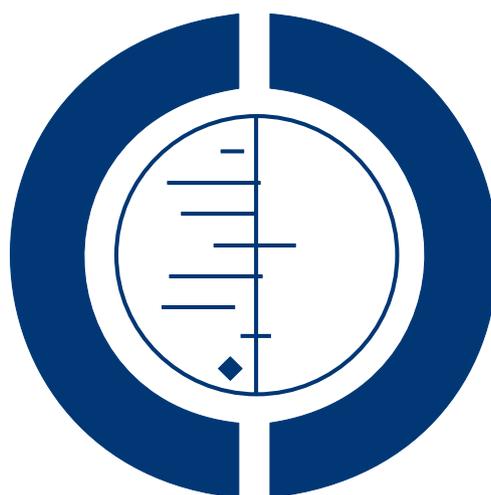


Training interventions for improving telephone consultation skills in clinicians (Protocol)

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[Intervention Protocol]

Training interventions for improving telephone consultation skills in clinicians

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ABSTRACT

This is the protocol for a review and there is no abstract. The objectives are as follows:

To assess the effectiveness of training interventions on clinician telephone skills.

BACKGROUND

Description of the condition

Telephone consultations

The ability to consult by telephone is now an integral part of any modern patient-centred healthcare system (Evans 2003). It has been reported that in the United States up to a quarter of all primary care consultations are now conducted over the telephone (Patel 1997). The British Medical Association (BMA) has provided guidance for general practitioners (GPs) entitled *Consulting in the modern world* (2001) and advise “telephone consultations when correctly conducted can be considered to be safe and acceptable practice”. Reisman 2005 describes how telephone communication

is the primary mode of communication between physicians and patients outside of the office visit. Car 2004 and Patel 2005 argue that telephone consulting is both a feasible and effective form of clinical intervention.

Bunn 2004 describes telephone consulting as a process whereby patients receive medical advice by one or more qualified healthcare professionals via the telephone. The authors conclude that telephone consultations appear to be safe and that people were just as satisfied with them as with face-to-face consultations. They also suggest that telephone consultations appear to decrease the number of immediate visits to doctors without increasing attendance to emergency departments. As with face-to-face consulting, there are many ways in which telephone consulting can be utilised; these are described below.

The role of telephone consultations

Telephones are being used to provide a range of healthcare services including delivery of routine and emergency care, obtaining repeat prescriptions, gathering results of laboratory investigations and facilitating health promotion (Car 2003). Examples of telephone consultations include the management of conditions such as heart failure (Clark 2007; Riegel 2002) and asthma (Gruffydd-Jones 2005; Patel 2009; Pinnock 2003).

Telephone consultations may reduce doctors' workloads and enhance access to care without the inconvenience and cost associated with physically attending a consultation, thus increasing the flexibility and availability of service (Hallam 1992; Patel 2005).

Katz 2008 highlights some of the safety concerns that exist in relation to telephone consultations. The authors suggest that the most effective risk-management strategy is to improve the quality of telephone care and service to patients. The authors also suggest that prevention should include a more disciplined approach to documentation, improved workload systems, and increased skills training.

Bunn 2004 claims that there are still questions about the effect of telephone consultations upon service use. Since telephone consultations play a role in patient management, it is essential that when consulting via the telephone, healthcare professionals feel confident with their skills to conduct and document the interview with accuracy and clinical competency. It is therefore important that they receive adequate training to enable them to carry out their clinical roles with efficiency.

Description of the intervention

Telephone consultation skills training

As with face-to-face consulting skills, the ability of consulting via the telephone requires adequate training. This training may occur at any stage of a professional's career. We use the term training as defined within the Medical Subject Heading (MeSH) of the US National Library of Medicine vocabulary thesaurus, under the MeSH term of education (<http://www.ncbi.nlm.nih.gov/mesh/68004493>). Essentially, we use the term within the context of medical education.

Training can employ varied educational interventions such as, traditional one-way teaching methods (e.g. lectures) as well as more interactive techniques (e.g. simulation software).

One-way Methods

One-way training usually consists of lectures or reading materials, or both. Flannery 1995 finds that only a few internal medicine programs offer teaching in telephone management. When training is part of the curriculum, it is delivered via single and informal lectures.

Interactive Methods

Medical education is increasingly employing the use of simulated patients. As early as 1983, Evans and colleagues (Evans 1983) used patient simulators to teach telephone communication skills. Greenberg 1999 developed a telephone management educational programme using standardised patients to teach paediatric residents.

Computerised training programmes use especially designed software to simulate calls and provide pertinent feedback. These programmes can be delivered either online or via a CD-ROM. Ottolini 1998 designed an interactive CD-ROM programme through which scripts representing the 10 most common complaints were presented to healthcare professionals to simulate telephone conversations with the parents of paediatric patients.

Kosower 1991 used a programme called T.A.L.K. to teach telephone communication skills by allowing residents to analyse recorded calls in group and individual feedback sessions. Wood 1989 developed a role-play telephone management curriculum on history-taking and management skills.

Structured Tools

A paper by Marshall 2009 describes the use of a communication tool to improve the quality of telephone clinical referrals. This study used final year medical students to measure the effect of the intervention upon their content and clarity of telephone referrals.

Multifaceted Approach

Interventions may often incorporate different types of training interventions. Training courses may employ a combination of one-way and interactive methods. King 2007 developed and evaluated a continued educational programme called The Effective Patient Teaching and Problem Solving (EPT-PS) course. The intervention consisted of several sessions incorporating didactic presentations with modelling, demonstrations of taught skills and interactive group exercises.

The purpose of this review will be to identify and measure the effectiveness of these types of interventions on clinician telephone skills.

How the intervention might work

The intervention should aim ultimately to improve patient care. We argue that this can be achieved through successfully changing physician behaviour. In addition, we propose specific areas that may be affected by this altered behaviour.

Changing clinician behaviour

It is vital that any training intervention changes clinician behaviour in the desired manner. [Grimshaw 2002](#) describes some of the factors that may influence change including the following.

- Implementation of effective change strategies through understanding the determinants of physician behaviour and identification of barriers.
- More evidence-based strategies of implementation and dissemination.
- Emphasis upon population-based improvement in clinical outcomes.

This review will look at the various determinants of clinician behaviour as described in the previous section to help understand how training programmes can ensure the desired outcomes. Results may inform how these programmes could be implemented and disseminated appropriately.

In addition to this, it will be worth applying theoretical considerations that are relevant to changing clinician behaviour. Many theories of behavioural change and learning theory exist. [Slotnick 2002](#) et al describe some of the ways in which various theories may be applied. [Grol 2002](#) describes the following six elements of effective change.

- **The complex reality of clinical practice needs to be considered:** This may relate to clinician workload, resources and experience in relation to telephone consulting.

- **Specific attention must be directed toward the designed change/improvement:** The same intervention may lead to different outcomes for different learners. This review may address the reasons for this through the variety of outcomes it will assess e.g. age, sex, professional specialty etc.

- **A diagnostic analysis of the target group and setting:** This review may help understand learning needs and environments that will be conducive to effective training.

- **A mix of actions including training, rewards, feedback, and organisational measures addressing the needs and problems of the target groups and the barriers is needed:** This review may lead to the development of a multifaceted training programme that will incorporate these factors.

- **Develop a plan indicating which actions will be taken when, by whom, and in what order:** The results of this review may inform organisations (such as educational institutions) how to develop, design and implement effective training programmes for telephone consulting.

- **Implement continuous monitoring, feedback and adaptation of strategies as needed:** An effective training programme for teaching telephone consulting skills must include appropriate evaluation and feedback methods to ensure learning objectives are being achieved. This review will identify and analyse the existing evidence regarding this area.

Why it is important to do this review

We have earlier highlighted how the BMA has provided guidance for GPs entitled [Consulting in the modern world](#) and advise “telephone consultations when correctly conducted can be considered to be safe and acceptable practice”. We have also demonstrated some of the use of telephone consultations within healthcare (e.g. asthma and heart failure). If we agree that there is an important role for telephone consultations within healthcare, we then need to ensure we can provide the adequate skills to the relevant healthcare professionals.

The need for effective training

We believe that this review will have impact on the ways in which we train clinicians in telephone consulting. It appears there have been no systematic reviews on how we train clinicians to consult via the telephone. However, we have shown how telephone consulting is being increasingly utilised within healthcare.

[Consulting in the modern world](#)(BMA) describe how during a telephone consultation the doctor “cannot see, touch, examine, investigate, smell or, in the strictest terms, even hear the caller/patient.” We believe the differences in telephone consulting compared to face-to-face warrants specific evidence based training. We hope this review will aim to achieve this. The review may also help to develop telephone specific consulting models.

In the same way as face-to-face consulting, we argue that there should be robust studies to investigate the best ways to teach telephone consulting skills. Modern face-to-face consultation models have been developed with an emphasis on informed information provision, exploring patients’ concerns, ideas and expectations, patient centeredness and satisfaction. There appears to be increasing body of evidence to support the use of a patient centered approach to healthcare ([Hayden 2003](#)). There have been many models of consulting proposed such as Balint’s Model ([Balint 1964](#)), Berne’s transactional analysis ([Berne 1968](#)), Byrne and Long Model ([Byrne 1976](#)), Middleton agenda model ([Middleton 1989](#)) Neighbour’s inner consultation ([Neighbour 1987](#)), Pendleton’s Consultation Model ([Pendleton 1984](#)) and Stott and Davis Model ([Stott 1979](#)) to name but a few. These models have been used to help train face-to-face consulting. We therefore hope that by understanding how best to teach telephone consulting skills, a similar patient centered consulting approach can be achieved.

Ultimately we hope improved clinician skills can lead to improved clinical outcomes. This can be achieved though identifying an evidence base, transferring appropriate skills and providing consistency.

EVIDENCE BASE: Ideally, training interventions should be evidence-based. [Car 2003](#) argues that training targeted at telephone consultations, protocols for managing common scenarios, dedicated time for telephone contacts, documentation of all consultations, and a low threshold for organising a face-to-face consultation may help to ensure quality and safety of telephone consultations. The telephone is a communication tool that poses several

disadvantages to consulting with patients, including an absence of visual clues and non-verbal communication. [Toon 2003](#) highlights how, despite this, there has been little study of telephone consulting skills and little critical thinking about how best to work on its limitations or what background and training users need.

Training programmes could ideally utilise and develop this evidence base for provision of telephone consulting skills.

TRANSFER OF APPROPRIATE SKILLS: A healthcare professional trained in telephone consultation skills is expected to have a more refined appreciation of verbal cues and focused history-taking is required to compensate for the inability to examine the patient ([Car 2004](#)). Training can improve clinician consultation skills ([Foster 1999](#)). Effective training aims to transfer the required skills to enable telephone consulting.

IMPROVING OUTCOMES: [Reisman 2005](#) argue that increasing familiarity with common challenges when consulting with patients over the telephone may help healthcare professionals decrease the likelihood of negative outcomes. A randomised, prospective, controlled comparison of resident management of two telephone calls by [Ottolini 1998](#) concluded that the use of a CD-ROM telephone management programme was associated with better post-intervention telephone management. [Marklund 1989](#) evaluated the effect of a teaching programme on telephone advice. It was found that the educational programme resulted in improved quality of advice, confidence and satisfaction among participating nurses. [Lattimer 1998](#) evaluated the safety and effectiveness of nurse telephone consultation in out-of-hours primary care. A key recommendation was that further testing in the selection and training of nurses may improve outcomes.

CONSISTENCY: [O’Cathain 2003](#) examined the consistency of triage outcomes when nurses used telephone communication supported by a computerised decision support software in out-of-hours emergency services by NHS Direct in the UK. The study found that there was variability in the ways nurses dealt with the calls, in particular the triage outcomes such as recommending self-care versus advising Accident and Emergency attendance. The authors claim that effective training on telephone consultation skills in the specific setting can enable the nurses to answer calls in a more standardised manner.

Potential effects of changing clinician behaviour

We argue training may lead to many potential outcomes through altered clinician behaviour. [Grimshaw 2001](#) describes how multifaceted interventions targeting different barriers are more likely to be effective in changing provider behaviour. Importantly, the authors also conclude how future educational activities should be informed by the findings of systematic reviews of professional behaviour change interventions. Current evidence suggests that there may be a variety of potential barriers that exist in the training of telephone consultation skills as described below.

Addressing the perceived lack of training

[Elnicki 2000](#) reveals that physicians in practice and in training can benefit from regular review of telephone cases, both for educational purposes and for making practice policies. Interestingly, [Patel 2009](#) shows that primary care physicians do not feel there is a need for specific training, as they perceive telephone consultations as just another form of history-taking. Another study, [Reisman 2005](#), reports that only 6% of residency programs in the US teach any aspect of telephone communication. The authors suggest the paucity of training in telephone medicine in residency programs may be a significant contributor to telephone communication errors.

Improving clinician satisfaction and confidence

[Hannis 1996](#) reveals how primary care physicians are often dissatisfied with telephone encounters and that their level of confidence is lower when consulting via a telephone than seeing patients face-to-face.

Improving consultation techniques

[Innes 2006](#) highlights that when consulting via the telephone, physicians adopt a more dominant approach to interaction, compared with face-to-face consultations. It is also noted that information exchange in telephone consultations is rich in biomedical and poor in psychosocial aspects.

Appropriate length of telephone consultation

[Innes 2006](#) reports that the length of interaction accounts for much of the variation seen between consultations in the domains of rapport, data-gathering, patient education, counselling and partnership. [Derkyx 2009](#) concludes that apart from adequate communication skills, triagists needed sufficient time for telephone consultation to enable high-quality performance.

Improving clinical accuracy (history-taking, diagnosis, management)

A study by [Isaacman 1992](#) reports that advice given via the telephone within paediatric care by emergency departments reveals inadequate histories, variable advice, and insufficient follow-up care. [Hallam 1989](#) considered the use of the telephones within primary care and found 20% of the calls to be incorrect on follow-up as well as inappropriate in triage decisions for common problems.

Improving documentation

A series of case reviews of telephone-related claims by [Katz 2008](#) found that absent or poor documentation was present in almost all cases, highlighting the need to document all calls of significant relevance.

Therefore this review will assess the impact of training and educational programmes on clinician skills and relevant care. Results of this review may inform training and evaluation of programs to provide effective telephone consultations skills which could result in better clinician behaviour and ultimately improved patient outcomes.

OBJECTIVES

To assess the effectiveness of training interventions on clinician telephone skills.

METHODS

Criteria for considering studies for this review

Types of studies

We will consider the following types of studies.

- Randomised controlled trials (RCTs)
- Non-randomised controlled trials (NRCTs)
- Controlled before-after (CBA) studies with a minimum of two studies and two control sites
- Interrupted time series studies (ITS) of interventions with a clearly defined point in time when the intervention occurred and at least three data points before and three after the intervention

The initial search suggests that, due to the nature of the intervention, there are few RCTs. Where non-randomised studies are considered, we will follow the guidance on how to assess and report on them in line with guidelines outlined by the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2008).

Types of participants

Clinicians (a broad term that encompasses all doctors, nurses and other health professionals) who have undergone educational interventions for developing telephone consultation skills. We will include studies from all settings including primary care, outpatient, inpatient and public health.

Types of interventions

We will consider the following types of intervention:

- Computerised training programmes
- Written training programmes
- Face-to-face structured training
- Decision support programmes

We will make comparisons between outcomes of clinicians who have received the intervention with those who have not.

Types of outcome measures

Primary outcomes

- Patient outcomes:
 - health outcomes (e.g. validated tools, biomedical markers and patient behaviour)
 - effect upon morbidity/mortality
 - patient satisfaction
 - diagnostic accuracy
 - adverse events
- Clinicians' telephone consulting skills as measured/assessed by a validated tool

Secondary outcomes

- Clinician knowledge gain
- Attitudes to telephone consultation (e.g. confidence, satisfaction)
- Time effectiveness (length and frequency of consultations, avoidance of face-to-face contact, effect on further clinical contact)
 - Referral patterns
 - Economic evaluation (litigation issues, resource issues, time effectiveness)

Subgroup analyses is described in a later section.

Search methods for identification of studies

The initial Medline strategy [Appendix 1](#) was written by M. Fian-der, Trials Search Co-ordinator for the Cochrane Effective Practice and Organisation of Care (EPOC) Group in consultation with the authors. Additional strategies will be based on the Medline strategy and results limited by methodological filters to identify acceptable study designs (see [Types of studies](#)). Primary studies will be identified using the following bibliographic databases, sources, and methods. Related systematic reviews will be identified by searching the Cochrane Database of Systematic Reviews, the Database of Abstracts of Reviews of Effectiveness (DARE), and the databases listed below.

Databases

MEDLINE, OVID (1950-, In-Process and other non-indexed citations)

EMBASE, OVID (1947-)

PsycINFO, OVID (1806-)

The Cochrane Central Register of Controlled Trials, Wiley ERIC (Educational Resources Information Center) database

Cumulative Index to Nursing and Allied Health Literature *CINAHL*, EbscoHost (1980-)
The EPOC Specialised Register, Reference Manager
ProQuest Dissertations & Theses (PQDT) database (1861-)
Web of Science, Conference Proceedings Citation Index--Science,
Web of Knowledge (1990-)

Searching other resources

We will search trial registries and additional thesis resources (below); selected grey literature (sites will be documented in the review); and Google Scholar (we will screen the first 500 items retrieved). We will also:

- a) Screen individual journals and conference proceedings (e.g. hand searching).
- b) Review reference lists of relevant systematic reviews or other publications.
- c) Contact authors of relevant studies or reviews to clarify reported published information or seek unpublished results/data (when necessary).
- d) Contact researchers with expertise relevant to the review topic or EPOC interventions.
- e) Conduct cited reference searches in ISI Web of Science/ Web of Knowledge.

Trial Registries

WHO International Clinical Trials Registry Platform (ICTRP) <http://www.who.int/ictcp/en/>
ClinicalTrials.gov <http://clinicaltrials.gov/>
TrialsCentralTM (www.trialscentral.org)
Current Controlled Trials (www.controlled-trials.com)

Theses Portals

Australasian Digital Theses Program (<http://adt.caul.edu.au/>)
EThOS, Electronic Thesis Online Service, British Library (<http://ethos.bl.uk>)
Networked Digital Library of Theses and Dissertations (<http://www.ndltd.org>)
Index to Theses (<http://www.theses.com/>) (Great Britain and Ireland)

Data collection and analysis

Selection of studies

Two review authors (RG and KA) will independently assess the eligibility of all titles and abstracts identified from electronic searches. We will retrieve full text copies of all articles judged to be potentially eligible. At least two review authors will independently assess these retrieved articles to determine whether they meet the inclusion criteria.

We will only include studies that include primary outcomes (e.g. not those with just secondary outcomes).

The final list of included and excluded studies will be agreed between RG and KA. References will be uploaded into EndNote X4 software. Where there is insufficient detail about the study to decide whether it meets the inclusion criteria, we will contact the study authors to enable a more informed decision. If necessary, a third review author will be asked to resolve any potential conflicts of opinion.

Data extraction and management

We will extract data from all included studies using a standard data recording form derived from the data extraction template provided by Cochrane EPOC Group. Two review authors will independently extract and manage the data, with a third review author being called upon if there are differences in opinion.

We will extract the following data.

- General information: Title, authors, source, publication status, date published, language, review author information, date reviewed.
- Details of study: Aim of intervention and study, study design, location and details of setting, methods of recruitment of participants, inclusion/exclusion criteria, ethical approval and informed consent.
- Assessment of study quality: Key features of allocation, contemporaneous data collection for intervention and control groups; and for ITS studies, number of data points collected before and after the intervention, follow-up of participants.
- Risk of bias: Data to be extracted depends on study design (see [Assessment of risk of bias in included studies](#)).
- Participants: Description, geographical location, setting, number receiving educational intervention, number randomised, number completing the study, age, gender, ethnicity, socio-economic grouping and other baseline characteristics.
- Intervention: We will detail the description of the intervention. We will highlight the context of the clinical information related to the telephone skills. Description will also include how recipients of interventions are identified. Other parameters that we will report include, duration of intervention, quality of intervention, follow-up period and rationale for chosen period.
- Outcomes: Primary and secondary outcomes, methods for measuring outcomes, methods of follow-up, tools used to measure outcomes, whether the outcome is validated.
- Results: Results for outcomes and timing of outcome assessment, control and intervention groups if applicable.

We will use RevMan software to enter relevant data.

- Assessment of risk of bias in included studies
- Measurement of treatment effect
- Unit of analysis issues
- Dealing with missing data
- Assessment of heterogeneity
- Assessment of reporting biases
- Data synthesis

- Subgroup analysis and investigation of heterogeneity
- Sensitivity analysis

Assessment of risk of bias in included studies

Two review authors will independently assess the quality of included studies, with any disagreements resolved by discussion and consensus, and by consulting a third review author, where necessary.

Specifically, we will assess the risk of bias in the following groups.

- Studies with a separate control group (RCTs, NRCTs, CBAs); we shall use the nine standard criteria as outlined by the Cochrane EPOC Group
- ITS studies; we shall use the seven standard criteria for ITS studies as outlined by the Cochrane EPOC Group

We will describe the study and assign a judgement relating to the risk of bias for each item. We will use a template to guide the assessment of risk of bias, based upon the guidance outlined by the Cochrane EPOC Group as well as the guidelines outlined in *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2008), judging each item as 'yes' (indicating a low risk of bias), 'no' (indicating a high risk of bias) or 'unclear' (indicating an uncertain risk of bias) and providing a description to explain the decision.

Low risk of bias within selected studies will be decided if all the above mentioned elements are deemed to be low risk. Conversely, if one or more of these key elements are found to have a high risk of bias, then that selected study will be classified as high risk.

In the case of studies other than RCTs (that is, NRCTs, CBA and ITS studies), we will assess the risk of bias systematically and according to the criteria outlined in *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2008).

We will present the results of the 'Risk of bias' assessment in tables and will incorporate the results of the assessment of risk of bias into the review through systematic narrative description and commentary about each of the quality items, for each type of included study. This will lead to an overall assessment of the risk of bias across the included studies and a judgement about the possible effects of bias on the effect sizes of the included studies.

Where deemed necessary, we will contact study authors for additional information about the included studies.

Measures of treatment effect

Effect measures will be analysed in relation to the primary outcome measures described previously in section on outcomes.

We hope to assess whether there are definable and significant changes in a variety of outcomes after the training intervention. We anticipate the primary outcomes will reveal data that can be assessed by measures such as mean difference (MD), standardised mean difference (SMD) and proportions where appropriate.

Dichotomous data: Where feasible, we will analyse outcomes with dichotomous data (such as confidence rating scales) with relative

effect. We also recognise that it will be important to identify if validated measures/scales are being used. Mortality and morbidity will be analysed using both relative and absolute effects such as risk/odds ratios and risk differences respectively.

Continuous data: We will report the mean difference (MD) or standardised mean difference (SMD) (if there is a difference in measurement of scales across trials). We will use 95% confidence intervals (CI) as measures of the amount of random errors influencing the outcome estimates. We will carefully consider whether it is appropriate to combine the numerical results of all or some of the studies. MD with standard deviation (SD) will be measured for health outcomes using validated tools such as Quality of Life Adjusted Years (QALYs) and Disability Adjusted Life Years (DALYs). We will likely measure mean and SD of biomedical markers of specific conditions such as HBA1C (in diabetics), Body Mass Index (BMI), Blood Pressures (BPs) where these are defined as outcomes of the study. Patient behavioural changes could include indicators such as alcohol consumption and cigarette smoking. Smoking will ideally be measured as continuous data and therefore be measured using either mean difference or standardised mean difference (we acknowledge the difficulty of calculating proportional odds ratios). Likewise, adverse effects may be measured with means and include SD depending on the outcomes of the study e.g. mean number of patients experiencing a defined adverse reaction. Knowledge gain may be measured by mean scores (for example pre and post intervention multiple choice questions) or by proportions achieving a predefined score.

Some studies may use standardised assessment tools of consulting (such as Pendleton's Consultation Rating Scale). These again can be measured using MD and SD or SMD if different tools are used. If medians are used, then interquartile ranges (IR) will be measured. Where total numbers and effect sizes are not recorded then we will describe results narratively.

Unit of analysis issues

Issues may arise from the inclusion of cluster-randomised trials. If applicable, we will analyse the data according to recommendations in the Cochrane Collaboration Open Learning Module on issues related to the unit of analysis (Alderson 2002).

Dealing with missing data

We will contact the authors of included studies for missing data and we will assess findings for inclusion into the analyses.

Assessment of heterogeneity

We will prepare tables and box plots comparing effect sizes of studies grouped according to potential effect modifiers. These will include:

1. Type of health professional.

2. Type of intervention.
3. Duration of education/intervention.
4. Outcomes of intervention.
5. Setting and contextual factors: primary/secondary care, face-to-face/eLearning
6. Study design (e.g. RCT, CCT, CBA, ITS).
7. Methodological quality of studies.

We expect to find substantial variation in the study results due to differences in types of interventions, the type of healthcare professional (targeted population), the design of the intervention, duration of the intervention and the context in which the intervention is implemented. We plan to conduct subgroup analyses based on type of intervention, type of health professional and study setting if we find two or more studies considering the same outcomes or using the same intervention in a similar population.

Assessment of reporting biases

If possible, we will use funnel plots to assess for the potential existence of small study bias. There are a number of explanations for the asymmetry of a funnel plot (Sterne 2001). Therefore, we will carefully interpret results (Lau 2006).

Data synthesis

Data-synthesis will begin with a narrative overview of the findings and a table systematically summarising the extracted results. We will assess the participants, interventions and outcomes for comparability, which is necessary for statistical pooling. We will look for studies sufficiently similar in terms of study design, setting, intervention, follow-up and outcome measures in order to combine the study data in a meta-analysis. A meeting of all review authors will decide whether or not it is appropriate to carry out such a meta-analysis.

The choice of model would depend on the heterogeneity of the studies included in the meta-analysis. We will conduct the analysis according to the *Cochrane Handbook for Systematic Reviews of Interventions* guidance (Higgins 2008). We expect that if meta-analysis is feasible, we will use a random-effects model, which provides a more conservative estimate of effect and can be used where there is moderate heterogeneity.

It is likely that due to the methodology of the selected studies, and variety of outcomes, that non-meta-analytical methods will not be appropriate or possible. We will measure median effect sizes across groups as originally described by Grimshaw 2004, a method which has been used by several subsequent authors (Jamtvedt 2006, Shojania 2004, Shojania 2009, Steinman 2006, Walsh 2006). This method will help measure the median effect of each outcome within a study and subsequently measure the overall single effect size for that study. It is from these single effect sizes for each study that the median effect size and interquartile range

across all studies can be calculated. This type of analysis will still be subject to limitations, e.g. studies will be assumed to have equal weight. However, Grimshaw 2004 argues the process of using median as opposed to the mean results means the summary estimate is less likely to be resulting from a few out lying results.

As described in the measures of treatment effect, this review will hope to assess whether there are definable and significant changes in a variety of outcomes after the training intervention. We anticipate the primary outcomes will reveal data that can be assessed by measures such as mean difference (MD), standardised mean difference (SMD) and proportions where appropriate.

We will be cautious when considering the pooling of data in a meta-analysis, especially where differing study designs are concerned.

We will synthesise separately data deriving from randomised and non-randomised study designs. In the case that we cannot combine data, for each study meeting our inclusion criteria, we will report the main results in natural units and calculate the change data if they are not reported. We will present the results for all comparisons using a standard method of presentation where possible.

We will prepare tables and box plots comparing effect sizes of studies grouped according to potential effect modifiers. The type of intervention is the most likely effect modifier. Other effect modifiers will include: type of health professional duration and intervention. We will use incidence rate ratio (IRR) or risk ratios (RR) for dichotomous data.

We will synthesise data through specific analysis of outcome measures previously described. Where possible, we will present separately results of studies comparing:

- the intervention to no intervention (e.g. telephone training programmes alone);
- the intervention to other forms of intervention (e.g. telephone consulting training versus face-to-face consulting training).

Subgroup analysis and investigation of heterogeneity

Where there are sufficient data and where it is appropriate in the context of the study, we will conduct subgroup analysis. This will allow the examination of the effect of certain studies on the pooled effects of the intervention.

1. Profession/specialty

We will consider the profession and/or speciality of the clinician receiving the intervention. This may identify if differences exist between the training of telephone consulting skills between different specialities and healthcare professionals.

2. Patient characteristics

We will consider the acceptability and effect of the intervention on different patient groups. This may identify whether the training of telephone consulting skills has different effects depending upon specific patient characteristics.

3. Location

We will also consider the location of the study, since differing environments may have impact upon the effect of any intervention.

4. Year of publication

We will consider results by year of publication.

5. Type of intervention

We will consider the nature of the intervention e.g. one-way, interactive, structured tools or multifaceted.

6. Disease specific training interventions and development of protocols.

We will consider the nature of the disease the intervention is affecting and also any protocols that may be developed. This may identify whether there are different training factors required depending upon the disease that is being focused upon.

Sensitivity analysis

We will remove studies from the analysis deemed to be at high risk of bias after examination of individual study characteristics, to examine the effect on the pooled effects of the intervention. We will also consider the assessment of the risk of bias of included studies, as described above. We will exclude studies according to

the following filters.

- Outlying studies after initial analysis.
- Largest studies.
- Unpublished studies.
- Language of publication.
- Source of funding (e.g. public versus industry).
- Other possible considerations for sensitivity analysis will include different measures of effect size (risk difference, odds ratios).

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* Indicates the major publication for the study

APPENDICES

Appendix I. Medline Search Strategy

Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations and Ovid MEDLINE(R) <1948 to Present>

-
- 1 (teleconsult\$ or tele-consult\$).ti,ab. (644)
 - 2 Remote Consultation/ and (tele\$.ti,ab,hw. or (phone or phones).ti,ab.) (2253)
 - 3 or/1-2 [Teleconsult] (2535) [Combine with Filters only]
 - 4 telemedicine/ or telepathology/ or teleradiology/ or Telenursing/ (9653)
 - 5 (teleassist\$ or tele-assist\$ or teleaudiolog\$ or tele-audiolog\$ or telebased or tele-based or telecancer or tele-cardiolo\$ or telecardiolog\$ or telecounselling or tele-counselling or teledental or tele-dental or telederm\$ or tele-derm\$ or telediagnos\$ or tele-diagnos\$ or teledialysis or tele-dialysis or teleecho\$ or tele-echo\$ or teleemerg\$ or tele-emerg\$ or teleepileps\$ or tele-epileps\$ or telefollow\$ or tele-follow\$ or teleguidance or tele-guidance or telehealth\$ or tele-health\$ or telehome\$ or tele-home\$ or teleICU or tele-ICU or teleintervention\$ or tele-intervention\$ or telemanag\$ or tele-manag\$ or telemedicine or tele-medicine or telemental\$ or tele-mental\$ or telemonitor\$ or tele-monitor\$ or telenurs\$ or tele-nurs\$ or teleoncolo\$ or tele-oncolo\$ or teleophthalm\$ or tele-ophthalm\$ or telepalliat\$ or tele-palliat\$ or tele-patholog\$ or tele-patholog\$ or teleprocedu\$ or tele-procedu\$ or telepsych\$ or tele-psych\$ or teleradiol\$ or tele-radiol\$ or telerefer\$ or tele-refer\$ or telerehab\$ or tele-rehab\$ or telesurger\$ or tele-surger\$ or telesurgic\$ or tele-surgic\$ or teletherap\$ or tele-therap\$ or teletreat\$ or tele-treat\$ or teletriage or tele-triage).ti,ab. (8707)
 - 6 (tele\$ adj2 (advice or assist or care or counselling or diagnos\$ or health\$ or intervention? or manag\$ or therap\$ or treat\$ or medicine or medical or nursing or nurse? or physician? or doctor? or practitioner?)).ab. (3588)
 - 7 ((telephone or telephones or phone or phones) and (care or counselling or diagnos\$ or health\$ or intervention? or manag\$ or therap\$ or treat\$ or medicine or medical or nursing or nurse? or physician? or doctor? or practitioner?)).ti. (1848)
 - 8 or/4-7 [Telemedicine] (16468)**
 - 9 Telephone/ or Cellular phone/ (10096)
 - 10 (telephone? or phone or phones or transtelephon\$).ti. (6306)
 - 11 (telephone based or phone based).ab. (590)
 - 12 (telephone? or phone or phones).ab. (36345)
 - 13 or/9-12 [Telephone] (41796)**
 - 14 (remote adj2 (consult\$ or diagnos\$ or monitor\$ or treat\$ or therap\$ or care)).ti,ab. (1485)
 - 15 (e-care or ecare or e-consult\$ or econsult\$ or e-diagnos\$ or ediagnosis\$ or e-health\$ or ehealth\$ or e-medicine or emedicine or e-nurse? or enurse? or e-nursing or enursing or e-physician? or ephysician? or e-psych\$ or epsych\$ or e-therapy or etherapy).ti,ab. [e-Health] (1597)
 - 16 "referral and consultation"/ (44673)
 - 17 consult\$.ti,ab. (64760)
 - 18 exp Patient Care/ (493164)
 - 19 exp Diagnosis/ (5318967)
 - 20 exp patient care management/ or comprehensive health care/ or "delivery of health care"/ or disease management/ or nurse's practice patterns/ or patient care team/ or patient-centered care/ or physician's practice patterns/ (431137)
 - 21 exp health services/ or community health services/ or emergency medical services/ or triage/ or nursing care/ or nursing services/ or patient care/ (1348302)
 - 22 (history adj2 taking).ti,ab. (3329)
 - 23 (patient? adj2 (assess\$ or diagnos\$ or screen\$)).ti,ab. (110158)
 - 24 (care or patient? or treatment?).hw. or diagnosis.fs. (2997595)
 - 25 or/14-24 [Patient Care/Consultation etc] (7274677)**
 - 26 exp Professional Education/ (210709)
 - 27 Inservice Training/ or Staff Development/ (20702)
 - 28 (inservice or ((staff or physician? or nurse or nurses or doctor? or resident? or intern or interns or practitioner?) adj2 (educat\$ or train\$ or development?)).ti,ab. (28607)
 - 29 ed.fs. (189232)
 - 30 (training or education\$).ti. (157238)
 - 31 (skill? adj2 develop\$).ti,ab. (3552)

- 32 (continuing adj2 education\$).ti,ab. (13412)
- 33 CME.ti,ab. and education.ti,ab,hw,fs. (1455)
- 34 communication? skill?.ti,ab. (4464)
- 35 Communication/ and (skill?.ti. or (skill? adj2 develop\$).ab.) (1694)
- 36 ((telephone? or phone) adj3 skill?).ab. (39)
- 37 **or/26-36 [Education/Training]** (412548)
- 38 health personnel/ or infection control practitioners/ or medical staff/ or exp nurses/ or exp nursing staff/ or pharmacists/ or exp physicians/ (202091)
- 39 allied health personnel/ or exp nurses' aides/ or exp physician assistants/ or preceptorship/ (19780)
- 40 (doctor? or nurse or nurses or physician? or practitioner?).ti. (190588)
- 41 ((medical or health\$ or nursing or allied health\$) adj2 (personnel or staff\$)).ti,ab. (30071)
- 42 or/38-41 [Health Professionals] (360208)
- 43 Professional-Patient Relations/ or Physician-Patient Relations/ or Nurse-Patient Relations/ (97107)
- 44 (professional patient or physician patient or nurse patient).ti,ab. (4683)
- 45 **or/43-44 [Professional Professional Relations]** (98684)

COMBINATIONS

- 46 8 and 37 [Telemed & Education] (1514)
- 47 13 and 25 and 37 [Telephone & Patient Care & Education] (2395)
- 48 13 and 45 and 37 [Telephone & Phys-Patient Relations & Education] (182)
- 49 42 and (or/34-36) [Health Professionals and Telephone/Communication Skills] (1118)
- 50 3 or 46 or 47 or 48 or 49 [Results before Filters] (6975)

FILTERS

Cochrane Highly Sensitive Search Strategy for identifying randomized trials in MEDLINE: sensitivity- and precision-maximizing version (2008 revision).

EPOC Methodological Filter

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