

Methodology for the systematic search, review and critical appraisal of the scientific evidence base

The Transmission Based Precautions model policies aim to provide a set of consistent evidence based guidance on the infection control measures required to prevent and control infections that are transmissible by a known route and that are not controlled by the use of standard infection control precautions alone. They consist of 3 separate policies which are designed to be used separately or together if required, depending on the nature of the organism and its route of transmission. These are Droplet Precautions, Contact Precautions and Airborne Precautions.

The scientific process to identify and critically appraise, the evidence base to produce the recommendations which underpin these guidelines is detailed below.

- **Approval of primary literature**

An initial search of the literature found that the newly published *CDC Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings 2007*, (Siegel et al., 2007) was the most recent international guidance produced relevant to the subject. This guidance was evaluated by five independent reviewers using the AGREE instrument (The AGREE Collaboration, 2001) which is designed to assess the methodological quality of guidelines. The content and associated recommendations of the CDC guideline were reviewed and an assessment of their applicability for health and social care settings within Scotland was conducted. The results showed the guidelines were suitable for adaptation as the primary reference source for literature review and formulation of recommendations.

- **Additional key research questions**

Additional key research questions covering the three areas for production of transmission based precautions i.e. droplet, contact and airborne transmission of infectious agents were formulated by the scientists and comments requested regarding their suitability from the Peer Review Group, which was set up to oversee the scientific processes. Following comment and discussion, the key questions were finalised to form the basis of the search strategy.

- **Search Strategy**

A search strategy was developed using the key research questions to supply the initial keywords. The keyword list was further added to as a result of discussions between the ICT scientists and Peer Review Group; from scientific articles identified from the initial search results and by using the OVID subject headings (mapped terms). The search strategies used have been saved for further use if required. A number of different databases (i.e. Medline, CINAHL, British Nursing Index, Cochrane Library) and public health websites (i.e. WHO, DH, CDC, HPA, SG, SGHD) were searched to identify any additional resources / issues not reviewed within the CDC guidance or specific to the requirements of the NHS in Scotland.

- **Critical appraisal of additional studies / guidance**

All additional journal articles / guidelines were assessed for their relevance to the key research question firstly by review of abstract / description (1st sift)

The identified documents were compiled within an ICT Reviewing Log, which is an excel spreadsheet format to enable tracking of the review process. The relevant journal articles / guidelines were entered into an Endnote Library before undergoing full critical appraisal using the SIGN 50 methodology (2nd sift) (SIGN, 2004).

- **Assessment of evidence**

Identified journal articles / guidelines, not already reviewed within the CDC guidelines, were assessed for relevance to the key research question firstly by review of abstract / description (1st sift). The documents from the first sift were then compiled within an ICT Reviewing Log (an excel spreadsheet format to enable tracking of the review process) and entered into an Endnote Library before undergoing full critical appraisal using the SIGN 50 methodology (2nd sift) (SIGN, 2004) to determine if additional information or considerations were required for production of Transmission Based Precautions for healthcare settings in NHS Scotland.

A combined evidence / considered judgement table was completed based on the critical appraisal of the identified studies and guidance document, with reference to the relevant key question.

All studies were critically appraised as part of the literature review were assigned a grade of evidence based on the SIGN 50 methodology grading system (SIGN, 2004), which allows scientific studies to be assessed for quality using a number of reviewing forms (available from the SIGN website - <http://www.sign.ac.uk>).

Evidence Grading

1++ High quality meta analyses, systematic reviews of RCTs, or RCTs with a very low risk of bias

1+ Well conducted meta analyses, systematic reviews of RCTs, or RCTs with a low risk of bias

1- Meta analyses, systematic reviews of RCTs, or RCTs with a high risk of bias

2++ High quality systematic reviews of case-control or cohort studies

High quality case-control or cohort studies with a very low risk of confounding, bias, or chance and a high probability that the relationship is causal

2+ Well conducted case control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relationship is causal

2- Case control or cohort studies with a high risk of confounding, bias, or chance and a significant risk that the relationship is not causal

3 Non-analytic studies, e.g. case reports, case series

4 Expert opinion

- **Formulation of recommendations**

Literature reviews were written based on the identified primary reference source and additional critically appraised journal articles / guidance. Recommendations were formulated based on the combined scientific evidence to inform the development of the final guidance document. Each recommendation was assigned a category based on the volume / quality of evidence associated to the recommendation.

The recommendations have been categorised based on a combination of the system used in the CDC/HICPAC (Siegel et al., 2007) and EPIC 2 National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England.

Recommendations

Category IA - Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.

Category IB - Strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies and a strong theoretical rationale.

Category IC - Mandatory or required for implementation

Category II - Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale.

GPP (Good Practice Point) – Is a recommendation for best practice based on the expert opinion or practical experience of the Model Policies Steering Group

No recommendation; unresolved issue. Practices for which insufficient evidence or no consensus regarding efficacy exists.

An assessment of the recommendations for their applicability for health and social care settings within Scotland was conducted through meetings and the consultation process with the Model Policy Steering Group.

- **Additional searches**

Through discussion which took place at the Model Policy Steering Group and from comments received during the consultation process of the draft literature reviews, a number of ‘contentious issues’ were identified prompting additional literature search and review to be conducted to address the scientific evidence around these specific areas. These have included: use of IC measures for control of RSV and *Pseudomonas aeruginosa* as well as other more general points on the use of disinfectants versus detergents. These additional literature reviews were presented to the Model Policy Steering Group and consensus opinion sought when required.

Critical Appraisal Methodology

Scottish Intercollegiate Guidelines Network (2004) SIGN 50: A guideline developers' handbook, SIGN, Edinburgh. <http://www.sign.ac.uk>.

The AGREE Collaboration (2001) Appraisal of Guidelines For Research & Evaluation (AGREE) Instrument, September 2001. <http://www.agreecollaboration.org/>