The infection control management of MRSA within the acute care hospital

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Authors' objectives
To determine the effectiveness of strategies used to control nosocomial spread of methicillin-resistant Staphylococcus aureus (MRSA) in the acute hospital setting.

Searching
MEDLINE, EMBASE, HealthSTAR, CINAHL, Core Biomedical Collection, Core Nursing Collection, the Cochrane Library and the Joanna Briggs Institute's database were searched. Reference lists, the Internet, reports of expert committees and guidelines were also searched. Published and unpublished reports were eligible for inclusion as long as they were written in English. The search period was 1985 to 2000. The search strategies were reported.

Study selection
Study designs of evaluations included in the review
Any empirical research study available within the dates searched was eligible. Expert opinion and literature reviews were excluded. All the included studies were level IV evidence (i.e. obtained from case series, post-test or pre-test post-test).

Specific interventions included in the review
Infection control strategies implemented in response to a nosocomial outbreak of MRSA in an acute clinical setting were eligible for inclusion. Studies that did not provide a detailed description of the control measures were excluded. A wide range of infection control strategies was used in the included studies, such as surveillance of the environment, staff and patients, patient isolation, flagging of medical records, protective apparel, staff education and compliance with infection control precautions.

Participants included in the review
There were no explicit inclusion criteria for the participants other than the acute care setting (community-acquired MRSA epidemics were excluded). The included studies involved adult, paediatric and neonatal patients, as well as health personnel, and were conducted in specific critical care areas and across entire hospitals.

Outcomes assessed in the review
The primary outcome was any change in the rate of nosocomial acquisition of MRSA. To be included, the studies had to report data on MRSA distinct from other nosocomial pathogens.

How were decisions on the relevance of primary studies made?
One reviewer applied the inclusion criteria to the studies identified. A second person assessed articles if there was uncertainty.

Assessment of study quality
The authors used a quality checklist (available in the report) that they developed for this review. A quality score out of 33 was assigned to each study. Studies that met the criteria for inclusion in the review, but subsequently scored less than the threshold quality score of 24 (based on the mean quality score across all studies), were excluded from the review. Validity was assessed by two reviewers.

Data extraction
Two reviewers extracted the data using a data extraction form (available in the report) that was designed for this review. The data extracted were the setting, control measures used, results and study authors' conclusions.
Methods of synthesis
How were the studies combined?
The studies were synthesised in a narrative summary. Studies that investigated the control of endemic MRSA were considered separately from those that described the management of MRSA outbreaks.

How were differences between studies investigated?
In addition to grouping the studies according to endemic and outbreak control, the narrative was sub-headed according to specific components of the control strategies used.

Results of the review
Sixty studies met the inclusion criteria: 12 described endemic MRSA control measures and 48 described control measures during MRSA outbreaks. Only 34 studies (7 endemic, 27 outbreak) achieved the quality threshold score necessary to be included in the review.

Good-quality research on the effectiveness of strategies to control either epidemics or outbreaks of MRSA was lacking. The clinical effectiveness of any single strategy could not be determined due to the presence of confounding in the included studies, such as strategies being added to or modified during the study. Differences between the studies, such as control practices being modified to meet local needs, precluded meaningful comparisons. The evidence suggested that the effectiveness of infection control strategies was increased if they were directed at identified vectors and used in specific clinical areas. While no study specifically measured staff compliance with infection control practices, the available data (number of staff colonised, degree of environmental contamination, anecdotal reports of poor compliance) suggested inadequate levels of staff adherence to infection control precautions.

Authors' conclusions
Specific clinical recommendations cannot be made on the basis of the research reviewed. The main points identified were that the early identification of MRSA reservoirs is essential to the implementation of focused strategies to eradicate the vectors, and that staff compliance with current infection control guidelines is sub-optimal.

CRD commentary
The review addressed a broad question in terms of the intervention, therefore, it is unsurprising that the authors were unable to reach a clear conclusion regarding effectiveness. The review appears to have been fairly well-conducted using explicit inclusion criteria and procedures to minimise bias in the data extraction. Several relevant sources were searched, but the studies were largely selected based on the decisions of one reviewer. Unpublished data were eligible for inclusion. The review could be affected by language bias because only reports in English were included. The authors did well to try to assess the validity of the primary studies using criteria appropriate to the study design. However, the value of their composite quality score (in which all items were given equal importance), and their use of it to subsequently exclude studies, is questionable. The validity of the individual studies is not governed by any such average score. The authors did, at least, provide a table showing how each finally included study scored on each quality parameter, so the reader can make their own judgment on validity. The authors were correct not to attempt to pool data due to differences between the studies, particularly in the infection control strategies and populations. A narrative method was appropriate, although the findings could have been synthesised more clearly. The authors' conclusions are in line with the evidence reviewed.

Implications of the review for practice and research
Practice: The authors state that they were unable to derive specific clinical recommendations from the evidence reviewed. They concluded that the early identification of MRSA reservoirs and the implementation of focused strategies to eradicate the vectors was essential. Also, staff compliance with infection control guidelines needs to be improved.

Research: The authors state that recommendations for research included investigation of the current knowledge level of staff, nosocomial modes of MRSA transmission, the role of colonised staff and patients in the spread of MRSA, the risk associated with visitors, the efficacy of protective clothing and optimal cleaning regimens to reduce contamination.
of the equipment and environment.

**Bibliographic details**

**Other publications of related interest**

**Indexing Status**
Subject indexing assigned by CRD

**MeSH**
Cross Infection /prevention & control; Infection Control /methods; Methicillin Resistance; Staphylococcal Infections /prevention & control

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**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.