Selected nonvaccine interventions to prevent infectious acute respiratory disease

Lee T, Jordan N N, Sanchez J L, Gaydos J C

CRD summary
This review assessed the effectiveness of population-based nonvaccine interventions to prevent infectious acute respiratory disease in community settings. The authors concluded that promoting hand hygiene and reducing crowding through the provision of adequate living space may offer benefits, and that further research is needed. The review has a number of weaknesses which may limit its reliability.

Authors' objectives
To assess the effectiveness of population-based nonvaccine interventions to prevent infectious acute respiratory disease in community settings.

Searching
MEDLINE (1963 to 2004) and the Technical Reports Collection on the Scientific and Technical Information Network of the Defense Technical Information Center (1974 to 2004) were searched; the search terms were not reported. In addition, bibliographies of identified articles, military publications and studies in the Armed Forces Epidemiological Board (Falls Church VA) archives were checked. Senior military officials were also contacted for details of further studies.

Study selection
Study designs of evaluations included in the review
There were no inclusion criteria specified for study design.

Specific interventions included in the review
Studies of the following population-based nonvaccine interventions were eligible for inclusion:

personal measures (hand hygiene, respiratory masks),

administrative controls (limiting contact between training groups to reduce disease transmission, living space allocation, 'head-to-toe' sleeping arrangement, barriers between beds), and

engineering controls (air dilution ventilation, ventilation filter efficiency, dust suppression, air sterilisation).

Participants included in the review
Community-based studies were eligible for inclusion. Studies that were in a health care setting were excluded. The included studies involved a range of populations, including children in school, daycare or other settings, military personnel, office workers, and elderly people and staff in daycare.

Outcomes assessed in the review
Studies reporting acute respiratory disease outcomes were eligible for inclusion. The included studies reported a variety of outcomes, including respiratory illness or symptoms, measles, chicken pox, mumps, and absence or hospitalisation due to respiratory illness.

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.

Methods of synthesis
How were the studies combined?
The studies were grouped according to the intervention and a narrative synthesis was undertaken. The broad results were also summarised in a table.

How were differences between studies investigated?
Differences between the studies were discussed in the text of the review.

Results of the review
The review included 38 studies involving more than 237,762 participants in total. Twenty-three studies were described as having an interventional study design and 15 were observational studies (3 cross-sectional studies, 6 cohort studies, 5 case-control studies, and one described as an observational study).

Personal measures.
There were 12 studies of hand hygiene: 10 intervention trials and 2 observational studies. Nine of these studies reported that hand hygiene reduced the occurrence of respiratory diseases. No studies of respiratory masks were found.

Administrative controls.
Five observational studies provided data to support cohorting to reduce disease transmission. Five further studies concluded that reducing crowding would have a favourable impact on the occurrence of acute respiratory disease. One inadequately-controlled study supported the use of cloth barriers between beds. There were no studies on 'head-to-toe' sleeping arrangements.

Engineering controls.
Two studies supported the use of air dilution ventilation to prevent disease transmission. There were no studies on ventilation filter efficiency. There were 5 studies of dust suppression by oiling floors and blankets, four of which found these measures reduced respiratory disease. One study found a positive effect from air sterilisation using glycol vapours. There were 10 studies of air sterilisation using ultraviolet (UV) lights. Seven of these supported UV lights as a means to reduce the incidence of acute respiratory disease, although these effects were small in 2 studies and high UV irradiation was required in others.

Authors' conclusions
Promoting hand hygiene and reducing crowding through the provision of adequate living space and cohorting of training units may offer benefits in respiratory disease control. Further controlled trials of these interventions, along with UV lights and air dilution or ventilation, should be carried out to assess their efficacy.

CRD commentary
The review question and inclusion criteria were reasonably well defined. Several sources were searched for published and unpublished primary studies, although the military focus of the search may mean that studies in other community settings were missed and it was unclear whether any language restrictions were applied. It was not possible to judge whether the likelihood of bias and errors was minimised in other ways since details of the review process were not reported. There were no inclusion criteria for study design and the quality of the included studies was not assessed, therefore the reliability of the included primary studies is unclear. Given the variation between the studies, it was appropriate to combine them in a narrative and summary table. The authors' cautious conclusions follow broadly from
the evidence presented. However, there are a number of weaknesses to the review which may limit its reliability.

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

Practie: The authors recommended the use of hand antisepsis, cohorting and head-to-toe sleeping to prevent the spread of disease, but stated that there is inadequate evidence to recommend the use of masks, cloth and other barriers, and air dilution, ventilation, filtration and sterilisation with UV light.

Research: The authors stated that further research of nonvaccine interventions to prevent infectious acute respiratory disease is warranted. Such research should include an analysis of the costs and benefits.

**Bibliographic details**


**PubMedID**

15766621

**DOI**

10.1016/j.amepre.2004.12.010

**Indexing Status**

Subject indexing assigned by NLM

**MeSH**

Adolescent; Adult; Aged; Child; Child, Preschool; Crowding; Female; Hand Disinfection /methods; Humans; Male; Population Surveillance /methods; Respiratory Distress Syndrome, Adult /epidemiology /etiology /prevention & control; Sanitary Engineering

**AccessionNumber**

12005000006

**Date bibliographic record published**

30/06/2006

**Date abstract record published**

30/06/2006

**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.