Handwashing in the intensive care unit: a big measure with modest effects
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CRD summary
The review aimed to evaluate the effectiveness of hand washing on infection rates in intensive care units (ICUs). The authors concluded that there was little evidence to support efforts to control ICU infections with hand washing. However, this conclusion was not well supported by the evidence presented, as there were a number of methodological weaknesses.

Authors' objectives
The stated aim of this review was to evaluate the effectiveness of hand washing on infection rates in intensive care units (ICUs) and to analyse reasons for the failure of hand washing.

In practice, the review evaluated different approaches to hand washing and interventions designed to increase hand washing. The second part of the stated objective, to evaluate the failure of hand washing, was addressed by a non-systematic review of other factors that might influence infection rates.

Searching
MEDLINE was searched from January 1976 to December 2003; the search terms were reported. Citations from before 1998 were retrieved from the only potentially relevant review article.

Study selection
Study designs of evaluations included in the review
Studies using any design were eligible for inclusion. The included trials comprised randomised controlled trials (RCTs) and controlled observational studies. None were blinded.

Specific interventions included in the review
Studies of hand washing or hand hygiene practices were eligible for inclusion. The studies compared different hand washing agents with each other, with the use of protective clothing with or without isolation, and with other unspecified comparators. The interventions in the included studies consisted of non-medicated soap, 60% alcohol, 1% and 4% chlorhexidine, chloroxylenol, 10% povidone-iodine and 1% triclosan, with or without interventions to increase hand washing.

Participants included in the review
Participants eligible for inclusion were patients in ICUs. The studies were set in adult, paediatric and neonatal ICUs.

Outcomes assessed in the review
Studies reporting infection rates in ICUs were eligible for inclusion. The review excluded studies of hand hygiene adherence, hand washing frequency or duration, and studies of the efficacy of different hand washing solutions or soaps in reducing bacterial counts on hands.

All of the included studies reported the rates of patient infection and/or rates of infective episodes. Two also reported the rates of patient carriers. Some studies focused on specific infective organisms such as Klebsiella (1 study) and methicillin-resistant Staphylococcus aureus (1 study). Two studies focused on specific types of infection such as bacterial and fungal pneumonia (1 study) or infections of the bloodstream or cerebrospinal fluid (1 study). The other 5 studies reported all nosocomial infections; in one of these studies the rates were broken down by infection site.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.
Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. For some studies the results were reported as the number of events in each group or the percentage of each group affected; for others the authors reported the statistical significance of the difference in event rates between the two groups.

Methods of synthesis
How were the studies combined?
The studies were combined in a brief narrative.

How were differences between studies investigated?
The authors grouped studies within the narrative by study design and highlighted the results of the 2 RCTs as distinct from the non-randomised evidence.

Results of the review
Nine studies were included: 2 RCTs and 7 controlled observational studies. The number of participants in each study was not reported. Amongst the observational studies, two were of a crossover design, one (described as sequential comparative) compared different interventions given in sequence, and four compared an intervention with historical controls (three described as sequential and one described as a prospective study with retrospective control).

Four of the 7 observational studies reported a statistically significant reduction in infection rates, favouring the use of antiseptics. The comparator was non-medicated soap in two of these 4 studies; it was unclear what the comparator was in the other 2 studies.

The authors stated in the text that the 2 RCTs found no difference in infection rates. According to their table, one RCT detected no significant difference in infection rates between hand washing with chlorhexidine versus protective gown and glove interventions. However, the other RCT compared isolation with hand washing versus a control group that also used hand washing, and reported significantly more infections in the isolation group.

There was no difference in mortality rates in any of the 9 assessed studies.

Authors' conclusions
There was little evidence to support efforts to control infections in the ICU with hand washing or hand antisepsis.

CRD commentary
The review question was clear in terms of the intervention and outcomes of interest. However, the inclusion criteria did not specify any comparator for hand washing. The search terms were listed but the search strategy was somewhat limited, being restricted to a single database and one bibliography. The methods used to select the studies and extract the data were not reported in full, and it was unclear whether these were carried out in duplicate to minimise errors and reviewer bias. There was no indication that the quality of the studies was formally assessed: evidence was graded I to IV in the table of included studies, but no explanation of the grading was supplied.

Few details of the individual studies were given: there was an inadequate description of the interventions used, particularly in the control groups, and no information on study size. The interventions in the included studies were clinically very heterogeneous, ranging from antiseptics to isolation techniques and educational programmes. The outcomes were also heterogeneous, with some studies focusing on nosocomial infections and others including all types of infection. The results did not report confidence intervals or p-values. Furthermore, as noted already, the results
reported in the text differed from those tabulated.

The authors’ conclusions on the effectiveness of hand washing did not appear to be adequately supported by the evidence presented.

**Implications of the review for practice and research**

Practice: The authors stated that there was little evidence to support the effectiveness of hand washing in controlling ICU infections.

Research: The authors recommended a randomised trial of standard hand washing with non-medicated soap versus an alcohol-based hand-rubbing solution for patients requiring long-term ventilation on an ICU, with randomisation by ICU unit rather than by patient.

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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.