper (0.5) default thresholds for imprecision (based on SD of 1 in the control group)

[c] 95% CI for absolute effect does not cross the lower (-0.35) or upper (0.35) default thresholds for imprecision (based on SD of 0.7 in the control group)

[d] 95% CI for absolute effect does not cross the lower (-0.475) or upper (0.475) default thresholds for imprecision (based on SD of 0.95 in the control group)

[e] 95% CI for absolute effect does not cross the lower (-0.25) or upper (0.25) default thresholds for imprecision (based on SD of 0.5 in the control group)

Table H.45: Facial burns – miscellaneous topical treatments versus other miscellaneous topical treatments

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Pain score							
1 (Tsoutsos 2009 cited by Hoogewerf 2020)[33]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	27	16	-	MD=0.70 higher (0.03 to 1.37 higher)	Very low
Patient perception/satisfaction							
1 (Hindy 2009 cited by Hoogewerf 2020)[33]	Randomized trial	Very serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: none	12/20	2/20	RR=6.00 (1.54 to 23.44)	NR	Low

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation

[a] Hoogewerf 2020[33] reported at least one item as having high risk of bias for Hindy 2009 and Tsoutsos 2009

[b] 95% CI for absolute effect crosses the upper (0.445) default threshold for imprecision (based on SD of 0.89 in the control group)

Table H.46: Antimicrobial prophylaxis additional evidence – enteral vancomycin versus baseline infection control measures

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Acquisition of GISA							
1 (Cerda 2007)[30]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	0/365	0/377	RR not calculable	NR	Very low
Acquisition of MRSA							
1 (Cerda 2007)[30]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: none	25/365	115/377	RR=0.22 (0.15 to 0.34)	NR	Very low
Acquisition of VRE							
1 (Cerda 2007)[30]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	0/365	4/377	RR=0.11 (0.01 to 2.12)*	Not calculable	Very low

CI confidence interval; GISA *Staphylococcus aureus* with intermediate sensitivity to glycopeptides; MRSA meticillin-resistant *Staphylococcus aureus*; NR not reported; RR risk ratio; VRE vancomycin-resistant enterococcus

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI not calculable

[c] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.47: Antimicrobial prophylaxis additional evidence – topical nystatin for skin grafts versus no topical nystatin

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Acquisition of yeasts							
1 (Dube 1994)[31]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	NR/NR (10.5%)	NR/NR (15.5%)	OR=0.64 (0.48 to 0.86)	NR	Very low
Acquisition of *Candida rugosa*							
1 (Dube 1994)[31]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: none	NR/NR (5.25%)	NR/NR (0.36%)	OR=15.3 (4.1 to 128)	NR	Very low
Incidence of fungaemia							
1 (Dube 1994)[31]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	NR/NR (1.43%)	NR/NR (3.25%)	OR=0.43 (0.22 to 0.87)	NR	Very low

CI confidence interval; NR not reported; OR odds ratio

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

Table H.48: Antimicrobial prophylaxis additional evidence – systemic antibiotic prophylaxis (flucloxacillin, co-amoxiclav, or clarithromycin) at time of referral to the burns unit versus no systemic antibiotic prophylaxis at time of referral to the burns unit

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of infection							
1 (Rashid 2005)[50]	Prospective cohort study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	2/39	1/11	RR=0.56 (0.06 to 5.66)*	NR	Very low
Incidence of toxic shock syndrome							
1 (Rashid 2005)[50]	Prospective cohort study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	0/39	0/11	RR not calculable	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[c] 95% CI not calculable

Table H.49: Antimicrobial prophylaxis additional evidence – systemic antibiotic prophylaxis (ampicillin and cloxacillin) versus no systemic chemoprophylaxis

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of infection with coliforms							
1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	NR/21 (11.8%)	NR/20 (14.3%)	RR=0.83 (95% CI not calculable)*	Not calculable	Very low
Incidence of infection with *Escherichia coli*							
1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	NR/21 (0%)	NR/20 (14.3%)	RR=0.00 (95% CI not calculable)*	Not calculable	Very low
Incidence of infection with *Klebsiella aerogenes*							
1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[d] Other considerations: none	NR/21 (23.6%)	NR/20 (7.1%)	RR=3.32 (95% CI not calculable)*	Not calculable	Very low
Incidence of infection with *Proteus mirabilis*							
1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[e] Other considerations: none	NR/21 (5.9%)	NR/20 (7.1%)	RR=0.83 (95% CI not calculable)*	Not calculable	Very low
Incidence of infection with *Pseudomonas aeruginosa*							

1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[f] Other considerations: none	NR/21 (53.1%)	NR/20 (43%)	RR=1.23 (95% CI not calculable)*	Not calculable	Very low
Incidence of infection with *Staphylococcus aureus*							
1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[g] Other considerations: none	NR/21 (0%)	NR/20 (7.1%)	RR=0.00 (95% CI not calculable)*	Not calculable	Very low

CI confidence interval; NR not reported; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI not calculable; Ugburo 2004[57] reported *p* = 0.599

[c] 95% CI not calculable

[d] 95% CI not calculable; Ugburo 2004[57] reported *p* = 0.0004

[e] 95% CI not calculable; Ugburo 2004[57] reported *p* = 0.731

[f] 95% CI not calculable; Ugburo 2004[57] reported *p* = 0.141

[g] 95% CI not calculable; Ugburo 2004[57] reported *p* = 0.0066

Table H.50: Antimicrobial prophylaxis additional evidence – systemic antibiotic prophylaxis (gentamicin and erythromycin) versus no systemic chemoprophylaxis

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of infection with coliforms							
1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	NR/20 (18.8%)	NR/20 (14.3%)	RR=1.31 (95% CI not calculable)*	Not calculable	Very low

Incidence of infection with *Escherichia coli*							
1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	NR/20 (0%)	NR/20 (14.3%)	RR=0.00 (95% CI not calculable)*	Not calculable	Very low
Incidence of infection with *Klebsiella aerogenes*							
1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[d] Other considerations: none	NR/20 (0%)	NR/20 (7.1%)	RR=0.00 (95% CI not calculable)*	Not calculable	Very low
Incidence of infection with *Proteus mirabilis*							
1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[e] Other considerations: none	NR/20 (6.2%)	NR/20 (7.1%)	RR=0.87 (95% CI not calculable)*	Not calculable	Very low
Incidence of infection with *Pseudomonas aeruginosa*							
1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[f] Other considerations: none	NR/20 (68.8%)	NR/20 (43%)	RR=1.60 (95% CI not calculable)*	Not calculable	Very low
Incidence of infection with *Staphylococcus aureus*							
1 (Ugburo 2004)[57]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[g] Other considerations: none	NR/20 (6.2%)	NR/20 (7.1%)	RR=0.87 (95% CI not calculable)*	Not calculable	Very low

CI confidence interval; NR not reported; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI not calculable; Ugburo 2004[57] reported *p* = 0.099
[c] 95% CI not calculable
[d] 95% CI not calculable; Ugburo 2004[57] reported *p* = 0.007
[e] 95% CI not calculable; Ugburo 2004[57] reported *p* = 0.820
[f] 95% CI not calculable; Ugburo 2004[57] reported *p* = 0.0002
[g] 95% CI not calculable; Ugburo 2004[57] reported *p* = 0.821

Table H.51: Burn wound dressings and topical agents additional evidence – silver sodium carboxymethyl cellulose (Aquacel Ag) dressing versus nanocrystalline silver-coated polyethylene (Acticoat) dressing

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Brown 2016)[28]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	1/44	2/45	RR=0.51 (0.05 to 5.44)*	Not calculable	Very low

CI confidence interval; RR risk ratio
* Calculated by the HIS team
[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains
[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.52: Burn wound dressings and topical agents additional evidence – silver sulfadiazine cream versus enzyme alginogel

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound colonization[a]							
1 (Rashaan 2019[48] and Rashaan 2020)[49]	Randomized controlled trial	Serious risk of bias[b] No serious inconsistency No serious indirectness	13/40	29/37	RR=0.41 (0.26 to 0.67)*	Not calculable	Moderate

		No serious imprecision Other considerations: none					
Incidence of burn wound infection							
1 (Rashaan 2019[48] and Rashaan 2020)[49]	Randomized controlled trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	1/48	4/41	RR=0.21 (0.02 to 1.84)*	Not calculable	Very low
Pain score – before dressing change							
1 (Rashaan 2019[48] and Rashaan 2020)[49]	Randomized controlled trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[d] Other considerations: none	48	41	-	MD=0.10 lower (0.77 lower to 0.56 higher)	Very low
Pain score – during dressing change							
1 (Rashaan 2019[48] and Rashaan 2020)[49]	Randomized controlled trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[d] Other considerations: none	48	41	-	MD=0.26 lower (0.97 lower to 0.45 higher)	Very low
Pain-related and anticipatory anxiety (BSPAS)							
1 (Rashaan 2019[48] and Rashaan 2020)[49]	Randomized controlled trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[e] Other considerations: none	48	41	-	MD not calculable	Very low
Health-related quality of life – QALYs based on EQ-5D-5L							
1 (Rashaan 2019[48] and Rashaan 2020)[49]	Randomized controlled trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[d] Other considerations: none	48	41	-	MD=0.03 higher (0.03 lower to 0.09 higher)	Very low
Health-related quality of life – QALYs based on EQ-VAS							

1 (Rashaan 2019[48] and Rashaan 2020)[49]	Randomized controlled trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[d] Other considerations: none	48	41	-	MD=0.01 higher (0.02 lower to 0.05 higher)	Very low
Duration of hospital stay (days)							
1 (Rashaan 2019[48] and Rashaan 2020)[49]	Randomized controlled trial	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[f] Other considerations: none	48	41	-	MD not calculable	Very low

BSPAS Burn Specific Pain Anxiety Scale; CI confidence interval; EQ-5D-5L EuroQol 5-level, 5-dimensional descriptive system; EQ-VAS EuroQol visual analogue scale; MD mean difference; QALY quality of life year; RR risk ratio; SD standard deviation

* Calculated by the HIS team

[a] Incidence of burn wound colonization refers to colonization with any Gram-positive or Gram-negative micro-organism; the predominant micro-organism was *Staphylococcus aureus* (intervention 9/40, comparator 24/37, RR=0.35, 95% CI 0.19 to 0.65)*

[b] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[c] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[d] SD not reported by Rashaan 2019[48] for either intervention or control group

[e] Rashaan 2019[48] reported *p* = 0.45 based on Mann-Whitney test (median 26, range 0 to 82 in intervention group; median 35, range 0 to 78 in control group)

[f] Rashaan 2019[48] reported *p* = 0.79 based on Mann-Whitney test (median 17, range 2 to 102 in intervention group; median 16, range 1 to 33 in control group)

Table H.53: Burn wound dressings and topical agents additional evidence – silver sulfadiazine ointment versus Great Plantain ointment

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Keshavarzi 2022)[36]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b]	10/15	10/15	RR=1.00 (0.60 to 1.66)*	NR	Very low

		Other considerations: none					
Pain score on day 3							
1 (Keshavarzi 2022)[36]	Randomized trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	15	15	-	MD=0.07 higher (0.89 lower to 1.02 higher)*	Very low

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[c] 95% CI for absolute effect crosses both the lower (-0.64) and upper (0.64) default thresholds for imprecision (based on SD of 1.27 in the control group)

Table H.54: Burn wound dressings and topical agents additional evidence – once-daily dressing changes versus twice-daily dressing changes

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of burn wound infection							
1 (Sheridan 1997)[52]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	1/50	0/50	RR=3.00 (0.13 to 71.93)*	Not calculable	Very low
Incidence of bacteraemia							
1 (Sheridan 1997)[52]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	0/50	2/50	RR=0.20 (0.01 to 4.06)*	Not calculable	Very low
Incidence of pneumonia							

1 (Sheridan 1997)[52]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	0/50	1/50	RR=0.33 (0.01 to 7.99)*	Not calculable	Very low
Incidence of UTI							
1 (Sheridan 1997)[52]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	1/50	2/50	RR=0.50 (0.05 to 5.34)*	Not calculable	Very low

CI confidence interval; RR risk ratio; UTI urinary tract infection

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.55: Hydrotherapy – discontinuation of hydrotherapy versus routine hydrotherapy

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Acquisition of *Pseudomonas* spp.							
1 (Tredget 1992)[56]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	18/225	29/218	RR=0.60 (0.34 to 1.05)*	NR	Very low
Incidence of bacteraemia							
1 (Tredget 1992)[56]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	17/225	12/218	RR=1.37 (0.67 to 2.81)*	NR	Very low

***Pseudomonas*-related mortality**							
1 (Tredget 1992)[56]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	0/225	6/218	RR=0.07 (0.004 to 1.32)*	NR	Very low
Sepsis-related mortality							
1 (Tredget 1992)[56]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	1/225	8/218	RR=0.12 (0.02 to 0.96)*	NR	Very low
Duration of hospital stay (days)							
1 (Tredget 1992)[56]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[d] Other considerations: none	225	218	-	MD=4.7 higher (0.73 lower to 10.13 higher)*	Very low

CI confidence interval; MD mean difference; NR not reported; RR risk ratio; SD standard deviation

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

[c] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[d] 95% CI for absolute effect does not cross the lower (-10.7) or upper (10.7) default thresholds for imprecision (based on SD of 21.4 in the control group)

Table H.56: Device-related cleaning/disinfection – alcohol-impregnated central venous line port protectors versus standard isopropyl alcohol swab cleaning procedures

Quality assessment			Number of events (rate)		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of CLABSI							
1 (Martino 2017)[38]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	8/2624 (3.05 per 1,000 central line days)	5/673 (7.43 per 1,000 central line days)	IRR=0.41 (0.13 to 1.25)*	Not calculable	Very low

CI confidence interval; CLABSI central line-associated bloodstream infection; IRR incidence rate ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.57: Device-related cleaning/disinfection – placement of central venous catheters – new site access versus guidewire exchange

Quality assessment			Number of events (rate)		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of CRBSI – all patients[a]							
1 (O'Mara 2007)[43]	Prospective cohort study	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	18/1172 (15.36 per 1,000 central line days)	8/519 (15.41 per 1,000 central line days)	IRR=0.996 (0.43 to 2.29)*	Not calculable	Very low
Incidence of CRBSI – paediatric patients[a]							

1 (O'Mara 2007)[43]	Prospective cohort study	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	11/662 (16.62 per 1,000 central line days)	8/317 (25.24 per 1,000 central line days)	IRR=0.66 (0.26 to 1.64)*	Not calculable	Very low
Incidence of CRBSI – adult patients[a]							
1 (O'Mara 2007)[43]	Prospective cohort study	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	7/510 (13.73 per 1,000 central line days)	0/202 (0 per 1,000 central line days)	IRR=5.94 (0..34 to 104.03)*	Not calculable	Very low

CI confidence interval; CRBSI catheter-related bloodstream infection; IRR incidence rate ratio

* Calculated by the HIS team

[a] Paediatric and adult patients differed in characteristics such as burn size/severity, venous site of catheter placement, and proximity of lines to burn wounds – paediatric patients tended to have larger burns, lines placed closer to the burn wound, and a higher proportion of femoral lines; it is unclear whether the analysis based on all patients adjusted for potential confounders

[b] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[c] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.58: Device-related cleaning/disinfection – placement of central venous catheters – insertion near an open burn wound versus insertion far from an open burn wound

Quality assessment			**Number of central venous catheters**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of catheter-related bacteraemia							
1 (Ramos 2002)[46]	Prospective cohort study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: none	7/26	3/57	RR=5.12 (1.44 to 18.22)	NR	Very low

CI confidence interval; NR not reported; RR risk ratio

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

Table H.59: Device-related cleaning/disinfection – skin disinfection at central venous catheter insertion sites – mupirocin plus povidone iodine versus povidone iodine alone

Quality assessment			Number of catheters or number of events (rate)		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of skin colonization at insertion site							
1 (Tao 2015)[55]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: none	NR/29	NR/24	RR=0.32 (0.06 to 0.62)	NR	Moderate
Incidence of CLABSI							
1 (Tao 2015)[55]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	1/NR (5.3 per 1,000 catheter days)	5/NR (29.1 per 1,000 catheter days)	IRR=0.18 (0.02 to 1.56)*	Not calculable	Very low

CI confidence interval; CLABSI central line-associated bloodstream infection; IRR incidence rate ratio; NR not reported; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.60: Device-related cleaning/disinfection – skin disinfection at central venous catheter insertion sites – thrice-daily skin disinfection versus once-daily skin disinfection

Quality assessment			Number of catheters		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of skin colonization at insertion site							
1 (Tao 2015)[55]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	NR/29	NR/24	RR=0.60 (0.42 to 0.88)	NR	Low

CI confidence interval; NR not reported; RR risk ratio

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

Table H.61: Device-related cleaning/disinfection – hang time of enteral feeding administration sets – increased hang time (8 hours) versus standard hang time (4 hours)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of hospital-acquired infection							
1 (Neely 2006)[41]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	13/318	12/315	RR=1.07 (0.50 to 2.32)*	Not calculable	Very low

CI confidence interval; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.62: Environmental cleaning/disinfection – infection control measures related to use of infectious waste containers – enhanced infection control measures (such as disinfecting container lids and improved hand hygiene) versus baseline infection control measures

Quality assessment			Number of events (rate)		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of hospital-acquired infection							
1 (Neely 2003)[40]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	NR/NR (3.2 per 100 patients)	NR/NR (5.8 per 100 patients)	IRR=0.55 (95% CI not calculable)*	Not calculable	Very low

CI confidence interval; IRR incidence rate ratio; NR not reported

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI not calculable; Neely 2003[40] reported $p < 0.05$ based on a one-tailed t-test

Table H.63: Staffing – clothing routines for healthcare professionals– modified clothing routine (cotton ward suit covered by a cotton operating gown worn at every close-nursing contact and both changed after each contact episode) versus standard clothing routine (cotton ward suit worn all day and covered by the same cotton operating gown at every patient contact)

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of exogenous colonization with *Pseudomonas aeruginosa*							
1 (Ransjo 1979)[47]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	4/27	0/29	RR=9.64 (0.54 to 171.10)*	Not calculable	Very low
Incidence of exogenous colonization with *Staphylococcus aureus*							

1 (Ransjo 1979)[47]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	20/27	22/29	RR=0.98 (0.72 to 1.32)*	Not calculable	Very low
Incidence of exogenous colonization with Streptococcus groups A, B, C, F, and G							
1 (Ransjo 1979)[47]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	11/27	14/29	RR=0.84 (0.47 to 1.52)*	Not calculable	Very low

CI confidence interval; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.64: Staffing – clothing routines for healthcare professionals– modified clothing routine (cotton ward suit worn all day and covered by a cotton operating gown at every close-nursing contact with the same gown used for each contact episode) versus standard clothing routine (cotton ward suit worn all day and covered by the same cotton operating gown at every patient contact)

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of exogenous colonization with *Pseudomonas aeruginosa.*							
1 (Ransjo 1979)[47]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	8/33	0/29	RR=15.00 (0.90 to 249.07)*	Not calculable	Low
Incidence of exogenous colonization with *Staphylococcus aureus*							

1 (Ransjo 1979)[47]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	27/33	22/29	RR=1.08 (0.83 to 1.40)*	Not calculable	Low
Incidence of exogenous colonization with Streptococcus groups A, B, C, F, and G							
1 (Ransjo 1979)[47]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	23/33	14/29	RR=1.44 (0.93 to 2.24)*	Not calculable	Low

CI confidence interval; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses the upper (1.25) default threshold for imprecision

Table H.65: Staffing – clothing routines for healthcare professionals– modified clothing routine (cotton ward suit worn all day and covered by a semi-disposable polyethylene fibre coverall at every close-nursing contact with the coverall changed after each contact episode) versus standard clothing routine (cotton ward suit worn all day and covered by the same cotton operating gown at every patient contact)

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of exogenous colonization with *Staphylococcus aureus*							
1 (Ransjo 1979)[47]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	17/22	22/29	RR=1.02 (0.75 to 1.38)*	Not calculable	Very low
Incidence of exogenous colonization with Streptococcus groups A, B, C, F, and G							

1 (Ransjo 1979)[47]	Controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	10/22	14/29	RR=0.94 (0.52 to 1.70)*	Not calculable	Very low

CI confidence interval; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.66: Staffing – enhanced nursing management – formalized nursing quality management programme (including strengthened training, cleaning/disinfection procedures, and communication with patients) versus routine nursing management

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of hospital-acquired infection							
1 (Wang 2020)[58]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	4/46	11/46	RR=0.36 (0.12 to 1.06)*	Not calculable	Low
Anxiety (SAS score; higher scores associated with worse mood)[c]							
1 (Wang 2020)[58]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[d] Other considerations: none	46	46	-	MD=7.2 lower (4.64 to 9.76 lower)*	Moderate
Depression (SDS score; higher scores associated with worse mood)[c]							
1 (Wang 2020)[58]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[e]	46	46	-	MD=7.0 lower (4.67 to 9.31 lower)*	Moderate

		Other considerations: none					
Duration of hospital stay (days)							
1 (Wang 2020)[58]	Randomized controlled trial	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision[f] Other considerations: none	46	46	-	MD=7.7 lower (4.77 to 10.63 lower)*	Moderate

CI confidence interval; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

[c] No further details of SAS and SDS scores reported

[d] 95% CI for absolute effect does not cross the lower (-3.31) or upper (3.31) default thresholds for imprecision (based on SD of 6.62 in the control group)

[e] 95% CI for absolute effect does not cross the lower (-2.94) or upper (2.94) default thresholds for imprecision (based on SD of 5.87 in the control group)

[f] 95% CI for absolute effect does not cross the lower (-3.84) or upper (3.84) default thresholds for imprecision (based on SD of 7.68 in the control group)

Table H.67: Bathing practices – total body bathing using chlorhexidine gluconate versus routine bathing (initial surface decontamination using povidone-iodine followed by regular bathing with soap)

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Acquisition of *Candida*							
1 (Ichida 1993)[35]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: none	9/84	24/71	RR=0.32 (0.16 to 0.64)*	Not calculable	Very low
Acquisition of *Enterococcus* spp.							
1 (Ichida 1993)[35]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b]	14/84	26/71	RR=0.46 (0.26 to 0.80)*	Not calculable	Very low

		Other considerations: none					
Acquisition of *Pseudomonas aeruginosa*							
1 (Ichida 1993)[35]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	23/84	23/71	RR=0.85 (0.52 to 1.37)*	Not calculable	Very low
Acquisition of *Staphylococcus aureus*							
1 (Ichida 1993)[35]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	22/84	27/71	RR=0.69 (0.43 to 1.10)*	Not calculable	Very low

CI confidence interval; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

[c] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.68: Bathing practices – total body bathing using chlorhexidine gluconate versus routine bathing (using soap and water)

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of CAUTI							
1 (Popp 2014)[45]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	1/277	4/203	RR=0.18 (0.02 to 1.63)*	Not calculable	Very low
Incidence of CLABSI							

1 (Popp 2014)[45]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	0/277	2/203	RR=0.15 (0.01 to 3.04)*	Not calculable	Very low
Incidence of VAP							
1 (Popp 2014)[45]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	0/277	3/203	RR=0.10 (0.01 to 2.02)*	Not calculable	Very low

CAUTI catheter-associated urinary tract infection; CI confidence interval; CLABSI central line-associated bloodstream infection; RR risk ratio; VAP ventilator-associated pneumonia

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

Table H.69: Decolonization practices – universal decolonization of intact skin and nasopharyngeal mucosa (using octenidine) versus no universal decolonization of intact skin and nasopharyngeal mucosa

Quality assessment			**Number of events (rate)**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Acquisition of MDRB							
1 (Baier 2019)[26]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	0/3380 (0 per 1,000 patient days)	4/5811 (0.69 per 1,000 patient days)	IRR=0.19 (0.01 to 3.55)*	Not calculable	Very low
Incidence of CLABSI							
1 (Baier 2019)[26]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness	2/2449 (0.82 per 1,000 catheter days)	8/3944 (2.03 per 1,000 catheter days)	IRR=0.40 (0.06 to 1.71)	NR	Very low

		Very serious imprecision[b] Other considerations: none					
Duration of hospital stay (days)							
1 (Baier 2019)[26]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	340	661	-	MD not calculable	Very low

CI confidence interval; CLABSI central line-associated bloodstream infection; IQR interquartile range; IRR incidence rate ratio; MD mean difference; MDRB multidrug-resistant bacteria; NR not reported

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses both the lower (0.8) and upper (1.25) default thresholds for imprecision

[c] 95% CI not calculable; Baier 2019[26] reported $p = 0.074$ based on Wilcoxon rank sum test (median 7 days in intervention group, IQR 2 to 19 days; median 6 days in control group, IQR 2 to 16 days)

Table H.70: Implementation of universal contact precautions – universal contact precautions versus no universal contact precautions

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Acquisition of antibiotic-resistant organisms, including carbapenem-resistant *Acinetobacter* and *Pseudomonas* spp., ESBL *Escherichia coli*, MRSA, and VRE[a]							
1 (Ho 2017)[32]	Uncontrolled before–after study	Serious risk of bias[b] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	NR/NR (27.6%)	NR/NR (27.9%)	RR=0.99 (95% CI not calculable)*	Not calculable	Very low

CI confidence interval; ESBL extended-spectrum beta lactamase-producing; GRADE Grading of Recommendations Assessment, Development and Evaluation; MRSA meticillin-resistant *Staphylococcus aureus*; NR not reported; RR risk ratio; VRE vancomycin-resistant enterococcus

* Calculated by the HIS team

[a] Acquisition rates for the different types of micro-organism were not reported by Ho 2017[32] in a form suitable for analysis using the GRADE framework

[b] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[c] 95% CI not calculable; Ho 2017[32] reported $p > 0.05$

Table H.71: Limiting the use of broad-spectrum antibiotics – limiting broad-spectrum cephalosporin use versus not limiting broad-spectrum cephalosporin use

Quality assessment			Number of events (rate)		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of MRSA infection							
1 (May 2000)[39]	Controlled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	1/NR (0.24 per 1,000 patient days)	NR/NR (1.51 per 1,000 patient days)	IRR=0.16 (95% CI not calculable)*	Not calculable	Very low
Incidence of VRE infection							
1 (May 2000)[39]	Controlled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[c] Other considerations: none	0/NR (0 per 1,000 patient days)	7/NR (1.76 per 1,000 patient days)	IRR=0 (95% CI not calculable)*	Not calculable	Very low
Duration of hospital stay (days)							
1 (May 2000)[39]	Controlled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[d] Other considerations: none	NR	NR	-	MD=1.4 higher (95% CI not calculable)*	Very low

CI confidence interval; IRR incidence rate ratio; MD mean difference; NR not reported; MRSA meticillin-resistant *Staphylococcus aureus*; VRE vancomycin-resistant enterococcus

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI not calculable; May 2000[39] reported $p > 0.05$ based on Poisson regression

[c] 95% CI not calculable; May 2000[39] reported $p < 0.05$ based on Poisson regression

[d] 95% CI not calculable; May 2000[39] reported duration of stay as 9.9 days in intervention group and 8.5 days in control group (SD not reported for either group)

Table H.72: Multimodal interventions – multimodal intensification of infection control measures (more infection control nurses, education programmes for all healthcare workers, increased emphasis on hand hygiene, more stringent clinical waste disposal procedures, implementation of published clinical guidelines for antibiotic use, precautions related to venous cannula sites and urinary catheter use) versus baseline infection control measures

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Prevalence of hospital-acquired infection							
1 (Atukorala 1998)[25]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	4/14	10/17	RR=0.49 (0.19 to 1.22)*	Not calculable	Very low
Prevalence of burn wound infection							
1 (Atukorala 1998)[25]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	1/14	9/17	RR=0.13 (0.02 to 0.94)*	Not calculable	Very low

CI confidence interval; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses the lower (0.8) default threshold for imprecision

Table H.73: Multimodal interventions – multimodal intensification of infection control measures (particularly changes to showering facilities and other hygiene measures, including reduced burn wound hydrotherapy) versus baseline infection control measures

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Acquisition of multidrug-resistant *Acinetobacter* spp.							
1 (Lindford 2015[37]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision[b] Other considerations: none	0/NR	31/NR	RR not calculable	Not calculable	Very low

CI confidence interval; RR risk ratio

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI not calculable

Table H.74: Multimodal interventions – multimodal intensification of infection control measures (education programmes for all healthcare workers, increased emphasis on hand hygiene, more frequent environmental cleaning/disinfection, increased bed capacity overall and fewer shared patient rooms, increased emphasis on antibiotic stewardship, discontinuation of hydrotherapy tank use, improved air conditioning, appointment of more experienced healthcare professionals, changes to surgical procedures) versus baseline infection control measures

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of hospital-acquired infection							
1 (Ozkurt 2012)[44]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: none.	11/NR (4.5%)	74/NR (28.3%)	RR=0.16 (0.09 to 0.29)*	Not calculable	Very low

Incidence of burn wound infection							
1 (Ozkurt 2012)[44]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency No serious indirectness Very serious imprecision Other considerations: none	10/NR (4.27%)	60/NR (29.85%)	RR=0.18 (0.09 to 0.34)*	Not calculable	Very low

CI confidence interval; NR not reported; RR risk ratio

* Calculated by the HIS team

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

Table H.75: Multimodal interventions – multimodal intensification of infection control measures aimed at reducing central line-associated bloodstream infection (such as a line insertion checklist, daily assessment of need for central access, use of alcohol-impregnated caps, and enhanced nursing care documentation) versus baseline infection control measures

Quality assessment			**Number of events (rate)**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of CLABSI							
1 (Remington 2016)[51]	Uncontrolled before–after study	Serious risk of bias[a] No serious inconsistency Serious indirectness[b] Serious imprecision[c] Other considerations: none	0/NR (0 per 1,000 central line days days)	11/NR (1.2 per 1,000 central line days)	IRR not calculable	Not calculable	Very low

CI confidence interval; CLABSI central line-associated bloodstream infection; IRR incidence rate ratio; NR not reported

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] Results are for burns and trauma ICU patients combined

[c] 95% CI not calculable; Remington 2016[51] reported $p = 0.02$

Table H.76: Multimodal interventions – multimodal intensification of infection control measures aimed at reducing central line-associated bloodstream infection (such as development of new blood culture procurement procedures, implementation of chlorhexidine bathing/dressings, use of alcohol-impregnated caps, and routine central venous catheter changes) versus baseline infection control measures

Quality assessment			Number of events (rate)		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Intervention**	**Comparator**	**Relative (95% CI)**	**Absolute**	
Incidence of CLABSI							
1 (Sood 2017)[53]	Interrupted time series	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: none	0/NR (0 per 1,000 patient days)	19/NR (15.5 per 1,000 patient days)	IRR not calculable	IRD=15.5 lower (8.54 to 22.48 lower)	Very low

CI confidence interval; CLABSI central line-associated bloodstream infection; IRD incidence rate difference; IRR incidence rate ratio; NR not reported

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI reported by Sood 2017[53] does not cross line of no effect (RD = 0), but SD not reported for either intervention or control group

Table H.77: Modifiable risk factors for infection – exposure to potential risk factors for acquisition of imipenem-resistant *Acinetobacter baumannii* versus reduced exposure to potential risk factors for acquisition of imipenem-resistant *Acinetobacter baumannii*

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Cases**	**Controls**	**Relative (95% CI)**	**Absolute**	
Acquisition of imipenem-resistant *Acinetobacter baumannii* – association with number of burn wound excisions							
1 (Cavalcante 2014)[29]	Case–control study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: adjusted OR[b]	29	179	OR=12.06 (2.82 to 51.64)	NR	Very low

Acquisition of imipenem-resistant *Acinetobacter baumannii* – association with number of antimicrobials used							
1 (Cavalcante 2014)[29]	Case–control study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: adjusted OR[b]	29	179	OR=22.82 (5.15 to 101.19)	NR	Very low

CI confidence interval; NR not reported; OR odds ratio

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] Cavalcante 2014[29] reported independent risk factors for acquisition of imipenem-resistant *Acinetobacter baumannii* based on multivariate logistic regression

Table H.78: Modifiable risk factors for infection – exposure to potential risk factors for acquisition of multidrug-resistant *Acinetobacter baumannii* versus reduced exposure to potential risk factors for acquisition of multidrug-resistant *Acinetobacter baumannii*

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Cases**	**Controls**	**Relative (95% CI)**	**Absolute**	
Acquisition of multidrug-resistant *Acinetobacter baumannii* – association with use of carbapenem							
1 (Huang 2017)[34]	Case–control study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: adjusted HR[b]	NR/NR	NR/NR	HR=1.08 (1.01 to 1.16)	NR	Very low
Acquisition of multidrug-resistant *Acinetobacter baumannii* – association with use of non-carbapenem beta-lactam							
1 (Huang 2017)[34]	Case–control study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: adjusted HR[b]	NR/NR	NR/NR	HR=0.97 (0.81 to 1.15)	NR	Very low

CI confidence interval; HR hazard ratio; NR not reported

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] Huang 2017[34] reported independent risk factors for acquisition of multidrug-resistant *Acinetobacter baumannii* based on Cox proportional hazards regression

Table H.79: Modifiable risk factors for infection – exposure to potential risk factors for acquisition of multidrug-resistant *Acinetobacter baumannii* versus reduced exposure to potential risk factors for acquisition of multidrug-resistant *Acinetobacter baumannii*

Quality assessment			Number of patients		Effect		Quality
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Cases**	**Controls**	**Relative (95% CI)**	**Absolute**	
Acquisition of multidrug-resistant *Acinetobacter baumannii* – association with receipt of blood products							
1 (Simor 2002)[8]	Case–control study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: adjusted OR[b]	NR/29 (76%)	NR/87 (21%)	OR=10.8 (3.4 to 34.4)	NR	Very low
Acquisition of multidrug-resistant *Acinetobacter baumannii* – association with use of hydrotherapy room							
1 (Simor 2002)[8]	Case–control study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: adjusted OR[b]	NR/29 (72%)	NR/87 (35%)	OR=4.1 (1.3 to 13.1)	NR	Very low
Acquisition of multidrug-resistant *Acinetobacter baumannii* – association with duration of mechanical ventilation (per day)							
1 (Simor 2002)[8]	Case–control study	Serious risk of bias[a] No serious inconsistency No serious indirectness No serious imprecision Other considerations: adjusted OR[b]	29	87	OR=1.1 (1.0 to 1.1)	NR	Very low

CI confidence interval; NR not reported; OR odds ratio

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] Simor 2002[8] reported independent risk factors for acquisition of multidrug-resistant *Acinetobacter baumannii* based on multivariate logistic regression

Table H.80: Modifiable risk factors for infection – exposure to potential risk factors for *Acinetobacter baumannii* bloodstream infection versus reduced exposure to potential risk factors for *Acinetobacter baumannii* bloodstream infection

Quality assessment			**Number of patients**		**Effect**		**Quality**
Number of studies	**Design**	**Certainty of the evidence: risk of bias, inconsistency, indirectness, imprecision, and other considerations**	**Cases**	**Controls**	**Relative (95% CI)**	**Absolute**	
Incidence of *Acinetobacter baumannii* bloodstream infection– association with use of hydrotherapy							
1 (Wisplinghoff 1999)[60]	Case–control study	Serious risk of bias[a] No serious inconsistency No serious indirectness Serious imprecision[b] Other considerations: adjusted OR[c]	25/29 (86%)	32/58 (55%)	OR=5.5 (1.11 to 27.76)	NR	Very low

CI confidence interval; NR not reported; OR odds ratio

[a] At least one limitation related to design, analysis or reporting that is not covered by the other quality domains

[b] 95% CI for relative effect crosses the upper (1.25) default threshold for imprecision

[c] Wisplinghoff 1999[60] reported independent risk factors for *Acinetobacter baumannii* bloodstream infection based on multivariate logistic regression

Appendix I – Consultation

This section will be completed after the external consultation