



## Major article

## Impact of hand hygiene on the infectious risk in nursing home residents: A systematic review



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**Key Words:**

Hand hygiene  
 Infectious risk  
 Long-term care facilities  
 Nursing homes

**Background:** In nursing homes, the infectious risk is high, making infection control using approaches such as hand hygiene (HH) a major issue. However, the effectiveness of HH in these settings is not well documented, and HH compliance is low.

**Methods:** We systematically searched PubMed, Scopus, Web of Science, and Cochrane Clinical Trials for studies in nursing homes that either described a HH-related intervention or assessed HH compliance and included a measured infectious outcome. Two reviewers independently performed the study selection.

**Results:** Fifty-six studies met the inclusion criteria and were reviewed. Most were outbreak reports (39%), followed by observational studies (23%), controlled trials (23%), and before-after intervention studies (14%). Thirty-five studies (63%) reported results in favor of HH on at least one of their outcome measures; in addition, the infection control success rate was higher when at least one HH-related intervention (eg, staff education on HH, increased availability of handrub solution) was included (70% vs 30% for no intervention). However, only 25% of randomized trials concluded that HH-related interventions led to a reduction in the infectious risk.

**Conclusion:** The results of this systematic review suggest that more evidence on HH effectiveness in nursing homes is needed. Future interventional studies should enhance methodologic rigor using clearly defined outcome measures, standardized reporting of findings, and a relevant HH observation tool.

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Epidemiologic studies show that older adults are more susceptible to a number of infections and that they have worse outcomes when infections occur.<sup>1</sup> Combined with community life and limited hygiene, this leads to a high infectious risk in nursing homes. The available data show a high prevalence of infections in nursing homes, accompanied by high mortality rates, repeated stays in the hospital, and high prevalence of colonization with multiresistant bacteria.<sup>2,3</sup> Hence, infection control in nursing homes is a real public health concern, with important associated economic and health costs.<sup>3</sup>

Although there are published guidelines for infection prevention and control in nursing homes,<sup>4</sup> control measures and effective prevention remain largely inadequate. Most infection-prevention interventions in nursing homes have predominantly been adapted from those designed for acute care—a clinical setting

much different from nursing homes—without being assessed in nursing home settings.

Among the approaches to infection control, hand hygiene (HH) traditionally plays a privileged role because it is considered one of the main measures to reduce the risk of acquisition and transmission of infectious agents through contact and by the fecal-oral route. However, compliance with HH recommendations remains low among nursing home staff; it was estimated at only 15% in a U.S. study.<sup>5</sup> Several programs aiming at increasing HH compliance in nursing homes have been proposed; however, the effectiveness of HH to reduce the infectious risk in nursing home settings is not well documented.

To date, only a few reviews have examined the evidence for a link between infection prevention measures and the infectious risk in nursing homes. A Cochrane systematic review focused on methicillin-resistant *Staphylococcus aureus* (MRSA) was published in 2008<sup>6</sup>; another study reviewed influenza control practices and their effectiveness<sup>7</sup>; and a recent review systematically explored all randomized and nonrandomized trials published since 2001 to assess infection-control interventions.<sup>8</sup> However, to our knowledge, no general overview of the impact of HH on nursing home

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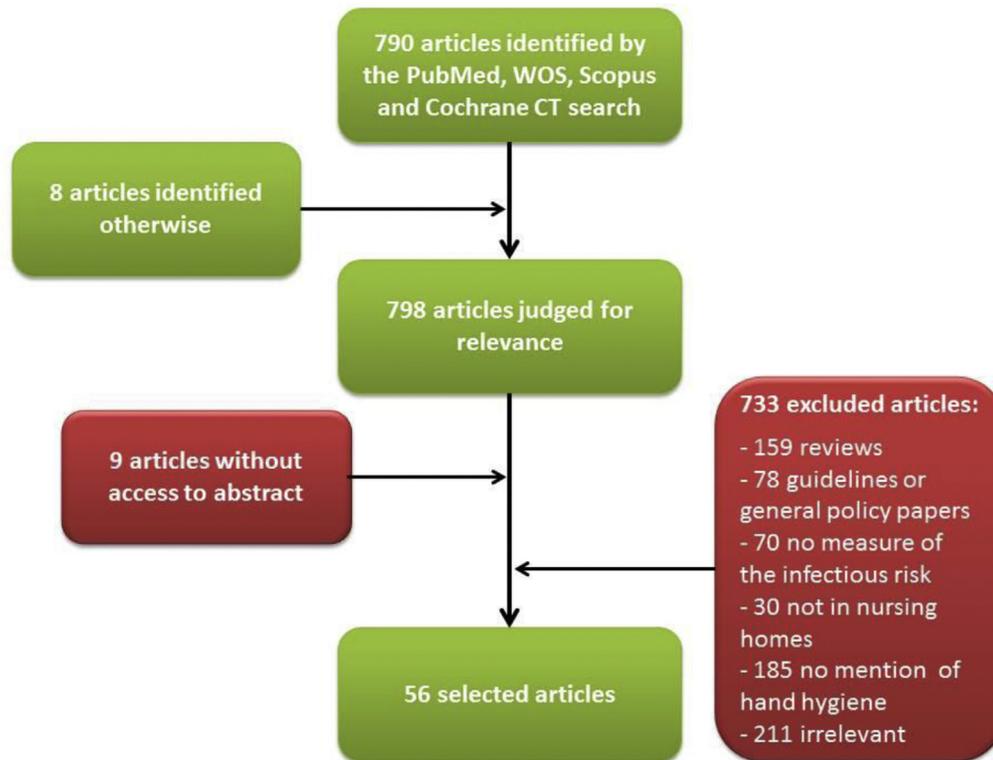


Fig 1. Flow diagram of the literature search. CT, Clinical Trials; WOS, Web of Science.

infections has been published. Here, we conduct a systematic review of all studies from which the impact of HH on the infectious risk may be assessed in nursing homes, with the objective of (1) synthesizing the available evidence, (2) evaluating the methodologic quality of these studies, and (3) offering recommendations for future investigations.

## METHODS

Our systematic review was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.<sup>9</sup> We systematically searched PubMed, Scopus, Web of Science, and Cochrane Clinical Trials for articles published through April 1, 2015. The search strategy was developed using key words, standardized key words, and Medical Subject Headings terms, depending on the database. Search terms for hygiene and long-term facilities were combined with search terms for health care settings as follows:

(Hand disinfection OR hand hygiene OR infection control) AND (nursing home\* OR home\* for the aged OR retirement home\* OR care home\* OR long term care).

To exclude articles focusing on dental hygiene, an important issue in nursing homes but irrelevant to our review, we excluded in our query articles with the words oral or dental in the title.

### Inclusion criteria

Eligible studies had to fulfill the following criteria:

1. Present data from nursing homes.
2. Either describe an intervention related to HH or include an assessment of HH practices; this assessment could be a measure of HH compliance through direct observation or a staff

survey, a surveillance of alcoholic handrub consumption, or an audit of HH knowledge among the staff.

3. Include a measured outcome related to the infectious risk; this outcome could be as simple as hospitalization or death rates, or focused on a specific type of health care—associated infection.

### Exclusion criteria

Results were limited to peer-reviewed original publications in English or in French. Reviews (including Cochrane reviews) and general policy articles were excluded.

### Resources extraction

Data was extracted from the selected articles on study objectives and design, type of HH compliance assessment performed (if any), type of interventions performed (if any), infectious outcomes reported, and findings on the impact of HH on nursing home residents.

## RESULTS

### Study selection

The database search retrieved 790 unique articles, to which we added 8 additional articles identified through other means, such as reference lists. These 798 articles were independently assessed by 2 reviewers (M.N.H. and L.T.) based on the inclusion and exclusion criteria. After the initial round of independent reviews, the 2 reviewers discussed their findings. In case of disagreement regarding the inclusion of a specific study, each reviewer provided the rationale for their conclusion, and a decision was reached based on

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