BEME Collaboration
Best Evidence Medical Education

PROTOCOL
Systematic Review: What Features of Educational Interventions Lead to Compliance with Best Practice for Hand Hygiene in Healthcare Professionals within Acute Care?
Title: What features of educational interventions lead to compliance with best practice for hand hygiene in healthcare professionals within acute care?

Outcome measures considered will be:
- What are the effects of individual features of educational interventions on the skills of healthcare professionals and on the institutions in which they work?
- What characterizes the educational interventions that have been described?
- What are the methodological strengths and weaknesses of the reported studies?
- What are the implications of this review for service delivery, the teacher or trainer, the medical education researcher and for ongoing research in this area?

Group members: Gemma Cherry, CEDP, University of Liverpool

Dr. Jeremy Brown, EPRC, Edge Hill University

Dr. Ben Shaw, Mersey Deanery

Dr. Tim Neal, Liverpool Royal Hospital.

Contact of lead reviewer: Centre for Excellence in Developing Professionalism
School of Medical Education
University of Liverpool
Cedar House
Ashton Street
Liverpool
L693GE

m.g.cherry@liv.ac.uk

Sources of support: Mersey Deanery
Background Information

In the UK there are at least 300,000 healthcare acquired infections (HCAI) annually costing an estimated £1 billion per year. These infections result in longer hospitalisation (2.5 times longer than uninfected patients), disability and death (NAO 2004). In 1995 a DoH working party on infection prevention in hospitals suggested that ‘in the UK 5000 deaths (1% of all deaths) might be primarily attributable to hospital acquired infection (HCAI) and in a further 15,000 cases (3% of all deaths) HCAI might be a substantial contributor (DoH 1995). The same working party suggested that up to 30% of all HCAI were potentially preventable by better application of knowledge and adherence to infection prevention procedures.

A recent national study of HCAI in England, Wales and Ireland identified a prevalence in adult patients of 7.59% (range 0 – 34.6%) (Smyth et al 2008). Although slightly lower than the 9.0% identified in an earlier study (Emmerson et al 1996) this represents a significant risk to patients cared for in the modern NHS. The most common infections identified were gastrointestinal, urinary, and surgical wound infections. The national surveillance scheme for surgical site infections has collected data on gynaecological surgery (total abdominal hysterectomy) since 1997. 2% of wounds examined after this procedure become infected (CDR 2004).

The value of hand hygiene in reducing the transmission of organisms to patients was established in the 19th century (MMWR 2002) and is now recognised as the main intervention for reducing nosocomial infections (Larson et al 1995). As a consequence hand hygiene has been incorporated into evidence based practice (NICE 2003) and legislation in the UK (Health Act 2006). Despite this, compliance by healthcare staff with this simple intervention has been variable (Pittet et al 1999, Thompson et al 1997). The American national guidelines published in 2002 suggest an average compliance of 40% and lists a number of factors that influence adherence to this patient safety intervention including insufficient time, lack of knowledge, lack of personal or institutional priority. Compliance varies between healthcare settings and between different units in the same setting (Creedon et al 2008) with perversely worse compliance in intensive care units (Pittet 2004).

Recognition of poor compliance has generated a national campaign in the UK headed by the National Patient Safety Agency, the ‘cleanyourhands’ campaign, which has actively promoted hand hygiene since 2005. Evaluation of the campaign has demonstrated improvement in overcoming physical barriers and compliance as measured by consumption of hand hygiene products. Other educational campaigns focussing on hand hygiene have been shown to improve compliance and reduce nosocomial infection rates when rigorously applied (Safdar et al 2008, Pittet et al 2000). While these campaigns have been effective in the short-term they do not have sustained effects.

Previous systematic reviews (Cheater et al., 2001, O’Brien et al., 2001, Jamdveldt et al., 2006. Farmer et al., 2008, Gorman et al., 1998) have focused on specific educational interventions, such as the use of printed educational materials (Farmer et al., 2008), audit and feedback (Jamdveldt et al., 2006) and reminders (Gorman et al., 1998) with no specific healthcare worker or sector target population. This review aims to address a specific
proportion of the healthcare sector- healthcare workers responsible for aseptic hand hygiene practice of healthcare professionals. It aims to be a focused attempt to unravel the most effective components of educational interventions in determining behavioural change in this subset of healthcare workers.
Review Objectives:

The primary objective of the review is to determine individual features of educational interventions that impact on compliance with best practice for hand hygiene in healthcare professionals. To evaluate this, we will look at changes in infection control behaviour of healthcare professionals, and will consider changes in service delivery and the clinical welfare of patients involved provided they can be related directly to the delivery method of the educational intervention. We will consider all types of educational intervention involving healthcare professionals responsible for maintaining compliance with best practice for hand hygiene within acute care, as detailed below.

Method:

The following inclusion and exclusion criteria will be used in this review:

Types of intervention:

An educational intervention will be, for the purpose of this review, defined as an educational process intended to increase, improve or enhance the performance of the recipients with regards to the overall health or well being of their patients. Interventions that will be considered for this review include, but are not limited to courses, lectures, simulations, small group learning session(s), e-learning, curriculum-based learning, shadowing/mentoring, workshops and learning through educational material such as media, posters, handouts and other paper material. Educational interventions considered will be those designed to change staff attitudes/knowledge/behaviour with regards to one or more facet of hand hygiene behaviour. Interventions must be both structured and educational in their nature to be included in this review. Other interventions such as a reduction in working hours or changes in rates of pay will not be considered. Feedback alone or semi-structured educational methods, such as informal teaching will not be considered.

Types of participants:

This review focuses on the delivery of educational interventions relating to compliance with best practice for hand hygiene behaviour in healthcare professionals within acute care. Participants must be health care professionals who have a responsibility as part of their job role to ensure and maintain high standards of hand hygiene to ensure patient care under aseptic conditions, and have already been designated as ‘competent’ to do so by their job-role training. It is likely that participants will be specialist nurses, radiographers, midwives, doctors, medical residents or other health care practitioners, paramedics, domestic staff, dentists, dieticians, hygienists, psychologists, psychotherapists,
Studies where the sole participant groups are students will be excluded from the review. Studies with participants spanning both groups will be included, but only the results from the inclusion participant list will be considered. It is likely that the effectiveness of educational interventions targeting patients would be different to those targeting solely health care professionals. Given that the differing programmes to target health care professionals are already diverse in their delivery, it is felt that adding another comparator would complicate the report. All studies that do not focus solely on health care professionals will therefore be excluded. Where studies have focused both on educational interventions delivered to health care professionals and those delivered to patients, only the results of the health care professionals' intervention will be reported and considered. If these are not reported separately from that of the patients, the study will be excluded.

**Study design:**

Both non-comparative (audit, action-based research, case series, historical, narrative, observational and survey-based) and comparative (cross-sectional research, before and after studies, time series studies, non-randomised trials, randomised controlled trials, group randomised trials, case control trials, cohort studies and meta-analysis) research designs will be considered in the review. Reviews and systematic reviews will not be considered, as primary studies reviewed will already have been included in the review. Systematic reviews and reviews will be included in the search strategy however, as some may contain papers published before 1995 (boundary of our search) which may be relevant to the review. Should this occur, the time restrictions of the search will be revised as appropriate.

Information on data collection methods will also be recorded, as will a note of whether data collection is qualitative, quantitative or both.

**Study setting:**

Both non-comparative (audit, action-based research, case series, historical, narrative, observational and survey-based) and comparative (cross-sectional research, before and after studies, time series studies, non-randomised trials, randomised controlled trials, group randomised trials, case control trials, cohort studies and meta-analysis) research designs will be considered for inclusion. General review articles and editorials will not be considered but their reference lists will be scanned to check all relevant materials were included.

Studies looking at the delivery of educational interventions for compliance with best practice in hand hygiene behaviour in acute care settings will be considered for the review, including but not limited to ICUs, haemodialysis units, transplant units, chemotherapy units, accident and emergency units, neonatal units and hospitals.
Comparators:

Any comparators will be included in the review, including but not limited to use of a control group (e.g. other hospital area/ward), a differing educational intervention and use of differing health care groups.

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
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<tbody>
<tr>
<td>Study design</td>
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<tr>
<td>• All study designs will be considered</td>
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<td>• Studies from 1995 onwards will be included.</td>
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<td>Population</td>
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<tr>
<td>• Participants must be health care professionals who have a responsibility as part of their job role to ensure and maintain high standards of hand hygiene to ensure patient care under aseptic conditions</td>
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<td>Educational Intervention</td>
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<td>• Content documentable and repeatable.</td>
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<td>• Interventions run over defined time period.</td>
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<td>• Interventions designed to change staff behaviour with regards to one or more facet of hand hygiene behaviour</td>
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<tr>
<td>Comparator</td>
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<tr>
<td>• Any, including but not limited to use of a control group, a differing educational intervention and use of differing health care groups.</td>
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<td>Outcome Measures</td>
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<td>• At least one measure of correct hand hygiene technique/behaviour/attitude/infection rates/hospital policy</td>
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<td>• Measured using Kirkpatrick’s hierarchy</td>
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<td>Setting of study</td>
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<td>• Studies carried out in acute care settings will be considered for the review</td>
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<td>Exclusion criteria</td>
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<td>Study design</td>
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| Population         | • Studies where the sole participant groups are students  
|                    | • All studies that do not focus solely on health care workers, including studies using patients as sole participants  
|                    | • Studies where results of inclusion health care worker groups cannot be distinguished from exclusion health care worker groups |
| Educational Intervention | • Interventions focusing on patient education  
|                    | • Interventions that are not educational in content, such as change in working hours or change in rates of pay |
| Comparator         | • No exclusion criteria apply |
| Outcome Measures   | • No measure of correct hand hygiene technique/behaviour/attitude/ infection rates/hospital policy |
| Setting of study   | • Any setting other than acute care setting |

**Outcome measures of study:**

Only studies that measure hand hygiene technique, behaviour or attitudes of healthcare professionals, or patient outcome measures such as infection rates as outcome measures for effectiveness of delivery of educational intervention will be considered.

**Assessment of outcome measures:**

These will be based on modified Kirkpatrick’s 1967 model of hierarchical outcomes at four levels, as illustrated below. Additional predetermined or secondary outcome measures will also be accepted and recorded.

**Level 1: Reaction**

This covers learner’s views on the delivery and content of the educational intervention. This may take the form of verbal or written feedback immediately after the delivery of the intervention, and includes learner’s views on presentation, organisation, content, teaching methods, time-tabling, materials used and quality of teaching.

**Level 2a: Modification of attitudes and perceptions**

This relates to any changes in reciprocal attitudes or perceptions between participant groups. This includes any changes in perceptions or attitudes by participants towards the value and/or use of the taught approach to caring for patients, and their condition, circumstances, care and treatment.
Level 2b: Acquisition of knowledge and skills
For knowledge, this relates to the acquisition of concepts, procedures and principles of aseptic hand hygiene technique as a direct result of the delivery of the educational intervention.
For skills, this relates to the acquisition of thinking/problem-solving, psychomotor and social skills linked to aseptic hand hygiene technique as a direct result of the delivery of the educational intervention.

Level 3: Behavioural change
This relates to the transfer of principles of aseptic hand hygiene technique to the workplace, such as support for change in behaviour in the workplace, or willingness of learners to apply knowledge and skills about aseptic hand hygiene technique, obtained as a direct result of the delivery of the educational intervention, to their practice style.

Level 4a: Change in organisational practice
This relates to wider changes in the organisation/delivery of care, attributable to the delivery of an education intervention. These changes may be financial or organisational.

Level 4b: Benefits to patients / clients, families and communities
This relates to any improvements in the health and well being of patients as a direct result of the delivery of an educational intervention. Where possible, objectively measured or self reported outcomes will be used, including but not limited to health status measures, infection incidence, duration or cure rates, mortality rates, complication rates, readmission rates, adherence rates, patient/family satisfaction rates, continuity of aseptic hand hygiene technique and costs to carer or patient. These outcomes will be further determined by the literature found.

Search strategy:

To evaluate the literature base and to develop a potential search strategy, a scoping search will be conducted. It will cover the period 1995-2008, and will be run across Medline. Following this search, two reviewers from the project will review the titles and abstracts of the first 200 articles identified by the search. This will be to determine if the lead reviewer had an appropriate balance of sensitivity and specificity for relevant evidence which could not be improved by second-screening and to decide if it is appropriate for this researcher alone to select articles for further consideration from the main search. The pilot search will also allowed the researchers to establish an idea of the body of literature and to determine any need to refine the search terms used.

Following the pilot search, electronic databases will be searched using a strategy incorporating a variety of MeSH terms and free text terms encompassing infection control. This strategy will be translated into other databases using the appropriate controlled vocabulary as applicable. The following databases will be searched electronically:
• British Nursing Index
• Cumulated Index of Nursing and Allied Health Literature (CINAHL)
• Medline
• Embase
• Health Management Information Consortium Database (HMIC)
• Web of Knowledge
• Cochrane Library
• The NHS Centre for Reviews and Dissemination (CRD)
  (CRD includes 3 databases: Database of Abstracts of Reviews of Effectiveness (DARE), NHS Economic Evaluation Database (NHS EED), Health Technology Assessment (HTA) Database)
• National Research Register
• COPAC
• openSIGLE
• BUBLE
• British Library Catalogue
• ERIC
• TimeLit

Other sources to be searched will include:
Hand searching of high yield journals and conference proceedings.
Reference lists of all papers and relevant reviews identified.
Contacting authors regarding any unpublished work.
Contacting authors in the field to see if they are aware of any unpublished material.
AMEE, ASME and BEME abstracts

It is anticipated that the electronic database search will be completed by the end of August 2009.

**Time limits on search:**

The search will be carried out from 1995 onwards. This has been enforced to coincide with the publication of the Department of Health's Hospital Infection Control: Guidance on the Control of Infection in Hospitals. This guideline was put in place jointly by the Department of Health and Public Laboratory Service Working Group in response to changes in clinical practise, changes in the organisation of the NHS and the establishment of the post of Consultant in Communicable Disease Control. It states that infection control policies should be determined by the type of service provided by a hospital, rather than if it is NHS or private sector funded, and so represents an important milestone in the development and enforcement of infection control guidelines. It is thought that studies published prior to this date may not be as applicable to current evidence-based practise as far as stringent infection control guidelines and educational interventions are concerned, and so including these studies may affect the generalisability of the results of the review and subsequent transference of these results into practice.
However, as mentioned above, systematic reviews from 1995 onwards will not initially be excluded from the review. Studies found will be scrutinised and, if and where applicable, the boundaries of the search strategy may be altered.

**Study Selection Process:**

Following the search procedure described above, a list of titles will be obtained. These will be screened independently by 2 members of the review team and any study obviously not meeting the inclusion criteria, not informing one or more of the review questions or not relating to an educational intervention into aseptic hand hygiene technique in acute care will be discarded.

All abstracts will then be obtained, and will again be reviewed independently by at least 2 members of the review team. Inter-rater reliability checks will be performed on all of the abstracts screened to ensure consistency. Abstracts will be screened, and full text versions will be obtained of studies that relate to educational interventions for aseptic hand hygiene technique in acute care, that fulfil the inclusion criteria, that have been published between 1995 and 2009 and that appear to inform one or more of the review questions. In the event of a dispute regarding inclusion of an abstracted paper, the full paper will be obtained, and subjected to scrutiny by a third member of the review team.

Obtaining the full text of each paper will allow for confirmation that the study is relevant to the review, and relevant studies will be selected for appraisal. Data from eligible papers will be extracted using the coding sheet prepared. This has been adapted from the BEME sample coding sheet, and has been tailored for the review.

As there will be different qualitative and quantitative approaches to data collection, the coding sheet will be piloted across the group prior to formal data extraction. Each group member will independently code a percentage of studies using the coding sheet, and will then meet to discuss anomalies or inconsistencies. It is expected that this will result in further alteration of the coding sheet to maximise data extraction and consistency.

The coding sheet will extract the following information from full text papers:

- expected learning outcomes of the educational intervention
- context of the educational intervention
- description and impact of the educational intervention
- evaluation methods, including study design, data collection methods and data sources

Following data extraction of each paper, strength of findings will be scored using a detailed checklist of criteria for assessment for both qualitative and quantitative studies. This will be included in the coding sheet.
Any discrepancies will be resolved by review by a third member of the group. It is expected that any study scoring below 2 on Kirkpatrick’s hierarchy will be discarded from the review, but no study will be excluded based solely on quality. This will be dependent on the amount and quality of the retrieved studies.

**Analytical Procedures:**

To be determined. It is likely that data will not be strong enough to perform a meta-analysis, so a descriptive analysis of data is expected. This will be determined upon scrutiny of included papers.

**Synthesis of Findings:**

To be determined

**Conflict of interest:**

Nil

**Additional Information:**

This review aims to be the second part of a series of reviews into the effectiveness of delivery of educational interventions to change healthcare worker’s behaviour, attitudes and practice.
References:


Department of Health UK (2006) The Health Act


