Effectiveness of Day Care Centre
Infection Control Interventions

Infectious Diseases

March 1999
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To determine the effectiveness of interventions included in the Mandatory Health Programs and Services Guidelines (MHPKG), the following systematic reviews were completed and funded by the Public Health Research, Education and Development (PHRED) Program of the Public Health Branch, Ontario Ministry of Health.

1998 - 1999

- Health Hazard Investigation
- Emergency Response to Acute Environmental Hazards
- Strategies to Enhance Public Awareness of Environmental Risks

- Chronic Diseases and Injuries
  - Chronic Disease Prevention
    - Community interventions to Enhance Fruit and Vegetable Consumption
    - Use of Coalitions in Heart Health, Tobacco Use Reduction and Injury Prevention
    - Community-Based Heart Health Programs
    - School-Based Adolescent Risk Behaviour Prevention Programs

- Family Health
  - Sexual Health
    - Adolescent Pregnancy Prevention Strategies
  - Child Health
    - Professionally Led Parenting Groups
    - Peer/Paraprofessional 1:1 Interventions in Improving Maternal/Child Health
    - Public Health Nurse Home Visiting
    - Curriculum Suicide Prevention Programs for Adolescents

- Infectious Diseases
  - Day Care Centre Infection Control Interventions
  - Adolescent STD Prevention Strategies

1999 – 2000

- Chronic Diseases and Injuries
  - Chronic Disease Prevention
    - Postpartum Smoking Relapse Prevention Strategies
    - Cervical Cancer Screening Interventions
  - Injury Prevention
    - Anticipatory Care Interventions with Community Dwelling Elderly

- Family Health
  - Sexual Health
    - Youth to Youth Peer Health Promotion
  - Child Health
    - Healthy Feeding in Infants Under One Year of Age
    - Injury Prevention in Children & Adolescents

- Infectious Diseases
  - Needle Exchange Programs
  - Online Computer Support Groups for Adults

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The conclusions of the reviews are based on the available evidence. They do not necessarily represent the views of the Public Health Branch, Ontario Ministry of Health. This report may be copied for circulation as appropriate. Please ensure that the PHRED Program, Public Health Branch, Ontario Ministry of Health is acknowledged.
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ACKNOWLEDGEMENTS

We acknowledge the co-ordination support and project assistance of Helen Thomas, Mary Ann O’Brien, Sheila McNair, and Ginny Brunton of the Effective Public Health Practice Project. The invaluable assistance of the librarians Elena Goldbatt, Ruth Elliott and Millie Cayen is recognized. The continuing support and encouragement from Sarah Stone and Dr. Ian Gemmill, Kingston of the Frontenac and Lennox & Addington Public Health Unit was especially appreciated.

A special thank you to the Environmental Awareness Review Group, especially Monica Campbell, review group leader, and David Buckeridge, data analyst, who so kindly allowed us to ‘follow in their footsteps’ in the production of this review.
PREFACE

The Public Health Branch of the Ontario Ministry of Health released new Mandatory Health Programs and Services Guidelines (MHPSG) in December 1997. Although the MHPSG provide guidelines for a wide range of public health practices in Ontario, the strength of evidence for many of the guidelines has not been summarized in a systematic way.

In 1998-1999, the Public Health Branch provided funding for the Effective Public Health Practice Project. The mandate of the project was to complete 15 summary statements based upon systematic reviews of the effectiveness of specific requirements of the MHPSG. Each review was linked to one of the three general standards or three program standards. The reviews summarize the best available research evidence for public health practice in these areas. Research evidence is one piece of information needed to inform decision making in public health. Other factors, such as the local environment, local priorities, and available resources are also important.

The reviews were completed by review groups composed of members of the Ontario Public Health Research, Education and Development (PHRED) Program Health Units as well as representatives from other Health Units around the province. The PHRED Provincial Steering Committee has overseen the project.

Potential review topics were initially identified through a survey of public health practitioners and managers across Ontario. Each review group followed a systematic approach that included comprehensive search strategies and quality assessment of each primary research study selected for inclusion in the review.

One of the primary objectives in completing this work was to ensure that it is relevant to public health practitioners in the field. We contacted all Medical Officers of Health and asked for volunteer experts. The response was tremendous and more than 100 practitioners and managers from over 90% of health units across Ontario agreed to take on the role of peer reviewers for the draft reports.

This project already has had many benefits. Public Health professionals have developed skills in completing systematic reviews and have increased awareness of the importance and feasibility of evidence-based practice. Through this project, we have established new links with the Cochrane Collaboration. We hope that several reviews will be registered with the various Cochrane Review Groups, making them accessible to the international public health community. Finally, the process of completing this project has contributed to the development of a strong province-wide network of public health professionals.
Effective Infection Control Interventions in Day Care Centres

Public Health Mandate
Public Health Units in Ontario are responsible for reducing morbidity and mortality associated with infectious diseases transmitted within day care centres under the Infection Control Program Standard.

Background
Children attending day care centres have been shown to be at greater risk to acquire infections than children cared for in the family home environment.

Issue
Public health staff must ensure that day care staff are aware of effective day care centre infection prevention and control practices to reduce infectious diseases and their transmission within day care centre populations.

Finding the Answers
Systematic search of ten electronic databases, reference lists and key informants. Thirteen relevant studies were located; of these three were found to have sufficient quality to provide evidence.

What’s the Evidence?
The following interventions were found to be successful in improving infection control within day care centres:

• Educational sessions with frequent reinforcement of practices (i.e., three sessions in three weeks), enhanced short-term infection control knowledge and behaviour of hand-washing among day care centre staff.

• Immunization status monitoring and follow-up by public health nurses increased the rate of adequate protection according to the Ontario Ministry of Health Recommended Immunization Schedule in preschoolers attending child care centres.

• Exclusion and treatment policies were effective in controlling Giardia infections in children attending day care centres; however, a strict exclusion and treatment policy was found to be
Implications for Practice and Research

Practice:

• That public health staff provide in-service educational sessions with frequent reinforcement of practices to improve the knowledge base and routine practices of day care centre staff in the prevention and control of infectious diseases.

• That public health departments make use of public health nurses to increase the number of correctly immunized children attending day care centres by immunization record monitoring and providing follow-up for missing immunization information for preschoolers.

• That public health staff evaluate policies (including exclusion and treatment) concerning infectious diseases to ensure effectiveness and to determine whether such strict policies are required.

Research:

• That methodologically rigorous evaluation research be undertaken in Ontario to assess the effectiveness of diverse health promotion and protection interventions for enhancing infection control interventions in day care centres.

• That the scope of evaluation research be expanded to include a larger variety of day care centre infection control interventions.

More Sources of Information


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Effective Infection Control Interventions In Day Care Centres

Issue
Public health staff must ensure that day care staff are aware of effective day care centre infection prevention and control practices to reduce infectious diseases and their transmission within day care centre populations.

Background
Infection rates in children attending day care centres have been shown to be higher than those found in children cared for in the family home.

Public Health Mandate
Public Health Units in Ontario are responsible for reducing illness and death associated with infectious diseases transmitted within day care centres under the Infection Control Program Standard.

What’s the Evidence?
The following interventions were found to be successful in improving infection control within day care centres:

- Educational sessions with frequent reinforcement of practices (three sessions in three weeks) enhanced short-term infection control knowledge and practice of handwashing among day care centre staff.
- Immunization status monitoring and follow-up by public health nurses increased the rate of adequate protection according to the Ontario Ministry of Health Recommended Immunization Schedule in preschoolers attending child care centres.
- Exclusion and treatment policies were found to be effective in controlling Giardia infection in children attending day care centres. However, a strict exclusion and treatment policy was no more effective in preventing Giardia infections in children attending day care centre than two other less stringent exclusion and treatment policies.

Implications
- That public health staff utilize the above interventions to enhance infection control practices and policies in day care centres.
• That evaluation research be performed on current public health day care centre health promotion and protection interventions to determine the effectiveness of enhancing infection prevention control practices.

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ABSTRACT

Objectives
Children attending day care centres have been shown to be at greater risk to acquire infections than children cared for in the family home environment. The challenge to health unit staff is to ensure that the day care centre providers are aware of infection prevention and control practices and that the appropriate measures are taken to protect themselves and the children attending the day care centres.

The purpose of this study was to summarize evidence on the effectiveness of infection control interventions in day care centres.

Methods
A comprehensive literature search was performed. Retrieved articles were relevance tested, and those that passed were then assessed for quality and the data extracted and synthesized.

Results
Of the 13 relevant articles captured, three were rated ‘moderate’ and included in this review. The remaining ten articles rated as ‘weak’, and were excluded. The three interventions identified and found to be effective included: 1) educational sessions with frequent reinforcement of practices, 2) immunization status monitoring and follow-up by public health nurses, and 3) exclusion and treatment policies for controlling Giardia infections. In the third intervention, a strict exclusion and treatment policy, was found to be no more effective in preventing Giardia infections than two other less stringent exclusion and treatment policies.

Conclusions
Evidence was found that some public health infection prevention and control practice interventions are effective in day care centre settings.
BACKGROUND

Introduction
Children attending day care centres have been shown to be at greater risk to acquire infections than children cared for in the family home environment (Black et al., 1988, The Child Day Care Infectious Disease Study Group, 1984). The increased infection rate occurs as a result of exposure to infectious agents transmitted within the day care setting in which large groups of children come into contact, usually for the first time. The challenge to health unit staff is to ensure that the day care centre providers are aware of infection prevention and control practices, and that the appropriate measures are taken to protect themselves and the children attending the day care centres.

The MHPSG (Ontario Ministry of Health, 1997) contain the program standard, ‘Infection Control,’ with the objective to reduce morbidity and mortality associated with infectious diseases in day care centres. Specific program requirements include the following:

The Board of Health shall ensure that infection control programs are in place in day nurseries. Activities shall include as a minimum:

1. consultation on the development of infection control policies and procedures such as hand washing, daily observation of children, immunization, health evaluation of children and staff, and communication with parents;
2. inspection of premises at least twice a year to include diaper routines, general housekeeping practices, and to ensure existence of safe drinking water, safe food and sanitary facilities;
3. ensuring the creation of written policy on the management of infectious communicable diseases, exclusion of sick children and the reporting of designated diseases to the medical officer of health as required under the provisions of the Health Protection and Promotion Act; and,
4. provision of annual in-service education in basic infection control for all staff providing direct care, consistent with generally-accepted infection control standards.

Review Question and Objectives
The review question was specified to be: “What is the effectiveness of infection control interventions in preventing infections in day care centre populations?”

The purpose of this review was to identify and examine the effectiveness of interventions available to public health staff that could be used to prevent or reduce infections transmitted within day care centre settings. A broad systematic review was undertaken that attempted to encompass the extensive and diverse scope of public health interventions and infection control topic areas applicable to this program standard for day care centres. It was felt that the literature base for this topic would be quite small and consequently, a broad focus should be utilized for the project.

Given the quantity of literature available including systematic reviews on general infection prevention and control practice interventions (i.e., food safety in other settings),
it was decided by the Literature Review Committee to limit this review to those interventions specifically evaluated in day care centre settings because of its unique environment. The identified interventions examined a variety of health protection and promotion strategies such as counselling, educational sessions, and policy development.

The infectious disease risks of interest included any illness caused by any infectious agent that could be transmitted within a day care centre environment. Infectious respiratory and/or gastrointestinal diseases are the most commonly found infectious diseases within day care centre populations. Causal agents include a wide variety of pathogens for infectious diarrhea: Giardia lamblia, Campylobacter species, Cryptosporidium species, Shigella species, Salmonella species, Escherichia coli, rotavirus; for infectious respiratory illness: adenoviruses, enterovirus, respiratory syncytial virus, parainfluenza virus, and, for general infectious diseases: hepatitis A virus, cytomegalovirus, and Hemophilus influenza.

This study assessed the effectiveness of diverse interventions in relation to outcomes of interest such as, shifts in knowledge and practices by day care centre staff and/or children that would result in the reduction of infectious diseases within the day care centre populations. Examples of shifts in practices (i.e., behaviours) include the use of proper hand-washing methods and diapering techniques.

METHODS

Literature Review Committee
The overall direction for this review was provided by the Literature Review Committee, consisting of public health practitioners with substantial infection prevention and control practices expertise and methods experts who assessed the quality of the relevant studies. Appendix 1 lists the members of this committee. Specific tasks undertaken by this committee were as follows:

- Definition of the research question to ensure that the resulting systematic review was useful to public health practitioners.
- Identification of key search terms.
- Assistance with identification of key informants and unpublished studies.
- Performance of the quality assessment and data extraction phase.
- Review of the draft documentation.
- Creation of appropriate recommendations for research and practice.

Criteria for Study Selection
Studies received after January 25, 1999, with the exception of the two theses, were not subjected to relevance or quality assessment, and therefore were not available for inclusion in this review. Given that databases were searched in September and October 1998, new publications listed after this time period are not captured by this review.

The Literature Review Committee specified the selection criteria shown in Table 1. All study designs were included, not just random controlled trials (RCTs) or controlled trials,
as it was felt that study designs less rigorous than RCTs could provide good quality information if attempts to account for bias and control of confounding factors were made.

**Search Strategy**
The search strategy involved a comprehensive computer search of internationally published studies, as well as a systematic review of Canadian unpublished studies.

**Published Studies**
The computer-based search strategy for published studies was planned independently by two librarians incorporating the key search terms provided by the Literature Review Committee, then through discussion, the final search strategy was developed. The search terms utilized for the search are listed in Appendix 2 as part of the relevance tool. The following databases were searched: Cinahl; Embase, ERIC, Healthstar, Medline, Psychinfo, SocialScience Abstracts, Cochrane Library, and the Public Health Effectiveness database of the Hamilton-Wentworth Health Unit.

The search included primary and review studies; accepted publications in all languages; and went back to the inception of the computerized search database. The search identified approximately 67 potentially relevant abstracts that were then subjected to relevancy testing.

The following abstracts of key importance to public health practice were also hand searched back five years: American Journal of Public Health; American Journal of Epidemiology; American Journal of Health Promotion; Canadian Journal of Public Health; Health Education and Behaviour; Health Promotion International.

**Unpublished Studies**
Unpublished studies were retrieved using three strategies:
- direct request of key staff in all Ontario Health Units and all provincial and territorial Ministry of Health agencies,
- search of student theses through the Dissertation Abstracts database,
- key informants.

**Review Procedures**

**Screening Process**
The retrieved abstracts were screened for appropriateness by one of the reviewers (resulting in the retrieval of any article that involved infection prevention and control practice interventions in day care centres). The investigator also screened the reference lists of all articles reviewed for retrieval of potentially relevant articles.

**Quality Assessment**
A generic quality assessment tool was designed and leaders of the review groups provided input on validity of the tool. The tool was pilot-tested on several primary studies by multiple reviewers and was found to result in consistent (reliable) assessments of the methodological quality of the studies tested. For the day care centre infection control project, the quality assessment and data extraction components were combined into a single tool (see Appendix 3).
The internal validity of each study was based on how well it scored on each of six component ratings. The criteria used to develop the component ratings were: selection bias (were the selected individuals representative of the target population?), study design (RCTs and CCTs were rated as ‘strong’; cohort, case-control and time series were rated as ‘moderate’), control of confounders, blinding of outcome assessors/study participants, reliable and valid data collection methods, and withdrawals (numbers of participants who dropped out before study completion). Appendix 3 provides the rating algorithm for classifying each study as ‘weak’, ‘moderate’ or ‘strong.’ Overall, a study was rated as ‘strong’ if it had four ‘strong’ and no ‘weak’ component ratings; ‘moderate’ if it had less than four ‘strong’ component ratings and one ‘weak’ rating, and ‘weak’ if it had two or more ‘weak’ component ratings.

All of the studies undergoing quality assessment were appraised by one of the investigators to provide consistency in the interpretation and applicability of the tool. Most of the studies (11/13) were also divided amongst two other reviewers for independent appraisal. All studies, with the exception of the two retrieved theses, were independently assessed for methodological quality by two reviewers. When the reviewers disagreed on the study quality, consensus was reached on any rating in question. Due to time considerations, theses were not independently assessed by two reviewers, but by only the main reviewer.

One limitation of the quality assessment phase was score results for components with insufficient information provided by the study (e.g., blinding information for outcome assessor or study participants or control of confounders). Given more time to conduct this review, it would have been appropriate to pursue these questions further by seeking clarification from the study author. However, the time frame available for completion of this review did not allow for the possibility of this option.

Almost all the day care centre studies presented an additional problem in applying the quality assessment tool. For the most part, while the interventions were targeted to one population (day care centre staff), intervention outcomes were measured in another population (children attending the centres). In many of these studies, data provided on selected staff was limited, if provided at all, whereas the children attending the centres were described in great detail. As a result, quality assessment was determined for both of the populations, target and outcome. If the quality assessment global rating for the target population was found to be weak, then the entire study was also rated as weak.

**Data Extraction**

A data extraction tool was developed to ensure consistency among the reviewers in extracting the data. The data extraction tool was combined with the quality assessment tool on a single form (see Appendix 3). Two reviewers independently assessed all relevant studies (except theses as previously described) to extract the data. Consensus was reached on all data extraction components and this information was recorded in Microsoft Access data management software for easy retrieval and further analyses.
RESULTS

Search and Screening Process Results
The search for published and unpublished studies captured a large number of potentially relevant articles. Many abstracts were duplicates since they appeared in more than one database. After the initial screen of the abstracts to capture any article that involved both day care centres and infection control, a total of 67 articles were selected for retrieval. Of the retrieved articles, 13 were relevant and were sent for quality assessment by the team. Appendix 4 lists the potentially relevant articles that were not retrieved in time to be included in this review.

Quality Assessment Phase Results
Application of the quality assessment tool resulted in a ‘moderate assessment’ for three of the 13 relevant studies. Appendix 5 lists the component ratings of all 13 articles assessed for methodological quality. By examining the component ratings (Appendix 5) in conjunction with the rating algorithm (Appendix 3), the methodological strengths and weakness in each study become apparent. The most common methodological weaknesses were found in the confounders and withdrawals components.

Data Extraction Phase Results

Characteristics of Relevant Studies
Data was extracted from all 13 relevant articles, irrespective of methodological quality. Table 2 summarizes the characteristics of the relevant studies. As seen in Table 2, evaluation research on this topic area is relatively recent, with 11 studies conducted in the 1990s and two prior to 1990.

The most common design used to evaluate the day care centre infection control interventions was controlled clinical trials: RCTs (eight studies) and CCTs (one study). In addition, there were one uncontrolled cohort study, two time series, and one study of an undetermined design.

Ten of the 13 studies evaluated infection control interventions concerning hand-washing and general infection control education. The remaining studies evaluated other infection control interventions, mostly involving policies including immune status surveillance (one), infectious diseases surveillance (one) and exclusion/treatment policy (one). Table 2 indicates that education interventions were the most common type of infection control intervention evaluated.

To help clarify the effectiveness of the day care centre infection control interventions, this review clustered the interventions into the following categories:
Educational session - involves lectures, workshops and educational sessions delivered to groups of people, and may include the use of audiovisual aids or educational materials for home use

Counselling - involves interventions that are directed and implemented at individuals, including the provision of educational materials for home use

Mass campaign - involves extensive public education interventions directed at the general population or several targeted sub-populations, and uses a variety of communication strategies to reach target audience, such as, mass media, mass mailings, series of community events or educational sessions.

Other - interventions not classified by the above definitions

Interventions of Excluded (‘Weak’) Studies
The majority of the relevant studies (10/13) were assessed to be of weak methodological quality. Appendix 6 lists these studies including brief descriptions of the interventions evaluated. It must be emphasized that designating these studies as ‘weak’ does not mean that the intervention evaluated is ineffective, but rather that the evaluation methodology was weak. There is an absence of valid evidence as to the effectiveness of the intervention.

Interventions and Outcomes of Included (‘Strong’ or ‘Moderate’) Studies
From the results of the quality assessment phase, three studies were designated to be of moderate methodological quality, and none were of strong quality. A description of the interventions and outcomes for these three studies is provided in Table 3.

Two studies provide good evidence to support the effectiveness of the interventions evaluated. The third study, Bartlett et al. (1991), provides evidence that the less stringent treatment and exclusion policies for control of Giardia in day care centres are as effective as the stricter policy, and that all three treatment and exclusion policies were effective in reducing the prevalence of Giardia.

An educational session was an effective method of enhancing infection prevention knowledge and behaviour amongst day care centre staff for a short follow-up period of time (Benfield, 1991). The intervention consisted of a 20-minute slide/tape presentation followed by an instructional period in correct hand-washing technique including a five-ten minute discussion period, hand-washing technique demonstration by the researcher and practice sessions. A fifteen minute demonstration of hand-washing was reinforced at intervals of one and two weeks.

Nurse follow-up was found to be an effective intervention to increase the number of correctly immunized preschoolers attending child care centres (O’Mara & Isaacs, 1993). Record monitoring, to identify missing immunization information and calls to advise the day care centre administration and parents for correction, was found to be effective in
increasing in number of correctly immunized children as determined by the reports of parents.

DISCUSSION

This systematic review was undertaken to provide evidence on the effectiveness of public health infection control interventions in day care centres. The review revealed that literature available in this area is very limited. Given the short time frame available to conduct this review, unpublished studies were likely to have been missed in the search process. Of only 13 studies selected as relevant for this review, three studies were rated as ‘moderate’ methodological quality, and were included in the review. The remaining studies were rated as ‘weak’ and were therefore excluded.

A wealth of descriptive information exists on the presence of infectious agents within day care centre populations and many authors provide suggestions for infection prevention and control practices within this group. However, this search found little evidence-based literature to support the suggested infection control interventions for day care centre populations. Therefore, the review can only provide very limited evidence based on three interventions for infection control in day care centre settings and does not directly address many of the specific requirements of the MHPSG for day care centres, such as, frequency of inspection of premises, provision of annual in-service education, etc. It also should be noted that no evidence was found to suggest that the program requirements were not effective.

The interventions evaluated in the three studies were quite diverse, addressing such a variety of topics as immunization records policies, exclusion and treatment of sick children attending day care centres, and in-service education in basic infection control (Table 3). The effectiveness of the day care centre infection control interventions was positive in all three studies (Barlett et al. 1991, Benfield, 1991, O’Mara & Isaacs, 1993). As well, lack of evidence was found in the third study to support the strict policy to exclude and treat symptomatic and asymptomatic Giardia-infected children over two less stringent policies of a) exclusion and treatment of symptomatic infection only, and b) exclusion and treatment of symptomatic infection, and treatment of asymptomatic infection in the day care setting.

Unfortunately most of the evaluated studies were found to be of weak methodological quality, and were therefore excluded from the review. In many of these studies, the intervention was found to be targeted to one population (the day care centre staff), while the outcomes of the intervention were measured in another population (the children attending the day care centres). The authors described, in great detail, the profile of the children attending the day care centres, using statistical analyses to show fundamental similarities among the intervention and control centres. However the day care centre staff, who were the targets of the interventions, in most cases, were not described, except in passing, as recipients of the interventions.

Most studies also did not determine whether the intervention actually resulted in any change in knowledge or practice by the staff. Instead, an assumption was made that any reduction in infectious diseases among children attending the centres was directly related to the intervention provided to the staff. However, little evidence was provided
showing that the staff changed their practices or that any such changed practice was directly responsible for change in infection rates within the day care centre enrollment. This failure to examine staff practices in relation to disease transmission among the children was commonly found with both the educational session and counselling intervention studies. It is also important to note that when outcomes of these interventions are being measured, assessment of actual infection prevent and control practice behaviours should be included, not just knowledge of these procedures.

This study characteristic made the assessment of the studies for methodological quality quite challenging, resulting in many of the relevant studies receiving a ‘weak’ methodological quality assessment rating. This is not necessarily to say that the interventions per se were ineffective, but rather that the authors failed to provide sufficient information regarding selection of the subjects, assessment and control of confounders, and follow-up rate of withdrawals and drop-outs in the target population. Most of these were assessed to be ‘weak’ in the three categories and by definition of the algorithm, excluded from the review. Many of the interventions shown in Appendix 6 are applicable to public health practice for promoting day care centre infection control and would best be re-evaluated using better research methods.

Despite these limitations, this systematic review does provide some evidence for the effectiveness of day care centre infection prevention and control practice interventions that are applicable to public health practice for protecting the day care centre population from infection risks. Although effectiveness has been demonstrated for a very narrow range of interventions, it is reasonable for health practitioners to consider applying these interventions, and particularly to apply them in the context of the MHPSG.

**CONCLUSIONS**

The following conclusions are noted:

Evaluation research on the effectiveness of infection control interventions is a relatively recent activity, with 85 percent (11/13) of relevant evaluation studies conducted from 1990 onwards.

The majority of evaluation studies 76 percent (10/13) focused on interventions consisting of educational sessions or counselling on infection prevention and control practices (e.g., hand-washing). Evaluation research on the effectiveness of day care centre inspection frequency, exclusion policies for sick children, disease surveillance, and immunization status of children attending day care centres is remarkably scarce.

The majority 76 percent (10/13) of relevant evaluation studies were of poor (‘weak’) methodological quality and therefore, not useful in evidence-based public health practice.
The following conclusions apply to the three ‘moderate’ studies included in this review:

- There is evidence that educational sessions with frequent reinforcement of practices (three sessions in three weeks) are effective in enhancing short term infection control knowledge and behaviour among day care centre staff.

- There is evidence that immunization status monitoring and follow-up by public health nurses is effective in enhancing correct immunization rates in preschoolers attending child care centres.

- There is evidence that three exclusion and treatment policies for controlling Giardia infections in children attending day care centres are effective. Also that a strict exclusion and treatment policy is no more effective in preventing Giardia infections in children attending day care centre than two other less stringent exclusion and treatment policies.

Based on the information compiled through this literature review, the following recommendations are provided:

**Implications for Research**

- That methodologically rigorous evaluation research including assessing actual behaviour change rather than knowledge only and long-term follow-up, be undertaken in Ontario to assess the effectiveness of health promotion and protection strategies in enhancing public health interventions relating to infection prevention and control practices in day care centres.

- That the scope of evaluation research be expanded to include a larger variety of day care centre infection prevention and control practice interventions such as inspection of premises twice a year to access diaper routines.

- Health unit staff undertaking program design and/or evaluation should consult with experts in the field of study design and evaluation in the early stages of program design to ensure methodological rigour. A supplement to the ‘Evaluation Tool Kit’ (Porteous et al., 1997) could be prepared to inform evaluation teams about the requirements for quality assessment. Evaluators of the public health interventions should be educated about what factors contribute to a quality assessment of a study in the expectation that future evaluations would be better designed.

**Implications for Practice**

- That public health staff provide in-service educational sessions with frequent reinforcement of practices to improve the knowledge base and routine practices of day care centre staff in the prevention and control of infectious diseases.

- That public health departments make use of public health nurses to increase the number of correctly immunized children attending day care centres by immunization record monitoring and providing follow-up for missing immunization information for preschoolers.
- That public health staff evaluate policies concerning infectious diseases (including exclusion and treatment) to ensure effectiveness.

Because the existing research falls short of the scientific rigour required for acceptance within the academic community, it fails to provide the irrefutable evidence necessary to justify/validate current standards set out in the MHPSG. In no way does this call such programs/standards into question, but rather points to the need for further careful studies of these time-honoured, pragmatically endorsed practices. The dearth of both quantity and quality in the existing pool of studies reveals evidence of an open field for further work to be done. Certainly the 13 relevant studies provide a well defined foundation on which future scientific study can be built.
TABLES

Table 1: Selection Criteria for Study Inclusion/Exclusion
Table 2: Characteristics of Relevant Studies
Table 3: Summary of Intervention and Outcomes for ‘Moderate’ Studies
**Table 1: Selection Criteria for Study Inclusion/Exclusion**

<table>
<thead>
<tr>
<th><strong>Criterion</strong></th>
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<tr>
<td>Type of Study</td>
<td>All study types were eligible, ranging from RCTs to cross-sectional designs. Qualitative and quantitative studies were included. Only primary studies were eligible. Review studies were retrieved and examined for primary studies included within them.</td>
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<tr>
<td>Study Scope</td>
<td>Studies were eligible only if they involved day care centre infection control interventions such as the ones listed in Appendix 2.</td>
</tr>
<tr>
<td>Participants</td>
<td>Studies were eligible if the ultimate target of the study was either day care centre staff or children attending day care centres.</td>
</tr>
<tr>
<td>Interventions</td>
<td>Studies were eligible if the interventions examined fell within the scope of public health practice in Canada, (i.e., those interventions that public health staff should be able to implement, facilitate or promote). Appendix 2 lists the types of interventions that were eligible.</td>
</tr>
<tr>
<td>Outcome measures</td>
<td>Studies were eligible if they assessed the effectiveness of a relevant intervention. Typically, outcomes of interest included shifts in knowledge, attitudes and practices (behaviours) by the target population. Studies that evaluated only process (rather than outcome) measures were not eligible.</td>
</tr>
</tbody>
</table>
Table 2: Characteristics of Relevant Studies

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number of Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Publication date:</strong></td>
<td></td>
</tr>
<tr>
<td>1996-1998</td>
<td>4</td>
</tr>
<tr>
<td>1990-1995</td>
<td>7</td>
</tr>
<tr>
<td>1980-1989</td>
<td>2</td>
</tr>
<tr>
<td><strong>Study design:</strong></td>
<td></td>
</tr>
<tr>
<td>RCT</td>
<td>8</td>
</tr>
<tr>
<td>CCT</td>
<td>1</td>
</tr>
<tr>
<td>Time Series</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
</tr>
<tr>
<td><strong>Infectious Disease Outcome:</strong></td>
<td></td>
</tr>
<tr>
<td>Diarrhea</td>
<td>2</td>
</tr>
<tr>
<td>Respiratory illness</td>
<td>3</td>
</tr>
<tr>
<td>Both diarrhea &amp; respiratory illness</td>
<td>3</td>
</tr>
<tr>
<td>Giardia</td>
<td>1</td>
</tr>
<tr>
<td>Shigellosis</td>
<td>1</td>
</tr>
<tr>
<td>General infections</td>
<td>1</td>
</tr>
<tr>
<td>Immunization status</td>
<td></td>
</tr>
<tr>
<td>(No infectious disease)</td>
<td>1</td>
</tr>
<tr>
<td><strong>Intervention type:</strong></td>
<td></td>
</tr>
<tr>
<td>Educational session</td>
<td>8</td>
</tr>
<tr>
<td>Counselling</td>
<td>1</td>
</tr>
<tr>
<td>Mass media</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>(policy implementation)</td>
<td>3</td>
</tr>
</tbody>
</table>
**Table 3: Summary of Interventions and Outcomes for ‘Moderate’ Studies**

<table>
<thead>
<tr>
<th>Study (Country)</th>
<th>Design (Quality Assessment)</th>
<th>Intervention</th>
<th>Outcomes</th>
<th>Results/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bartlett et al. (1991) United States</td>
<td>RCT (Moderate)</td>
<td>Intervention type: Other – policy</td>
<td>No significant differences were found in Giardia prevalence across the three groups.</td>
<td>Provides evidence that the intervention of intensive policy for excluding and treating all symptomatic and asymptomatic Giardia-infected children was not more effective than other less rigorous policies.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infection: Giardia lamblia</td>
<td>• Provides evidence that the intervention of intensive policy for excluding and treating all symptomatic and asymptomatic Giardia-infected children was not more effective than other less rigorous policies.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Target: Day care centre (DCC) directors (adults)</td>
<td>• There were concerns regarding the post-treatment testing in groups where such testing was not required prior to re-admission. The outcome may have not been measured in all children.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intervenor: Can’t tell</td>
<td>• Provides evidence that the intervention of intensive policy for excluding and treating all symptomatic and asymptomatic Giardia-infected children was not more effective than other less rigorous policies.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Setting: DCCs (n=31 dcs)</td>
<td>• There were concerns regarding the post-treatment testing in groups where such testing was not required prior to re-admission. The outcome may have not been measured in all children.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intervention consisted of the following:</td>
<td>• Provides evidence that the intervention of intensive policy for excluding and treating all symptomatic and asymptomatic Giardia-infected children was not more effective than other less rigorous policies.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• standard intervention of exclusion and treatment of symptomatic and asymptomatic Giardia-infected children,</td>
<td>• There were concerns regarding the post-treatment testing in groups where such testing was not required prior to re-admission. The outcome may have not been measured in all children.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• exclusion and treatment of symptomatic infection only or</td>
<td>• There were concerns regarding the post-treatment testing in groups where such testing was not required prior to re-admission. The outcome may have not been measured in all children.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• exclusion and treatment of symptomatic infection, and treatment of asymptomatic infection in the centre.</td>
<td>• There were concerns regarding the post-treatment testing in groups where such testing was not required prior to re-admission. The outcome may have not been measured in all children.</td>
<td></td>
</tr>
<tr>
<td>Study (Country)</td>
<td>Design (Quality Assessment)</td>
<td>Intervention</td>
<td>Outcomes</td>
<td>Results/Comments</td>
</tr>
<tr>
<td>----------------</td>
<td>-----------------------------</td>
<td>--------------</td>
<td>----------</td>
<td>------------------</td>
</tr>
</tbody>
</table>
| Benfield (1991) United States | RCT (Moderate) | Intervention: Educational session  
Infection: Infection control  
Target: Day care centre (DCC) staff (adults)  
Intervenor: Researcher  
Setting: DCCs (6 dccs/71 staff) | • Significant differences were found in infection prevention behaviours (p< .0001), as well as, infection prevention knowledge (p=.001) between the control and intervention groups posttest. A significant difference was also found between the intervention group's pre and post-intervention scores for infection control knowledge (p=.001) and infection control behaviour (p<.001). | • Provides evidence of the effectiveness of educational sessions in increasing infection prevention knowledge and behaviour up to three weeks in DCC staff.  
Study limitations:  
• Incidence of infections in DCC staff and children not assessed.  
• Short follow-up period (about three weeks) which precludes assessment of long-term maintenance of knowledge and behaviour. |
| O'Mara & Isaacs (1993) Canada | Cohort (pre/post) (moderate) | Intervention type: Other  
Infection: Immunization status  
Target: Parents of day care centre (DCC) children (adults)  
Intervenor: Public health nurses  
Setting: DCC & home (n=14 DCC/382 records) | • Significant increase for immunization rates between the first and second reviews (p<.001 for all immunizations)  
• Primary vaccine  
• Booster series  
• MMR  
• HIB  
• No significant differences were found between immunization rates for the two intervention intensities. | • Provides evidence that follow-up by nurses increased the reported rate of correctly immunized preschoolers in child care centres  
• There are concerns about the generalizability given the fact that the centres used were not representative of all centres according to the age distribution of the children. |
REFERENCES


APPENDICES

Appendix 1: Literature Review Committee
Appendix 2: Relevance Tool and Key Words for Search
Appendix 3: Combined Validity and Data Extraction Tool
Appendix 4: Potentially Relevant Studies Not Retrieved
Appendix 5: Component Ratings of All Studies Assessed for Methodological Quality
Appendix 6: Day Care Centre Infection Control Interventions Assessed in ‘Weak’ Evaluation Studies
Appendix 1: Literature Review Committee

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Committee Chair

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Appendix 2: Relevance Tool and Key Words for Search

RELEVANCE TOOL:

Effectiveness of Public Health Interventions on Infection Control in Day Nurseries

Ref. ID: _______________
Reviewer: 

Relevance Criteria:

1) The study involves an intervention applicable to public health practice in Canada, consistent with Ontario’s Mandatory Health Programs and Services Guidelines
   Y   N

2) The intervention described could be implemented, facilitated or promoted by staff in local public health units.
   Y   N

3) The study intervention is directed at infants & children attending day care centres or day care centre staff (workers & management)
   Y   N

4) The study includes but is not limited to one or more of the intervention types listed in Table 1.
   Y   N

5) The study examines one or more of the infectious disease risks to human health listed in Table 1.
   Y   N

6) The study assesses the effectiveness of the intervention in relation to the outcomes of interest, such as shifts in knowledge, attitudes and practices.
   Y   N

7) Study contains outcome evaluation.
   Y   N

Reviewer Decision:

Include in critical appraisal (only if answer “yes” to all 7 relevance criteria)
   Y   N

If Discrepancy in Inclusion Decision: Reason for discrepancy:

   Oversight
   Y   N

   Difference in interpretation of criteria
   Y   N

   Differences in interpretation of study
   Y   N

Additional Comments:

FINAL DECISION: INCLUDE IN STUDY
   Y   N

If YES, search bibliography to identify other possible relevant articles to retrieve.
### Table 1  List of Applicable Interventions and Infections

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Communicable Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultation on infection control policies &amp; procedures</td>
<td>Bacterial diseases</td>
</tr>
<tr>
<td>Inspection of premises</td>
<td>Viral diseases</td>
</tr>
<tr>
<td>Creation of written policy for management of infectious communicable diseases, exclusion of sick children and reporting of designated disease to medical officer of health</td>
<td>Parasitic diseases</td>
</tr>
<tr>
<td>Provision of annual in-service education in basic infection control</td>
<td></td>
</tr>
</tbody>
</table>
### Key Words Used in Computer Search (also used in Relevance Testing)

<table>
<thead>
<tr>
<th>EFFECTIVENESS</th>
<th>INTERVENTIONS</th>
<th>INFECTIONS</th>
<th>POPULATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation</td>
<td>Standards</td>
<td>Prevention &amp; control</td>
<td>Child day care centers</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>Health Education</td>
<td>Cross infection</td>
<td>Child</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Health Policy</td>
<td>Infection control</td>
<td>Child, preschool</td>
</tr>
<tr>
<td>Outcome assessment</td>
<td>Health Promotion</td>
<td>Communicable disease control</td>
<td>Child, nurseries</td>
</tr>
<tr>
<td>Program evaluation</td>
<td>Guidelines</td>
<td>Disease Outbreaks</td>
<td>Day nurseries</td>
</tr>
<tr>
<td>Evaluation studies</td>
<td>Curriculum</td>
<td>Bacterial diseases</td>
<td>Infant nurseries</td>
</tr>
<tr>
<td></td>
<td>Inservice training</td>
<td>Viral diseases</td>
<td>Human</td>
</tr>
<tr>
<td></td>
<td>Parent education</td>
<td>Parasite diseases</td>
<td>Child care/Childcare</td>
</tr>
<tr>
<td></td>
<td>Inspection frequency</td>
<td>Gastroenteritis</td>
<td>Infant</td>
</tr>
<tr>
<td></td>
<td>Disinfection</td>
<td>Respiratory tract infections</td>
<td>Infant care</td>
</tr>
<tr>
<td></td>
<td>Hand washing</td>
<td>Rhinitis</td>
<td>Day care/Daycare</td>
</tr>
<tr>
<td></td>
<td>Hygiene</td>
<td>Diarrhea</td>
<td>Day care centre staff</td>
</tr>
<tr>
<td></td>
<td>Immunization schedule</td>
<td>Feces</td>
<td>Child day care providers</td>
</tr>
<tr>
<td></td>
<td>Immunization programs</td>
<td>Vomiting</td>
<td>Day care providers</td>
</tr>
<tr>
<td></td>
<td>Vaccination programs</td>
<td>Food poisoning</td>
<td>Day care workers</td>
</tr>
<tr>
<td></td>
<td>Health evaluation</td>
<td>Foodborne diseases</td>
<td>Toddler</td>
</tr>
<tr>
<td></td>
<td>Infection control policy</td>
<td>Gastrointestinal diseases</td>
<td>Home day care</td>
</tr>
<tr>
<td></td>
<td>Diapering routines</td>
<td>Bacterial infections</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Housekeeping practices</td>
<td>Viruses</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infectious communicable diseases management</td>
<td>Virus Diseases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sick child exclusion policy</td>
<td>Otitis media</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Food safety procedure inspection</td>
<td>Food contamination</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infection control education</td>
<td>Skin diseases, infectious</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Food handler</td>
<td>Respiratory diseases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infectious disease surveillance</td>
<td>Skin diseases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Day care food program</td>
<td>Intestinal diseases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Health Planning Guidelines</td>
<td>Vaccine preventable diseases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regulation</td>
<td>Bloodborne diseases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sanitation</td>
<td>diseases/infections</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Transmission of diseases in day care</td>
<td>Reportable diseases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regulatory enforcement</td>
<td>Communicable diseases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Investigations</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cohort staffing/children</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exclusion</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Search ran without Effectiveness key words due to limitation of literature base size.
Appendix 3: Combined Validity and Data Extraction Tool

Effectiveness of Day Care Centre Infection Control Interventions - Systematic Review

Ref ID: ___________  Reviewer: ____________________________

Study Context

1. Is there a potential conflict of interest between the study and the source of funding (i.e. does the funding group have a vested interest in the outcome of the study)?
   ☐ Yes
   ☐ No
   ☐ Can’t tell

2. Infection Control (General Category)
   ☐ Infection control policies & procedures
   ☐ Inspection of premises
   ☐ Written policy for management of infectious diseases, exclusion of sick children & reporting of designated disease to medical officer of health
   ☐ In-service education in basic infection control
   ☐ Other (specify) _________________
   ☐ Can’t tell

3. Communicable disease
   ________________________________
   (Describe the specific disease if not completely described by the general category above)

4. Years data collected  19____  to  19____
   ☐ Can’t tell
Study Design

5. Number of intervention groups

6. Number of control groups

7. Indicate the study design (VBQ1)
   - Randomized controlled trial
   - Controlled clinical trial
   - Cohort analytic (two group pre + post)
   - Case-control
   - Cohort (one group pre + post (before and after))
   - Interrupted time series
   - Other specify __________
   - Can’t tell

*If the study is a Randomized controlled trial answer 8 and 9.*

8. Was the method of randomization described? (VBQ2 - see dictionary)
   - Yes
   - No
   - Can’t tell
   - Not applicable

9. Was the method of randomization appropriate? (VBQ3 - see dictionary)
   - Yes
   - No
   - Can’t tell
   - Not applicable
Participant Recruitment and Retention

10. Number of individuals considered for inclusion in the study

11. Number of individuals who were eligible to participate in the study

12. Number of eligible individuals who were allocated (total and by group)
   - Total
   - Intervention #1
   - Intervention #2
   - Intervention #3
   - Control

13. Number of drop-outs (total and by group)
   - Total
   - Intervention #1
   - Intervention #2
   - Intervention #3
   - Control

14. Are the individuals that participated in the study (i.e. were allocated to an intervention) likely to be representative of the target population? (VAQ1)
   - [ ] Very likely
   - [ ] Somewhat likely
   - [ ] Not likely
   - [ ] Can’t tell
15. What percentage of eligible individuals agreed to participate (i.e. were allocated to an intervention)? (VAQ2)
   □  80 - 100% agreement
   □  60 - 79% agreement
   □  less than 60% agreement
   □  Not applicable
   □  Can’t tell

16. Were withdrawals and drop-outs reported in terms of numbers and reasons per group? (VFQ1)
   □  Yes
   □  No
   □  Can’t tell

17. Indicate the percentage of participants (i.e. those allocated to an intervention) completing the study. (If the percentage differs by groups, record the lowest.) (VFQ2)
   □  80 - 100 %
   □  60 - 79 %
   □  less than 60 %
   □  Can’t tell

18. Sex (Check one box only)  □  Male  □  Female  □  Mixed  □  Can’t tell

19. Age of intervention group ____________________________
   (Specify mean age in years, if given)

20. Ethnicity ____________________________
    (Specify the ethnic group [e.g. African-American] that best describes the majority of participants)

21. Socio-economic status ____________________________
    (Specify the measure [e.g. education] and level [e.g. completed university] that best describes the majority of participants)
### Intervention

22. Intervention (General Category – pick one most representative category):

<table>
<thead>
<tr>
<th>Intervention #1</th>
<th>Intervention #2</th>
<th>Intervention #3</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community development (e.g. reinforce social networks)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Mass campaign (e.g. phone bill insert)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Mass media (e.g. television, radio)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Distribution of printed educational materials (e.g. factsheets, posters)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Educational session (e.g. workshops)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>School curriculum (e.g. educational intervention intended to be part of a curriculum)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Counseling (i.e. one-on-one)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Computer-based learning</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Audio-visual materials (e.g. videos)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

23. Intervention (Describe in greater detail if not completely described by general category above)

<table>
<thead>
<tr>
<th>Intervention #1</th>
<th>Intervention #2</th>
<th>Intervention #3</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
24. Who or what provided the intervention?

<table>
<thead>
<tr>
<th>Professional (state profession)</th>
<th>Intervention #1</th>
<th>Intervention #2</th>
<th>Intervention #3</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research worker (member of study team)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Para professional</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Lay person</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Peer</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Volunteer</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Computer system</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Community groups</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Can’t Tell</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

25. Did the intervention provider receive internal training in how to provide the intervention (including ‘informal’ instruction by the research team)?

<table>
<thead>
<tr>
<th>Intervention #1</th>
<th>Intervention #2</th>
<th>Intervention #3</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>No</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Can’t tell</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

26. Intervention setting

<table>
<thead>
<tr>
<th>Intervention #1</th>
<th>Intervention #2</th>
<th>Intervention #3</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community (specify)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Home</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>School</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Telephone</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Worksite (specify)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Can’t tell</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
27. Intervention target group

<table>
<thead>
<tr>
<th></th>
<th>Intervention #1</th>
<th>Intervention #2</th>
<th>Intervention #3</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
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</tr>
<tr>
<td>Preschool</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Grade school</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Adolescents</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Parents</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Adults</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Seniors</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Family care givers</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Health professionals</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

28. Target group size:

<table>
<thead>
<tr>
<th></th>
<th>Intervention #1</th>
<th>Intervention #2</th>
<th>Intervention #3</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual (e.g. counselling)</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Family</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Group (e.g. school class)</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Community (e.g. mass media)</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can’t Tell</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
</tbody>
</table>

29. Intervention duration (e.g. 50 minutes)

<table>
<thead>
<tr>
<th></th>
<th>Intervention #1</th>
<th>Intervention #2</th>
<th>Intervention #3</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can’t Tell</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
<td>☑</td>
</tr>
</tbody>
</table>
30. Number of interventions given over what time period (e.g. 3 over 1 week)

<table>
<thead>
<tr>
<th>Intervention #1</th>
<th>Intervention #2</th>
<th>Intervention #3</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can’t Tell</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

31. Total time that participants were followed after the intervention (e.g. 2 years)

<table>
<thead>
<tr>
<th>Intervention #1</th>
<th>Intervention #2</th>
<th>Intervention #3</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can’t Tell</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Not Applicable</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

32. What percentage of participants received the allocated intervention or exposure of interest? (VGQ1)

- ☐ 80 -100 %
- ☐ 60 - 79 %
- ☐ less than 60 %
- ☐ Can’t tell

33. Was the consistency of the intervention ensured? (VGQ2)

- ☐ Yes
- ☐ No
- ☐ Can’t tell

34. Is it likely that subjects received an unintended intervention (contamination or co-intervention) that may influence the results? (VGQ3)

- ☐ Yes
- ☐ No
- ☐ Can’t tell
Outcome Assessment

35. Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants? (VDQ1)
   - ☐ Yes
   - ☐ No
   - ☐ Can’t tell

36. Were the study participants aware of the research question? (VDQ2)
   - ☐ Yes
   - ☐ No
   - ☐ Can’t tell

37. Were data collection tools shown to be valid? (VEQ1)
   - ☐ Yes
   - ☐ No
   - ☐ Can’t tell

38. Were data collection tools shown to be reliable? (VEQ2)
   - ☐ Yes
   - ☐ No
   - ☐ Can’t tell

39. Indicate the category of the outcome measure(s)

<table>
<thead>
<tr>
<th>Category</th>
<th>Outcome #1</th>
<th>Outcome #2</th>
<th>Outcome #3</th>
<th>Outcome #4</th>
<th>Outcome #5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Attitudes</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Practices (i.e. physical behaviour)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Environmental Exposure (e.g.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>blood lead level)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can’t Tell</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
40. Describe the specific nature of the outcome measures

<table>
<thead>
<tr>
<th>Specific description of outcome measure</th>
<th>Outcome #1</th>
<th>Outcome #2</th>
<th>Outcome #3</th>
<th>Outcome #4</th>
<th>Outcome #5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can’t Tell</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

41. **Assess Outcomes** using the *Outcome Assessment* form. Attach the completed forms to this form.

**Analysis**

42. Were there important differences between groups prior to the intervention? (VCQ1) (Examples of confounders include: race, sex, marital status / family, age, SES (income or class), education, health status, pre-intervention score on outcome measure.)

- ☐ Yes
- ☐ No
- ☐ Can’t tell
- ☐ Not applicable

43. If there are important differences between groups prior to the intervention, indicate the percentage of relevant confounders that were controlled (either in the design (e.g. stratification, matching) or analysis)? (VCQ2)

- ☐ 80 – 100%
- ☐ 60 – 79%
- ☐ Less than 60%
- ☐ Can’t tell
- ☐ Not applicable
44. Indicate the unit of allocation (circle one) (VHQ1)

☐ Community
☐ Organization/institution
☐ Practice/office
☐ Provider
☐ Client

45. Indicate the unit of analysis (circle one) (VHQ2)

☐ Community
☐ Organization/institution
☐ Practice/office
☐ Provider
☐ Client

46. Are the statistical methods appropriate for the study design? (VHQ2)

☐ Yes
☐ No
☐ Can’t tell

47. Is the analysis performed by intervention allocation status (i.e. intention to treat) rather than the actual intervention received? (VHQ4)

☐ Yes
☐ No
☐ Can’t tell
Outcome Assessment Form

For each outcome measure, complete an Outcome Description. Where indicated, complete a Baseline Outcome Assessment, and Post Intervention Outcome Assessment(s). Use the appropriate Outcome Assessment form for the type of outcome measure (i.e. continuous or dichotomous).

Attach completed forms to the Validity and Data Extraction Tools.

Outcome category (only tick one box)

☐ client goal attainment
☐ client satisfaction/perception
☐ cost or other economic indicators
☐ health care utilization
☐ health risk behaviours
☐ knowledge/attitudes/intentions
☐ mental health
☐ physical health status/development
☐ program process measures
☐ quality of care given by health professional
☐ quality of care given by family member
☐ quality of life
☐ social health indicators
☐ parent/child interaction

Indicate the outcome measure (specify) ________________________________

Was the outcome measure assessed at baseline?

☐ Yes (complete a Baseline Outcome Assessment)
☐ No

Indicate number of post-intervention outcome assessments ___________

(Complete a Post Intervention Outcome Assessment for each one)
### Baseline Outcome Assessment – Continuous Variable

Indicate outcome measure (specify) _________________ (indicate one measure only). 
Indicate length of time (in weeks) prior to intervention (e.g. 12 weeks) ____________

For continuous variables report: N (at data collection point), mean, sd, p-value (intervention group versus control), and 95% confidence interval (CI) about the mean.

<table>
<thead>
<tr>
<th></th>
<th>Control Group</th>
<th>Intervention Group #1</th>
<th>Intervention Group #2</th>
<th>Intervention Group #3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD</td>
<td>SD</td>
<td>SD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>95% CI</td>
<td>95% CI</td>
<td>95% CI</td>
</tr>
<tr>
<td>Are data reported as a difference score from the control group?</td>
<td>☐ Yes ☐ No</td>
<td>☐ Yes ☐ No</td>
<td>☐ Yes ☐ No</td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

Are data reported as a difference score from the control group? 
☐ Yes ☐ No
# Post Intervention Outcome Assessment – Continuous Variable

Indicate outcome measure (specify) _________________ (indicate one measure only)
Indicate length of time (in weeks) after the intervention (e.g. 24 weeks) _________________

## Post intervention Data Period

<table>
<thead>
<tr>
<th>Data Period</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group</td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>95% CI to</td>
</tr>
<tr>
<td>Intervention Group #1</td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>P-Value (From Control)</td>
</tr>
<tr>
<td>Intervention Group #2</td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>P-Value (From Control)</td>
</tr>
<tr>
<td>Intervention Group #3</td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>P-Value (From Control)</td>
</tr>
</tbody>
</table>

Are data reported as a difference score from the control group? □ Yes □ No

---

**Appendix 3: Combined Validity and Data Extraction Tool** 50
Baseline Outcome Assessment – Dichotomous Variable

Indicate outcome measure (specify) _______________ (indicate one measure only)

Indicate length of time (in weeks) prior to intervention (e.g. 12 weeks) _______________

For dichotomous variables report: N achieving ‘success’ (at data collection point), Total N (total at data collection point), % achieving ‘success’ (if reported), the p-value (intervention group versus control), and the 95% confidence interval (CI) around % achieving ‘success’.

<table>
<thead>
<tr>
<th>Control Group</th>
<th>N (success)</th>
<th>Total N</th>
<th>% (success)</th>
<th>95% CI</th>
<th>Are data reported as a difference score from the control group?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intervention Group #1</th>
<th>N (success)</th>
<th>Total N</th>
<th>% (success)</th>
<th>P-Value (From Control)</th>
<th>95% CI</th>
<th>Are data reported as a difference score from the control group?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intervention Group #2</th>
<th>N (success)</th>
<th>Total N</th>
<th>% (success)</th>
<th>P-Value (From Control)</th>
<th>95% CI</th>
<th>Are data reported as a difference score from the control group?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intervention Group #3</th>
<th>N (success)</th>
<th>Total N</th>
<th>% (success)</th>
<th>P-Value (From Control)</th>
<th>95% CI</th>
<th>Are data reported as a difference score from the control group?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>
**Post Intervention Outcome Assessment – Dichotomous Variable**

Indicate outcome measure (specify) _________________ (indicate one measure only)

Indicate length of time (in weeks) after the intervention (e.g. 24 weeks) _________________

Post intervention Data Period 1 2 3 4 (Circle the appropriate number)

<table>
<thead>
<tr>
<th>Control Group</th>
<th>N (success)</th>
<th>Total N</th>
<th>% (success)</th>
<th>95% CI</th>
<th>Are data reported as a difference score from the control group?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intervention Group #1</th>
<th>N (success)</th>
<th>Total N</th>
<th>% (success)</th>
<th>P-Value (From Control)</th>
<th>95% CI</th>
<th>Are data reported as a difference score from the control group?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intervention Group #2</th>
<th>N (success)</th>
<th>Total N</th>
<th>% (success)</th>
<th>P-Value (From Control)</th>
<th>95% CI</th>
<th>Are data reported as a difference score from the control group?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Intervention Group #3</th>
<th>N (success)</th>
<th>Total N</th>
<th>% (success)</th>
<th>P-Value (From Control)</th>
<th>95% CI</th>
<th>Are data reported as a difference score from the control group?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>☐ Yes ☐ No</td>
</tr>
</tbody>
</table>
Effectiveness of Day Care Centre Infection Control Interventions - Systematic Review

Supporting Documentation

Validity Assessment Tool Dictionary

The purpose of this dictionary is to describe items in the tool thereby assisting raters to score study quality. Due to under-reporting or lack of clarity in the primary study, raters will need to make judgements about the extent that bias may be present. When making judgements about each component, raters should form their opinion based upon information contained in the study rather than making inferences about what the authors intended.

STUDY DESIGN (Questions 7, 8 and 9)

In this section, raters assess the likelihood of bias due to the allocation process in an experimental study. For observational studies, raters assess the extent that assessments of exposure and outcome are likely to be independent. Generally, the type of design is a good indicator of the extent of bias. In stronger designs, an equivalent control group is present and the allocation process is such that the investigators are unable to predict the sequence.

Randomized Controlled Trial (RCT)
An experimental design where investigators randomly allocate eligible people to an intervention or control group. A rater should describe a study as an RCT if the randomization sequence allows each study participant to have the same chance of receiving each intervention and the investigators could not predict which intervention was next. See below for more details.

Question 8 - Was the method of randomization described?
Score YES, if the authors describe any method used to generate a random allocation sequence.
Score NO, if the authors do not describe the allocation method or describe methods of allocation such as alternation, case record numbers, dates of birth, day of the week, and any allocation procedure that is entirely transparent before assignment, such as an open list of random numbers of assignments.
If NO is scored, then the study is a controlled clinical trial.

Question 9 - Was the method appropriate?
Score YES, if the randomization sequence allowed each study participant to have the same chance of receiving each intervention and the investigators could not predict which intervention was next. Examples of appropriate approaches include assignment of subjects by a central office unaware of subject characteristics, or sequentially numbered, sealed, opaque envelopes.
Score NO, if the randomization sequence is open to the individuals responsible for recruiting and allocating participants or providing the intervention, since those individuals can influence the allocation process, either knowingly or unknowingly.
If NO is scored, then the study is a controlled clinical trial.

Controlled Clinical Trial (CCT)
An experimental study design where the method of allocating study subjects to intervention or control groups is open to individuals responsible for recruiting subjects or providing the intervention. The method of allocation is transparent before assignment, e.g. an open list of random numbers or allocation by date of birth, etc.

Cohort analytic (two group pre and post)
An observational study design where groups are assembled according to whether or not exposure to the intervention has occurred. Exposure to the intervention is not under the control of the investigators. Study groups might be non-equivalent or not comparable on some feature that affects outcome.
Case control study
A retrospective study design where the investigators gather ‘cases’ of people who already have the outcome of interest and ‘controls’ who do not. Both groups are then questioned or their records examined about whether they received the intervention exposure of interest.

Cohort (one group pre + post (before and after)
The same group is pretested, given an intervention, and tested immediately after the intervention. The intervention group, by means of the pretest, act as their own control group.

Interrupted time series
A time series consists of multiple observations over time. Observations can be on the same units (e.g. individuals over time) or on different but similar units (e.g. student achievement scores for particular grade and school). Interrupted time series analysis requires knowing the specific point in the series when an intervention occurred.

PARTICIPANT RECRUITMENT AND RETENTION (Questions 14, 15, 16 and 17)

Question 14
Participants are more likely to be representative of the target population if they are randomly selected from a comprehensive list of individuals in the target population (score very likely). They may not be representative if they are referred from a source (e.g. clinic) in a systematic manner (score somewhat likely) or self-referred (score not likely).

Question 15
Refers to the % of subjects in the control and intervention groups that agreed to participate in the study before they were assigned to intervention or control groups.

Question 16
Score YES if the authors describe BOTH the numbers and reasons for withdrawals and drop-outs.
Score NO if either the numbers or reasons for withdrawals and drop-outs are not reported.

Question 17
The percentage of participants completing the study refers to the % of subjects remaining in the study at the final data collection period in all groups (i.e. control and intervention groups).

INTERVENTION (Questions 32, 33 and 34)
The number of participants receiving the intended intervention should be noted (consider both frequency and intensity). For example, the authors may have reported that at least 80 percent of the participants received the complete intervention. The authors should describe a method of measuring if the intervention was provided to all participants the same way. As well, the authors should indicate if subjects received an unintended intervention that may have influenced the outcomes. For example, co-intervention occurs when the study group receives an additional intervention (other than that intended). In this case, it is possible that the effect of the intervention may be over-estimated. Contamination refers to situations where the control group accidentally receives the study intervention. This could result in an under-estimation of the impact of the intervention.

OUTCOME ASSESSMENT (Questions 35-38)

Question 35
Assessors should be described as blinded to which participants were in the control and intervention groups. The purpose of blinding the outcome assessors (who might also be the care providers) is to protect against detection bias.
Question 36
Study participants should not be aware of (i.e. blinded to) the research question. The purpose of blinding the participants is to protect against reporting bias.

Questions 36 and 37
Tools for primary outcome measures must be described as reliable and valid. Some sources from which data may be collected are described below:

- **Self reported data** includes data that is collected from participants in the study (e.g. completing a questionnaire, survey, answering questions during an interview, etc.).
- **Assessment/Screening** includes objective data that is retrieved by the researchers. (e.g. observations by investigators).
- **Medical Records / Vital Statistics** refers to the types of formal records used for the extraction of the data.

Reliability and validity can be reported in the study or in a separate study. For example, some standard assessment tools have known reliability and validity.

Analysis (Questions 42-47)

**Questions 42 and 43**
By definition, a confounder is a variable that is associated with the intervention or exposure and causally related to the outcome of interest. Even in a robust study design, groups may not be balanced with respect to important variables prior to the intervention. The authors should indicate if confounders were controlled in the design (by stratification or matching) or in the analysis. If the allocation to intervention and control groups is randomized, the authors must report that the groups were balanced at baseline with respect to confounders (either in the text or a table).

**Questions 47**
An intention-to-treat analysis is one in which all the participants in a trial are analyzed according to the intervention to which they were allocated, whether they received it or not. Intention-to-treat analyses are favoured in assessments of effectiveness as they mirror the noncompliance and treatment changes that are likely to occur when the intervention is used in practice, and because of the risk of attrition bias when participants are excluded from the analysis.
Validity Component Ratings

The following five validity components are used to rate the overall validity of each study. Questions relating to validity are identified in the Combined Validity and Data Extraction Tool by codes ‘VAQ1’ (Validity Component A, Question 1) to ‘VHQ4’. Individual reviewers do not need to rate the components (i.e. determine whether each area is strong, moderate or weak based upon the questions they have answered) as this will be done by a computer algorithm. The validity rating criteria are presented only for the reviewers’ information.

A) SELECTION BIAS

Strong
i. The selected individuals are very likely to be representative of the target population (VAQ1 is 1);
   and
ii. There is greater than 80% participation (VAQ2 is 1).

Moderate
i. The selected individuals are at least somewhat likely to be representative of the target population
   (VAQ1 is 1 or 2); and
ii. There is 60 - 79% participation (VAQ2 is 2).

Weak
i. The selected individuals are not likely to be representative of the target population (VAQ1 is 3); or
   ii. There is less than 60% participation (VAQ2 is 3) or
   iii. Selection is not described (VAQ1 is 4) and the level of participation is not described (VAQ2 is 5).

B) DESIGN - a rating of:

Strong will be assigned to those articles that described RCTs and CCTs.

Moderate will be assigned to those that described a cohort analytic study, a case control study, a cohort
design, or an interrupted time series.

Weak will be assigned to those that used any other method or did not state the method used.

C) CONFOUNDERS - a rating of:

Strong will be assigned to those articles that controlled for at least 80% of relevant confounders (VCQ1
   is 2); or (VCQ2 is 1).

Moderate will be given to those studies that controlled for 60 – 79% of relevant confounders (VCQ1 is
   1) and (VCQ2 is 2).

Weak will be assigned when less than 60% of relevant confounders were controlled (VCQ1 is 1) and
   (VCQ2 is 3) or control of confounders was not described (VCQ1 is 3) and (VCQ2 is 4).

D) BLINDING - a rating of:

Strong
i. The outcome assessor is not aware of the intervention status of participants (VDQ1 is 2); and
ii. The study participants are not aware of the research question (VDQ2 is 2).

Moderate
i. The outcome assessor is not aware of the intervention status of participants (VDQ1 is 2); or
ii. The study participants are not aware of the research question (VDQ2 is 2).

Weak
i. The outcome assessor is aware of the intervention status of participants (VDQ1 is 1); and
ii. The study participants are aware of the research question (VDQ2 is 1); or blinding is not described
   (VDQ1 is 3 and VDQ2 is 3).
E) DATA COLLECTION METHODS - a rating of:

Strong
i. The data collection tools have been shown to be valid (VEQ1 is 1); and
ii. The data collection tools have been shown to be reliable (VEQ2 is 1).

Moderate
i. The data collection tools have been shown to be valid (VEQ1 is 1); and
ii. The data collection tools have not been shown to be reliable (VEQ2 is 2) or reliability is not described (VEQ2 is 3).

Weak
i. The data collection tools have not been shown to be valid (VEQ1 is 2) or both reliability and validity are not described (VEQ1 is 3 and VEQ2 is 3).

F) WITHDRAWALS AND DROP-OUTS - a rating of:

Strong will be assigned when the follow-up rate is 80% or greater (VFQ2 is 1).
Moderate will be assigned when the follow-up rate is 60 – 79% (VFQ2 is 2).
Weak will be assigned when a follow-up rate is less than 60% (VFQ2 is 3) or if the withdrawals and drop-outs were not described (VFQ2 is 4).

Global Validity Rating for Paper

1  STRONG  (four STRONG ratings with no WEAK ratings)
2  MODERATE  (less than four STRONG ratings and one WEAK rating)
3  WEAK  (two or more WEAK ratings)
Appendix 4: Potentially Relevant Studies Not Retrieved


## Appendix 5: Component Ratings of All Studies Assessed for Methodological Quality

Note: (1) Day care centre staff  
(2) Day care centre children

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Global Rating</th>
<th>Selection Bias</th>
<th>Study Design</th>
<th>Confounders</th>
<th>Blinding</th>
<th>Data Collection</th>
<th>Withdrawals</th>
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### Appendix 6: Infection Control Interventions Assessed in ‘Weak’ Evaluation Studies

<table>
<thead>
<tr>
<th>Author &amp; Year (study Design)</th>
<th>Infectious Disease</th>
<th>Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barlett et al. (1988) United States RCT</td>
<td>Infectious diarrhea</td>
<td>Type: Educational session; Target: Day care centre staff (adults); Setting: Day care centres; Description: Training program for staff addressing infectious diarrhea and fecal-oral transmission, prevention and control. Post-evaluation of staff to determine knowledge. Intervention evaluated by presence of diarrhea in children.</td>
</tr>
<tr>
<td>Black et al. (1981) United States RCT</td>
<td>Infectious diarrhea Adenovirus Giardia lamblia Enteropathogenic E. coli Rotavirus Toxigenic E. coli Invasive E. coli Salmonella Shigella Vibrios Yersinia enterocolitica</td>
<td>Type: Educational session; Target: Day care centre staff (adults); Setting: Day care centre; Description: A hand-washing program consisting of infection control measures: employees washed hands after arriving at centre, handling food, using toilet, diapering children or helping child use toilet. Staff ensured children did not place hands in mouth after toileting; and also washed child’s hands after child entered centre, toileted, prepared to eat, or was diapered. Intervention evaluated by presence of diarrhea in children attending the day care centre. Stools were evaluated for presence of infectious agents pre- and post-intervention.</td>
</tr>
<tr>
<td>Butz et al. (1990) United States RCT</td>
<td>Infectious disease symptoms</td>
<td>Type: Counselling; Target: Day care centre providers (adults); Setting: Family day care homes; Description: An in-home four component intervention consisting of 1) a hand-washing educational program, 2) use of vinyl gloves, 3) use of disposable diaper changing pads and 4) use of an alcohol-based hand rinse. Intervention evaluated by presence of symptoms of enteric disease (diarrhea and vomiting) and respiratory disease (runny nose) in the children.</td>
</tr>
<tr>
<td>Author &amp; Year (study Design)</td>
<td>Infectious Disease</td>
<td>Intervention</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Kotch et al. (1994) United States RCT</td>
<td>Diarrhea Respiratory illness</td>
<td>Type: Educational session Target: Day care centre staff (adults) Setting: Day care centre</td>
</tr>
<tr>
<td>Description: A curriculum for caregivers consisting of three-hour training sessions in hand-washing, diapering, and infection control strategies. Pre- and post-test questionnaires measured improvements in knowledge. Intervention evaluated by hand-washing behaviour exhibited by staff and rates of diarrhea and/or respiratory illness in children.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Krilov et al. (1996) United States Time Series</td>
<td>Respiratory illness Gastrointestinal illness Otitis media Sinusitis</td>
<td>Type: Educational session Target: Preschool staff (adults) Setting: Specialized preschool</td>
</tr>
<tr>
<td>Description: A comprehensive infection control program consisting of education and training in infection control, increased emphasis on environmental cleaning and disinfecting and compliance monitoring provided to school personnel specifically tailored to each group of staff including teachers &amp; aides, environmental service workers, school bus drivers, and toy cleaning crew. Assessment of staff compliance to the intervention measures was recorded by an on-site monitor. Intervention evaluated by incidence of various illnesses, number of visits to doctors, courses of antibiotics and days absent from school in children pre- and post-intervention.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MacDonald et al. (1997) United States Can’t tell</td>
<td>Ear infection Diarrhea/vomiting Chickenpox Eye infection Strep throat Rash illness Impetigo Hand, foot &amp; mouth disease Head lice</td>
<td>Type: Other Target: Day care centre provides (adults) Setting: Day care centres</td>
</tr>
<tr>
<td>Description: Two models for public health surveillance of illnesses among children attending day care centres were compared, active surveillance and enhanced passive surveillance. Model effectiveness was evaluated by reported incidence of nine selected diseases.</td>
<td></td>
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</tbody>
</table>
| Author & Year  
(study Design) | Infectious Disease       | Intervention                                                                 |
|----------------|-------------------------|-----------------------------------------------------------------------------|
| Mohle-Boetani et al. (1995) United States RCT | Shigellosis               | **Type:** Mass media & counselling  
**Target:** Day care centre staff (adults) and children attending day care centres  
**Setting:** Community and day care centres  
**Description:** Community-wide intervention promoting hand-washing to control outbreak of shigellosis. Day care component consisted of PHN and environmental staff working to ensure rigorous hand washing and careful surveillance for diarrhea, and isolation of asymptomatic children until negative for Shigella sonnei. Convalescing asymptomatic staff encouraged to adhere to strict hand-washing practices. Intervention was not specifically evaluated for the day care centre populations. |
| Niffenegger (1997) United States CCT (longitudinal) | Colds                    | **Type:** Educational session & school curriculum  
**Target:** Day care centre staff (adults) and children.  
**Setting:** Day care centre  
**Description:** An instructional program on infectious diseases and hand-washing aimed at teachers and children. Teachers attended workshops and children received instruction on hand-washing and coughing into one’s elbow via a developmentally appropriate curriculum delivered by the teachers. Intervention evaluated by incidence of colds in children pre- and post-intervention. |
| Phillipchuk et al. (1992) Canada RCT | Respiratory Illness       | **Type:** Educational session  
**Target:** Day care centre staff (adults)  
**Setting:** Day care centre  
**Description:** An infection control intervention consisting of a workshop presenting a video, role play, educational lectures, and question and answer sessions. Intervention evaluated incidence of respiratory and enteric disease in children, number of days absent by children and staff. |
| Ulione (1996) United States Time series | Upper respiratory illness | **Type:** Educational session  
**Target:** Head Start Program staff (adults)  
**Setting:** Head Start centre  
**Description:** Educational program consisting of childhood illness, infection control, injury prevention and first aid. Intervention evaluated by incidence of upper respiratory illness in children pre- and post-intervention. |