Continuing education meetings and workshops: effects on professional practice and health care outcomes (Review)

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[Intervention Review]

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ABSTRACT

Background

Educational meetings and printed educational materials are the two most common types of continuing education for health professionals. An important aim of continuing education is to improve professional practice so that patients can receive improved health care.

Objectives

To assess the effects of educational meetings on professional practice and health care outcomes.

Search strategy

We searched the Cochrane Effective Practice and Organisation of Care Group specialised register, MEDLINE (from 1966), the Research and Development Resource Base in Continuing Medical Education in January 1999 and reference lists of articles.

Selection criteria

Randomised trials or well designed quasi-experimental studies examining the effect of continuing education meetings (including lectures, workshops, and courses) on the clinical practice of health professionals or health care outcomes.

Data collection and analysis

Two reviewers independently applied inclusion criteria, assessed the quality of each study, and extracted study data. We attempted to collect missing data from investigators. We conducted both qualitative and quantitative analyses.

Main results

Thirty-two studies were included with a total of 36 comparisons. The studies involved from 13 to 411 health professionals (total N= 2995) and were judged to be of moderate or high quality, although methods were generally poorly reported. There was substantial

variation in the complexity of the targeted behaviours, baseline compliance, the characteristics of the interventions and the results. The heterogeneity of the results was best explained by differences in the interventions. For 10 comparisons of interactive workshops, there were moderate or moderately large effects in six (all of which were statistically significant) and small effects in four (one of which was statistically significant). For interventions that combined workshops and didactic presentations, there were moderate or moderately large effects in 12 comparisons (eleven of which were statistically significant) and small effects in seven comparisons (one of which was statistically significant). In seven comparisons of didactic presentations, there were no statistically significant effects, with the exception of one out of four outcome measures in one study.

Authors' conclusions

Interactive workshops can result in moderately large changes in professional practice. Didactic sessions alone are unlikely to change professional practice.

PLAIN LANGUAGE SUMMARY

Interactive educational workshops can result in moderately large changes in professional practice

Educational meetings are one of the most common types of continuing education for health professionals, and an important aim of continuing education is to influence professional practice. This review looked at whether educational meetings and workshops aimed at qualified health professionals were effective in improving professional practice or health care outcomes. The following types of planned educational activities were included: meetings, conferences, lectures, workshops, seminars, symposia and courses that occurred off-site from the practice setting. The review found that interactive workshops could result in moderately large changes in professional practice. Lectures or presentations alone were unlikely to change professional practice.

BACKGROUND

Nearly all health professionals attend educational meetings, such as lectures and workshops and, on average, health professionals spend a total of from one to three weeks per year at educational meetings (Frank 2000; Lecoq-d'Andre 1999; Goulet 1998; Nylenna 2000; Turner 1991; Rothenberg 1982). Indeed, for many health professionals, educational meetings are a compulsory component of continuing education and continuing professional development (Peck 2000; Frank 2000). The amount of continuing education time spent at educational meetings is second only to the amount of time spent reading, by self-report (Frank 2000; Goulet 1998; Rothenberg 1982). The amount of resources expended on continuing education meetings for heath professionals is difficult to estimate, but the opportunity costs alone are substantial.

Yet, the effects of each of these activities alone to change professional practice and health care outcomes has been questioned (EBHC 1999; Davis 1995). Although educational meetings may have other benefits such as increased knowledge of appropriate therapy and might contribute to improvements in patient care when combined with other interventions, it is uncertain whether the benefits are worth the costs. Moreover, many educational meetings are organised by the pharmaceutical industry and have a promotional aspect as well as an educational aspect. However, in one survey of general practitioners, it was found that 60% of those who participated in meetings organised by pharmaceutical companies thought them to be of little educational value (Hayes 1990). This raises additional questions about why health professionals attend educational meetings and whether attendance is motivated by other factors.

The nature of continuing education meetings is highly variable in terms of content, the number of participants, the degree and type of interaction, length and frequency. In this review, we examine the effects of continuing education meetings on professional practice. An earlier version of this review has been published previously (Davis 1999). In this update, we have provided more details regarding the included studies and our methods, examined possible factors that might explain variation in the effectiveness of educational meetings more systematically, and included studies targeted at other health professionals in addition to physicians.

OBJECTIVES

This review addresses the following question:

Are educational meetings and workshops effective in improving professionals' practice or health care outcomes?

Comparisons

1. Educational meetings with or without educational materials compared with no intervention/usual care;
2. Educational meetings that use interactive components compared with those that are lecture based;
3. Small group educational meetings compared with large group educational meetings;
4. Educational meetings that include a preceptorship or traineeship with opportunity to practice skills compared with educational meetings alone;
5. Educational meetings that include a local consensus process compared with educational meetings alone.

METHODS

Criteria for considering studies for this review

Types of studies

We included randomised controlled trials (RCTs). We included non-equivalent group designs (NEGD) in which allocation to group was by a non-random process other than participant choice, if data collection was contemporaneous, and the choice of control site/activity appeared appropriate (Cook 1979).

Types of participants

We included studies that evaluated the participation of qualified health professionals or health professionals in post-graduate training (e.g. resident physicians). We excluded studies involving only undergraduate students.

Types of interventions

We included the following types of planned educational activities: meetings, conferences, lectures, workshops, seminars, symposia and courses that occurred off-site from the practice setting. We defined didactic sessions as those that were predominantly lectures or presentations but may have included question and answer periods. Interactive workshops and seminars were defined as sessions that involved some type of interaction amongst participants in small (< 10 participants), moderate (10-19 participants), or large (>19 participants) groups. The interaction may have included role-play, case discussion, or opportunity to practise skills. Mixed sessions included both didactic and interactive components.

Types of outcome measures

We only included studies that reported objectively measured health professional practice behaviour or patient outcomes in a setting where health care was provided.

Search methods for identification of studies

This review builds upon previous work in this area (Davis 1992; Davis 1995; Oxman 1995; Davis 1999). We searched the specialised register of the Cochrane Effective Practice and Organisation of Care (EPOC) Group (see EPOC SEARCH STRATEGY under SPECIALISED REGISTER in GROUP DETAILS),

MEDLINE (1966 to January 1999) without language restrictions, and the Research and Development Resource Base in Continuing Medical Education (RDRB/CME) (Davis 1991). The reference lists of related systematic reviews and all articles obtained were reviewed. The terms for the MEDLINE search follow: education/; exp education,continuing/; exp education,graduate/; internship and residency/; exp inservice training/; preceptorship/; exp teaching/. The educational terms were combined with methodological terms.

Data collection and analysis

Since the protocol was first published, we have reassessed our methods and made substantial changes to them, specifically in the analysis. Two reviewers (MAO and NF/DAD) independently applied inclusion criteria, assessed the quality of each study, and extracted data. The quality of all eligible studies was assessed using criteria described in the EPOC module (see ADDITIONAL INFORMATION, ASSESSMENT OF METHODOLOGICAL QUALITY under GROUP DETAILS) and discrepancies were resolved by discussion between the two reviewers. Each study was then assigned a quality rating (high, moderate, low protection against bias) based on three criteria: study design (RCT versus NEGD), blinded outcome assessment, and completeness of follow-up. We assigned a rating of 'high' protection against bias if all three criteria were scored as 'done', 'moderate' protection if one or two criteria were scored as 'not clear' (or one scored 'not clear' and one scored 'not done'), and 'low' if two or three were scored as 'not done'.

We also categorised the type of intervention, the complexity of the targeted behaviour, and the level of baseline compliance. The type of intervention was categorised as didactic, interactive, or mixed (see criteria for selecting studies for this review). The complexity of the targeted behaviour was categorised in a subjective manner by one of us (MAO) as high, moderate or low depending upon the number of behaviours to be altered and whether other factors such as organisational change were required for the behaviour to be improved. For example, the behaviours in the study by Westphal (Westphal 1995) were categorised as high complexity because hospital policies needed to be changed. Baseline compliance with the targeted behaviours was also categorised in a subjective manner by MAO.

Analysis

For each study, we recorded the main results in natural units (for example, mean prescribing rate per physician). For each outcome, we calculated either absolute or relative post-intervention differences and, where possible, 95% confidence limits. The relative post-intervention difference was used because it could be calculated even when variance estimates were missing. One of its limitations is that it is highly influenced by baseline performance in the control group unless the results have been adjusted using an analysis of covariance. We then reported the size of the effect on a scale from a moderately large effect to a negative effect (Table 1). We used symbols to distinguish statistically significant (X) from non significant results (0). We also indicated when there was a potential unit of analysis error in the primary study (#).

Table 1. Classification of Effect Scores

Effect Score	Absolute*	Relative**
Moderately Large	> 20%	>30%
Moderate	11-20%	21-30%
Small	1-10%	2-20%
Negative difference in favour of the control group		

The following symbols were used: X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error

*The post-intervention difference in compliance for targeted behaviours between the experimental and control groups

**The post-intervention difference in compliance for the targeted behaviours between the experimental and control groups divided by the (post-intervention) compliance for the control group.

See Table 1: Classification of effect scores.

When several major outcomes were reported with different effect scores, a range was reported in the Characteristics of included studies. When a significant difference was reported for only one of several outcome measures, this was reported as an overall small effect score. When relevant data were missing from published reports, we wrote to the corresponding author. Estimates of standard error for individual studies were derived from reported data or from the corresponding authors (two studies) (Browner 1994; Sulmasy 1992a; Sulmasy 1992b).

Potential causes of heterogeneity identified a priori as most likely to explain variation in the results of the included studies were study quality (high, moderate or low protection against bias), the type of educational activity (didactic sessions, mixed or interactive workshops), the complexity of the targeted behaviours (high, moderate or low) and the level of baseline compliance for the targeted behaviour (high, moderate or low). Initially, we anticipated that the type of health professional might be a potential explanatory variable but there were too few studies of health professionals other than physicians or physicians in training. We undertook explanatory analyses to explore the influences of these factors. We visually explored heterogeneity by preparing tables and scatter plots that grouped studies relative to each of these variables in relationship to the relative effect scores (presented as figures within the text of the review, additional information is provided in Table 2: Main Results). Each study was characterised relative to the other variables in the tables, but these visual analyses were primarily univariate, looking at one potential explanatory variable at a time. We looked for patterns in the distribution of the studies, hypothesising that larger effects would be associated with lower study quality, more interaction, less complexity of the targeted behaviour and lower baseline compliance.

Table 2. Overall Results

Study	Protection Against B	Behaviour-Complexity	Baseline Compliance	Intervention Type	Outcomes	Effects
Browner 1994 USA	High	High	Low	didactic	cholesterol screening and compliance with guidelines measured up to 18 months post-intervention	Small negative (relative); p>0.25
Angunawela 1991 Sri Lanka	High	Low	Low	didactic	antibiotic prescribing measured up to three months post-intervention	Small (relative); p>0.5
Sulmasy 1992 (brief) USA	Moderate	High	Low	didactic	care for patients with 'do not resuscitate' orders (4 variables)	Small (relative) (authors reported NS for all four variables. There was a large relative

Table 2. Overall Results (*Continued*)

						difference (40%) in one variable.
Wirtschafter 1986 USA	Moderate	Low-moderate	Not clear	didactic	care provided for neonates neonatal mortality outcomes measured up to 1 year post-intervention	Small (absolute); Patient outcome: small negative (absolute); authors report NS for both outcomes; unit of analysis error
Boissel 1995 France	Moderate	Low	Not clear	didactic	overall number of mammographies overall number of cervical smears	Small (moderate (relative),authors report NS (mammographies); Small (relative) negative for cervical smears; p<0.007
Dolan 1997 USA	Moderate	Low	Low-moderate	didactic	four skin screening activities	Small (moderately large effect (relative) but only on 1/4 variables) Sig
Parker 1995 USA	Moderate	Low	Low for 4/5 variables	didactic	care for patients with diabetes (5 variables)	Small (absolute); authors report NS; unit of analysis error
Jennett 1988 Canada	High	Low for both	cancer screening: Low (control); Moderate (intervention); Hypertension: Low	workshop	cancer screening and hypertension management outcomes measured at 6 and 12 months post-intervention	Moderate (relative) for both outcomes (at 6 months) Sig
Clark 1998 USA	Moderate	High	Low-moderate	workshop	care for children with asthma (9 variables); health care outcomes (4	Small-moderate (relative: (11 variables); abso-

Table 2. Overall Results (*Continued*)

					vari-ables); outcomes measured up to 22 months post-intervention	lute (2 variables) Sig (8 variables)
Heale 1988 Canada	Moderate	Moderate/high	Not clear	workshop	care for patients with any of 5 common problems seen in family practice (6 variables)	Small group vs control=small; small group vs large group= small; large group vs control=small, authors report all comparisons NS (relative); unit of analysis error
Dietrich 1992 USA	Moderate	Moderate	Moderate (20%-79%)	workshop	10 cancer screening behaviours measured 12-14 months post-intervention	Small (moderate effect (sig) for 1/10 behaviours but no effect for 9/10 behaviours); unit of analysis error
Smith 1995 United Kingdom	Moderate	Moderate	Low	workshop	communi-cation skills with women about prena-tal screening outcomes measured immediately and 3 months post-intervention	Moderately large (relative) Sig
Wood 1989 USA	Moderate	Moderate	Moderate-high	workshop	telephone communi-cation skills with parents (3 variables) measured 3 months post-intervention	Moderate (sig) (3 variables: small, moderate, mod-large) (relative)

Table 2. Overall Results (*Continued*)

Kimberlin 1993 USA	Moderate	Moderate	Not clear	workshop	counselling about prescriptions (8 behaviours) measured at 1 and 3 months post-intervention	Moderate/ moderately large (absolute) Sig for 5/8 variables
Hadiyono 1996 USA	Moderate	Low	Low	workshop	use of injections measured 3 months post-intervention	Moderately large (relative) Sig
Levinson 1993 USA	High	Moderate	Not clear	mixed	communciation skills with patients in primary care measured 1 month post-intervention	Small (relative) (authors do not report statistical significance for this comparison)
Maiman 1988 USA	High	Moderate/high	Not clear	mixed	compliance-enhancing strategies patients with no missed doses outcomes measured up to 6 months post-intervention	Moderately large (absolute) Sig for both outcomes Moderately large (absolute) Sig
Mazzuca 1987 USA	High	Moderate	Not clear	mixed	arthritis screening/ management activities measured up to 6 months post-intervention	Moderate (absolute) for screening (Sig); unit of analysis error
Bexell 1996 Zambia	High	Low	Low	mixed	prescribing outcomes measured up to 3 months post-intervention	Small (relative) Sig
Ockene 1996 USA	Moderate	High	Not clear	mixed	cholesterol screening/ management activities measured	Small (relative); authors report NS. However, referrals for

Table 2. Overall Results (*Continued*)

					up to 24 months post-intervention	nutrition counselling were significantly worse in the intervention group.
Roter 1995 USA	Moderate	High	Not clear	mixed	communication skills to address emotional distress	Moderate (relative) Sig for both intervention groups vs. control
Strecher 1991 USA	Moderate	High	Not clear	mixed	smoking counselling patient 6 month quit rate	Moderately-large (relative) Sig; Small difference in patients' quit rate, authors report NS
Sulmasy 1992 (extensive) USA	Moderate	High	Moderate/High	mixed	care for patients with 'do not resuscitate' orders measured 2 to 3 months post-intervention	Moderate (relative) Sig
Jones 1998 United Kingdom	Moderate	High	Moderate	mixed	patient positioning to reduce spasticity measured up to 3 months post-intervention	Small (absolute) Sig (unit of analysis error)
Perera 1983 USA	Moderate	High	Not clear (baseline rate was 9.8 and 6.2 sigmoidoscopies per panel size per 1000 patients 40 years and older)	mixed	rate of sigmoidoscopies per 1000 patients (40 years and older)	Moderately large (relative) Sig
Sulmasy 1996 USA	Moderate	High	Low	mixed	advance directives recorded in charts advance care planning recorded in	Small (absolute). authors report NS at 5 months but sig at follow-up in one of two

Table 2. Overall Results (*Continued*)

					charts (2 variables). Outcomes measured at 5 and 18 months post-intervention	variables; unit of analysis error
Pekarik 1994 USA	Moderate	Moderate-high	Not clear	mixed	group counselling skills, patient satisfaction outcomes measured 10 weeks and 5 months post-intervention	Small for patient outcomes (relative); Sig for 1 of 4 variables (unit of analysis error)
Westphal 1995 Brazil	Moderate	High	Low	mixed	breast-feeding practices in hospitals	Small (relative) (statistical significance not reported)
Kottke 1989 USA	Moderate	Moderate/high	Not clear	mixed	smoking cessation counselling behaviours measured up to one month post-intervention, number of patients who continued to smoke at 1 year	Moderately large (small-moderately-large) (relative) for counselling Sig for 4 of 6 variables Small effect for patient outcome, authors report NS
White 1985 USA	Moderate	Moderate	Moderate	mixed	care for patients with acute myocardial infarction measured 6 months post-intervention	Moderate (relative) Sig
Messmer 1998 USA	Moderate	Low	Not clear	mixed	infection control practices measured 1 week post-intervention	Moderately large (relative) Sig

Table 2. Overall Results (*Continued*)

Ward 1996 Australia	Moderate	Low	Low	mixed	number of patients asked about smoking status, number of patients asked about need for cervical smears	Moderate (relative) Sig No significant difference for cervical smears
Wilson 1992 Canada	Moderate	Low	Low	mixed	provision of exercise advice measured up to 6 weeks post-intervention	Moderately large effect (relative) Sig

We also calculated standardised effect sizes (the difference in means divided by the square root of the pooled group variances) for each comparison (Hedges 1985) when sufficient data were available. We calculated overall estimates of effect using a random effects model (Smith 1995b) and tested for heterogeneity among the results for all of the individual comparisons. In these analyses, comparisons were grouped according to the type of intervention. We calculated an overall estimate of effect for each subgroup of comparisons and tested for heterogeneity.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.

See Characteristics of included studies. Thirty-two studies met the inclusion criteria (36 comparisons). Thirty studies were RCTs and two used a NEGD. Twenty-four studies were based in North America, two in the United Kingdom, and one each in Australia, Brazil, France, Indonesia, Sri Lanka, and Zambia. While most of the participants in the studies were physicians (including postgraduate trainees), other studies involved nurses (Jones 1998; Mazzuca 1987; Messmer 1998; Parker 1995), psychotherapists (Pekarik 1994), pharmacists (Kimberlin 1993), or broadly defined 'health professionals' (Angunawela 1991; Bexell 1996; Hadiyono 1996; Westphal 1995). Health professional behaviour was measured in all but one study (Parker 1995). Eight studies measured a patient outcome (Clark 1998; Kottke 1989; Maiman 1988; Pekarik 1994; Roter 1995; Strecher 1991; White 1985; Wirtschafter 1986).

Nearly all the targeted behaviours involved learning a fairly complex set of skills such as the management of a clinical problem (Clark 1998; Heale 1988; Jones 1998; Kottke 1989; Maiman 1988; Mazzuca 1987; Messmer 1998; Ockene 1996; Parker 1995; Strecher 1991; Sulmasy 1992a; Sulmasy 1992b; Sulmasy 1996; White 1985; Wirtschafter 1986), prescribing (Bexell 1996) or prescribing counseling (Kimberlin 1993) and preventive care (Boissel 1995; Browner 1994; Dietrich 1992; Dolan 1997; Ward 1996; Wilson 1992). Jennett and colleagues (Jennett 1988) targeted preventive care (screening for colon and prostatic cancer) and treatment of hypertension. Four studies were focused upon improving communication skills (Levinson 1993; Roter 1995; Smith 1995b; Wood 1989). Two studies were designed to reduce the use of intramuscular injections in routine care (Angunawela 1991; Hadiyono 1996). One study was aimed at improving the initiation of breastfeeding (Westphal 1995), and one at improving sigmoidoscopy techniques (Perera 1983).

In seven studies, the format of the educational intervention was a lecture (Angunawela 1991; Boissel 1995; Browner 1994; Dolan 1997; Parker 1995; Sulmasy 1992a; Wirtschafter 1986). The duration of the lectures varied from 20 minutes to an all day session (Characteristics of included studies). In three studies, the lectures were held once. In the remaining four studies, the frequency of the lectures varied from twice to seven times.

In 25 studies, the intervention was a continuing education workshop or seminar involving interaction amongst participants sometimes including practice sessions and some type of didactic presentation. Both the duration and the frequency of the intervention varied. In 11 studies, the workshops were held once and lasted anywhere from several hours to two (Dietrich 1992) or three days (Ward 1996). In two of the 11 studies, home study was also expected (Kimberlin 1993; Pekarik 1994). In eight studies, the intervention took place on two occasions with each session lasting from two to three hours. In four studies, the intervention took place on three or more occasions. The longest intervention was a course that took place on 18 consecutive days (Westphal 1995). One of the studies (Jennett 1988) used an intervention that consisted of small group sessions (teleconferences) but no study investigated the use of journal clubs.

Assessing barriers to change and educational needs

Barriers to change were defined as factors affecting the individual or associated with the practice setting that prevented the uptake of new behaviours. Only one study formally assessed barriers to change and designed the intervention specifically to address them: the barrier to change was patient expectations; the subsequent intervention consisted of small focus groups comprised of both patients and health care providers to discuss ways of decreasing the use of intramuscular injections in routine care (Hadiyono 1996). In another study (Jennett 1988), there was an explicit attempt to involve learners by conducting a formal six step assessment of participant learning needs. In 14 studies, the authors explicitly made some attempt to determine the knowledge, attitudes or skills of participants prior to the intervention.

Risk of bias in included studies

Generally, the methods used in the included studies were poorly reported. In seven studies, overall protection against bias was scored as 'high' and in 24 studies, overall protection against bias was scored as 'moderate' (see Characteristics of included studies). There were no studies scored as 'low' protection against bias. In most trials (26/30), adequate concealment of allocation could not be determined from the published report. There was adequate follow-up of health professionals and adequate blinding of the outcome assessment in less than half of the studies. In the two studies that used a NEGD (Messmer 1998; Wood 1989), overall protection against bias was scored as 'moderate' because of adequate blinding and follow-up even though the groups were not randomly assigned. In eight studies, the unit of analysis was not appropriate for interventions aimed at changing the delivery of health care (Divine 1992; Whiting-O'Keefe 1984). These analyses may result in overly narrow confidence intervals.

Effects of interventions

Comparison 1. Educational meetings versus no intervention

There were 32 studies (35 comparisons) that investigated educational meetings versus a non-intervention control group. Of these, 24 studies (26 comparisons) reported significant improvement in professional practice (in at least one major outcome measure). There were statistically significant changes in favour of the experimental group in three of the eight studies that measured a patient outcome. There was important heterogeneity in the effect scores reported, which ranged from a negative effect to moderately large effects (Table 2). For the 12 comparisons for which sufficient data were available to calculate standardised effect sizes, substantial heterogeneity was found ($Q = 38.1$, $df = 11$, $P < 0.0001$).

Comparison 2. Interactive educational meetings versus lectures

There was one direct comparison of educational meetings that included an interactive workshop with a didactic presentation (Heale 1988). This compared a small group format to either a large group case-based discussion or a traditional lecture format and reported no differences between experimental and control groups. In examining indirect (between study) comparisons of interactive workshops and didactic presentations we attempted to control for other differences among the studies, as described under 'Methods'.

Explanatory analyses

Analysis 1. The potential of protection against bias to explain variation in the results

There was little variation in the quality of the included studies based on our classification of study quality. In examining Table 3: High protection against bias and Table 4: Moderate protection against bias, we were unable to detect a pattern of the effect scores in relationship to protection against bias.

Table 3. High Protection Against Bias

Effect Score	Number of Comparisons (n=8)
Relative	Absolute
Moderately Large	X
Moderate	XXX
Small	XXX

Table 3. High Protection Against Bias (*Continued*)

Negative	0

X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error.

Table 4. Moderate Protection Against Bias

Effect Score	**Number of Comparisons (n=28)**
Relative	Absolute
Moderately Large	XXXXXXX
Moderate	XXXXX #
Small	X00000 ########
Negative	

X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error.

Analysis 2. The potential of the type of intervention to explain variation in the results

In examining Table 5: Didactic presentations, Table 6: Mixed didactic presentations and workshops, and Table 7: Interactive workshops, we found a pattern of the effect scores in relationship to type of intervention which corresponded with our a priori hypothesis: the effect scores appear to increase in relationship to increasing interactivity.

Table 5. Didactic Presentations

Effect Score	**Number of Comparisons (n=7)**
Relative	Absolute
Moderately Large	--
Moderate	--
Small	0000 ##
Negative	0

X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error.

Table 6. Mixed Didactic Presentations and Workshops

Effect Score	Number of Comparisons (n=19)
Relative	Absolute
Moderately Large	XXXXXX
Moderate	XXXXX #
Small	X000 ###
Negative	--

X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error.

Table 7. Interactive Workshops

Effect Score	Number of Comparisons (n=10)
Relative	Absolute
Moderately Large	XX
Moderate	XXXX
Small	X ###
Negative	--

X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error.

Didactic presentations

See Table 5: Didactic presentations.

In seven randomised trials, at least one of the experimental arms was a presentation or a lecture targeted at specific behaviours (Angunawela 1991; Boissel 1995; Browner 1994; Dolan 1997; Parker 1995; Sulmasy 1992a; Wirtschafter 1986). The settings of the studies included a general or primary care practice (four studies), a long-term care facility (one study) or a critical care unit (two studies). The duration and frequency of the interventions varied. For example, one intervention consisted of 20 minute sessions held seven times, two weeks apart; other interventions were held once for three hours or seven hours (one day). In six of seven studies, there were no significant differences reported. One study reported a statistically significant effect in one of four skin cancer screening behaviours (Dolan 1997) and is reported as an overall small effect in the figure. In another study (Boissel 1995), there was a significant negative effect on one of two outcomes measures (cervical cancer screening). This study is also reported as an overall small effect in the figure.

Mixed didactic presentations and workshops

See Table 6: Mixed didactic presentations and workshops.

In 18 randomised trials and one study using a non equivalent group design, the interventions combined workshops with didactic presentations. The settings included family practice or primary care (nine studies), acute care (six studies), a health centre (Bexell 1996) or an outpatient clinic (two studies). The duration and frequency of these interventions also varied. For example, one session was held twice and lasted for 1.5 hours, while the longest intervention was held for 18 full days. Eleven studies reported moderate or moderately large effects, and five reported small effects. In two studies, there was no effect of the intervention. Four studies also reported improvement in practice but these studies used an incorrect unit of analysis. Improvement in patient outcomes was noted in two of six studies where these were assessed.

Interactive workshops (eight studies,10 comparisons)

See Table 7: Interactive workshops.

In seven randomised controlled trials, interactive workshops were compared to either a no intervention control group (Clark 1998; Dietrich 1992; Hadiyono 1996; Jennett 1988; Kimberlin 1993; Smith 1995b), a large group problem based session (Heale 1988) or a lecture format (Heale 1988). In six of seven studies, the health professionals practised in a community setting such as a general or family practice (four studies), a community pharmacy (one study), or a public health centre (one study). In one study, the setting was a hospital clinic (Smith 1995b). One non-randomised study examined the effects of a workshop in an out-patient clinic in which paediatric residents used role-play to reinforce telephone consultation skills (Wood 1989). The shortest intervention lasted about one hour while the longest session was held for one day.

In seven of eight studies, there were statistically significant improvements in practice in at least one major outcome measure in favour of the experimental group. In six studies, the effect scores were moderate or moderately large, and in one study the effect score was small. Dietrich et al (Dietrich 1992) reported that only one of 10 preventive care outcomes (mammography) was significantly improved. One of seven studies measured a patient outcome. Clark and colleagues (Clark 1998) reported significant reduction in asthma symptoms among paediatric patients.

Standardised effect sizes for different types of educational meetings

There were only 11 studies (12 comparisons) with sufficient data to calculate standardised effect sizes using an appropriate unit of analysis. The range of effects was from -0.30 (95% CI -0.71 to 0.11) to 1.52 (95% CI 0.58 to 2.47). There was substantial heterogeneity across all of the comparisons (Q = 38.1, df = 11, P < 0.0001). The overall effect size for comparisons that included only didactic elements was -0.02 (95% CI -0.27 to 0.20, Q = 2.72, df = 2, P = 0.26). For the comparisons that included interactive elements, the overall effect size was 0.84 (95% CI 0.51 to 1.17, Q =12.39, df = 8, P = 0.13). The 95% confidence intervals for both didactic and interactive comparisons are broad, reflecting the small number of studies, the small size of the studies and the observed variability of the results.

Analysis 3. The potential of the complexity of the targeted behaviours to explain variation in the results

In examining Table 8: High complexity behaviours, Table 9: Moderate complexity behaviours, and Table 10: Low complexity behaviours, we had the impression that the effect score tends to increase as the complexity of the targeted behaviour decreases, as we hypothesised, although this pattern was not as striking as the pattern we observed in relationship to the degree of interactivity.

Table 8. High Complexity Behaviours

Effect Score	Number of Comparisons (n=12)
Relative	Absolute
Moderately Large	XX
Moderate	XXX
Small	X000 ##
Negative	0

X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error.

Table 9. Moderate Complexity Behaviours

Effect Score	Number of Comparisons (n=13)
Relative	Absolute
Moderately Large	XXX
Moderate	XXX #
Small	0 #####
Negative	--

X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error.

Table 10. Low Complexity Behaviours

Effect Score	Number of Comparisons (n=11)
Relative	Absolute
Moderately Large	XXX
Moderate	XXX
Small	0000 #
Negative	--

X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error.

Analysis 4. The potential of baseline compliance to explain variation in the results

Data for baseline compliance with the targeted behaviour were missing for 16 of the 36 comparisons. In examining Table 11: Moderate baseline compliance, Table 12: Low-moderate baseline compliance, and Table 13: Low baseline compliance, we were unable to detect a pattern of the relative effect scores in relationship to baseline compliance.

Table 11. Moderate Baseline Compliance

Effect Score	Number of Comparisons (n=6)
Relative	Absolute

Table 11. Moderate Baseline Compliance (*Continued*)

Moderately Large	--
Moderate	XXXX
Small	##
Negative	--

X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error.

Table 12. Low-Moderate Baseline Compliance

Effect Score	**Number of Comparisons (n=2)**
Relative	Absolute
Moderately Large	--
Moderate	--
Small	X0
Negative	--

X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error.

Table 13. Low Baseline Compliance

Effect Score	**Number of Comparisons (n=12)**
Relative	Absolute
Moderately Large	XXX
Moderate	XX
Small	0000 ##
Negative	0

X = significant effect in favour of the experimental group; 0 = non significant effect in favour of the experimental group; # = unit of analysis error.

Other comparisons

For the comparison of small group educational meetings versus a large group, there was one study (two comparisons). Heale et al (Heale 1988) reported no significant difference for either comparison.

For the last two proposed comparisons, educational meetings that include a preceptorship or traineeship with opportunity to practise skills compared with educational meetings alone and educational meetings that include a local consensus process compared to educational meetings alone, there were no direct comparisons.

Publication bias

We plotted the relative effect scores against the number of health professionals in each study to explore the possibility of publication bias (Egger 1997). Visual examination suggests that there may be fewer small studies of interactive and mixed interventions with non-significant results (three with fewer than 50 participants) than studies with moderately large effects (six with fewer than 50 participants).

DISCUSSION

How good is the evidence of the effects of continuing education meetings?

In this review, we located 32 studies meeting our inclusion criteria. Given the popularity of continuing education activities as a method to help health professionals keep up to date, there are relatively few studies that rigorously evaluate this activity. Overall, the methods used in the studies were poorly reported. Most authors did not report sufficient detail about the study design, making it difficult to judge the degree to which the results may be biased. For example, concealment of allocation was rarely reported. Similarly, there was insufficient reporting of follow-up of health professionals and blinding of the outcome measures. When important details about study design were missing from the published report, the item was scored as 'not clear' rather than 'not done'. This may have resulted in an under-estimate of the risk of bias. In the review, we categorised the overall quality as high, moderate or low protection against bias based upon the study design, follow-up of health professionals and blinding of assessment of study outcomes. It is possible that these three items may not be the most important sources of bias in implementation research. In addition, the small size of many of the included trials in terms of the number of participating health care professionals, and the fact that most of the participants were volunteers, further limits the strength of the conclusions that can be drawn.

Overall, it is possible that the included studies overestimate the effects of continuing education meetings because of bias in the included studies, the fact that most of the participants were volunteers, and publication bias. While it is possible and perhaps even likely that 'negative' studies with statistically non-significant results were under reported (Dickersin 1997; Stern 1997; Ioannidis 1998), the extent of this bias is impossible to judge. Inspection of a funnel plot diagram in which we plotted the relative effect score against the number of health professionals in each study suggested that there are fewer small studies of interactive and mixed interventions with non-significant results than small studies with moderately large effects. However, the power of this analysis is limited and provides only weak support for the hypothesis that there may have been a publication bias.

Are interactive workshops more effective than lectures?

The use of 'traditional' continuing education such as didactic lectures has been criticised (Davis 1994; Kanouse 1988). Much of this criticism of passive diffusion of information stems from the assumption that participants in continuing education activities are willing and able to make changes, no matter how large a gap between perceptions of desired and actual practice (Davis 1994; Lomas 1987). Based on our review, this criticism appears justified. The few studies included in this review that evaluated didactic presentations alone did not show an effect upon professional practice. This finding does not indicate whether didactic presentations improved knowledge, but it does indicate that they did not improve performance, whether or not they did improve knowledge. In contrast, studies that used small group discussion and practice sessions to enhance skills were more likely to be effective in improving practice. This latter finding was not consistent across all studies as at least 11 comparisosn that used interactive or mixed activities reported small effects or non-significant differences between groups, especially if the behaviour to be changed was complex.

We believe that decisions about continuing education meetings should be based on the results of these subgroups of studies (didactic presentations versus interactive workshops) rather than on the overall results for the following reasons. The hypothesised difference preceded the analysis and is consistent with pedagogical theories, and the magnitude of the interaction was large. The qualitative analyses and the quantitative analyses that we conducted consistently supported that there is a difference in the effects of didactic presentations and interactive workshops. However, support for this hypothesised difference is based on indirect evidence; that is between study comparisons. We found only one direct comparison of a didactic presentation with an interactive workshop, which had inconclusive results.

What makes some interactive workshops more effective than others?

The studies included in this review do not provide helpful evidence regarding the importance of the size of the group, the length or number of sessions, practising skills or achieving a local consensus. We located only one small study that formally examined the size of the group (Heale 1988). In this study, insufficient data were reported, making interpretation difficult. Many interventions lasted for less than a day, failed to involve learners in the design of the intervention yet attempted to influence change in complex behaviours. Since long-term follow-up did not occur in most studies, it is uncertain if any effects of the interventions were long lasting.

AUTHORS' CONCLUSIONS

Implications for practice

Interactive workshops can improve professional practice. Lectures alone are unlikely to change professional practice. For those planning and attending continuing education conferences or meetings, the evidence reviewed here provides support for offering and attending interactive workshops rather than lectures, to the extent that the aim is to improve professional practice. There may be other reasons for offering and attending lectures, including entertainment, social and motivational functions, but interactive workshops are more likely to result in improvements in health care, either alone or in combination with other interventions.

Implications for research

Despite the small number of rigorous evaluations of the effects of lectures on professional practice, this review provides little support for further evaluations of this type of continuing education meeting. In contrast, interactive workshops have variable effects and future research should focus on specific attributes of workshops that may contribute to their effectiveness, including group size, the opportunity to practise skills and the use of follow-up sessions. Qualitative process evaluations combined with RCTs of interactive workshops could help to clarify how specific attributes of workshops might contribute to effects on professional practice. Better reporting of these trials would also help.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Angunawela 1991

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: DONE Overall protection against bias: HIGH
Participants	31 prescribers (physicians or assistant medical practitioners) in 15 institutions Behaviour complexity: LOW Country: SRI LANKA
Interventions	Didactic: 3-hour 'seminar' with 7-8 participants + educational materials (EM)
Outcomes	antibiotic prescribing measured up to three months post-intervention Baseline compliance: LOW
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Bexell 1996

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: DONE Overall protection against bias: HIGH
Participants	Prescribers (clinical officers and medical officers) in 16 health centres Behaviour complexity: LOW Country: ZAMBIA
Interventions	Mixed: Three two-day seminars held over four months
Outcomes	prescribing outcomes measured up to 3 months post-intervention Baseline compliance: LOW

Bexell 1996 (*Continued*)

Notes		
Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Boissel 1995

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	385 general practitioners in 278 practices providing breast and cervical cancer screening Behaviour complexity: LOW Country: FRANCE
Interventions	Didactic: session + EM held for 1 day
Outcomes	overall number of mammographies overall number of cervical smears outcomes measured up to one year post-intervention Baseline compliance: NOT CLEAR
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Browner 1994

Methods	RCT Randomisation concealment: DONE (off-site computer generated list) Follow-up providers: DONE Blinded assessment: DONE Overall protection against bias: HIGH

Browner 1994 (*Continued*)

Participants	197 doctors in 174 practices conducting screening for high serum cholesterol Behaviour complexity: HIGH Country: USA
Interventions	Didactic: 'seminar' (lecture) held for 3 hours
Outcomes	cholesterol screening and compliance with guidelines measured up to 18 months post-intervention Baseline compliance: LOW
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Clark 1998

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	74 general paediatricians in community-based practices providing care for asthmatic children Behaviour complexity: HIGH Country: USA
Interventions	Workshop: two 2.5 hour seminars, 2 to 3 weeks apart, interactive video, small group
Outcomes	care for children with asthma health care outcomes outcomes measured up to 22 months post-intervention Baseline compliance: LOW-MODERATE
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Dietrich 1992

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	98 doctors in 98 practices providing cancer screening for 2595 patients. Services: mammograms, clinical breast examinations, breast self- examination, cervical cytology, foetal occult blood, rectal examination, sigmoidoscopy, advice: reduce fat, increase fibre, quit smoking Behaviour complexity: MODERATE Country: USA
Interventions	Workshop: small group tutorial including discussion held for 2 days
Outcomes	10 cancer screening behaviours measured 12-14 months post-intervention Baseline compliance: MODERATE (20%-79%)
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Dolan 1997

Methods	RCT Randomisation concealment: DONE (random numbers table) Follow-up providers: NOT DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	82 general internal medicine house staff and attending physicians providing screening for skin cancer for 195 patients classified as moderate-to-high risk Behaviour complexity: LOW Country: USA
Interventions	Didactic: Two 1-hour small group sessions (coded by the reviewers as didactic based on the authors' description of the intervention)
Outcomes	four skin screening activities Baseline compliance: LOW-MODERATE
Notes	

Dolan 1997 (*Continued*)

Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Hadiyono 1996

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: NOT CLEAR Blinded assessment: DONE Overall protection against bias: MODERATE
Participants	24 health care centres in central Java providing care for out-patients Behaviour complexity: LOW Country: Indonesia
Interventions	Workshop: group discussion with patients and health professionals held for 1.5-2 hours
Outcomes	use of injections measured 3 months post-intervention Baseline compliance: LOW
Notes	

Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Heale 1988

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: NOT DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	46 family doctors, providing care for patients with one of 6 common problems Topics: transient ischaemic attacks, hypertension, pre-menstrual syndrome, chlamydial infections, dementia, prescribing Behaviour complexity: MODERATE/HIGH Country: CANADA

Heale 1988 (*Continued*)

Interventions	Workshop: large group problem based vs. small group problem based vs. lecture
Outcomes	care for patients with any of 5 common problems seen in family practice Baseline compliance: NOT CLEAR
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Jennett 1988

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: DONE Overall protection against bias: HIGH
Participants	31 family doctors in 25 practices providing care for 2077 episodes of patients with risk of colorectal or prostatic cancer or with hypertension Behaviour complexity: LOW for both groups Country: CANADA
Interventions	Workshop: 1.5 hour small group meeting + 2 teleconferences + EM held over 6-8 weeks
Outcomes	cancer screening and hypertension management outcomes measured at 6 and 12 months post-intervention Baseline compliance cancer screening: LOW (control); MODERATE (intervention); Hypertension: LOW
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Jones 1998

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	59 nurses and health care assistants from five wards in two teaching hospitals providing care for patients post-stroke Behaviour complexity: High Country: UNITED KINGDOM
Interventions	Mixed: Two 2-hour lectures (second lecture was primarily a practical session and included feedback) +EM
Outcomes	patient positioning to reduce spasticity measured up to 3 months post-intervention Baseline compliance: MODERATE
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Kimberlin 1993

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: NOT CLEAR Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	194 community-based pharmacists providing prescriptions for 762 elderly patients Behaviour complexity: MODERATE Country: USA
Interventions	Workshop: 1 day workshop (including small group discussion) + home study + EM
Outcomes	counselling about prescriptions (8 behaviours) measured at 1 and 3 months post-intervention Baseline compliance: NOT CLEAR
Notes	

Risk of bias

Kimberlin 1993 (*Continued*)

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Kottke 1989

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: NOT DONE Blinded assessment: DONE Overall protection against bias: MODERATE
Participants	66 doctors general/family practices providing smoking cessation interventions for 6053 patients Behaviour complexity: MODERATE/HIGH Country: USA
Interventions	Mixed: 3 hour sessions including didactic presentation and small group discussion + patient materials held twice
Outcomes	smoking cessation counselling behaviours measured up to one month post-intervention: number of patients who continued to smoke at 1 year Baseline compliance: NOT CLEAR
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Levinson 1993

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: DONE Overall protection against bias: HIGH
Participants	31 general internists, family doctors in practices encouraged to improve communications skills for 473 patients Behaviour complexity: MODERATE Country: USA

Levinson 1993 (*Continued*)

Interventions	Mixed: 4.5 hour didactic presentation + case based discussion
Outcomes	communication skills with patients in primary care measured 1 month post-intervention Baseline compliance: NOT CLEAR
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Maiman 1988

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: DONE Overall protection against bias: HIGH
Participants	83 paediatricians in practices, encouraged to provide medication compliance strategies to patients with otitis media Behaviour complexity: MODERATE/HIGH Country: USA
Interventions	Mixed: 2.5 hour tutorial (didactic and discussion) + EM held twice
Outcomes	compliance-enhancing strategies patients with no missed doses outcomes measured up to 6 months post-intervention Baseline compliance: NOT CLEAR
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Mazzuca 1987

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: DONE Overall protection against bias: HIGH
Participants	29 public health nurses in seven older-adult clinics providing care for patients with arthritis Behaviour complexity: MODERATE Country: USA
Interventions	Mixed: One 3-hour lecture and one practical session +EM
Outcomes	arthritis screening/management activities measured up to 6 months post-intervention Baseline compliance: NOT CLEAR
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Messmer 1998

Methods	NEGD Randomisation concealment: NOT DONE Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	50 nurses in a medical centre providing care for patients with tuberculosis Behaviour complexity: LOW Country: USA
Interventions	Mixed: Series of videotapes followed by group discussion + EM
Outcomes	infection control practices measured 1 week post-intervention Baseline compliance: NOT CLEAR
Notes	

Risk of bias

Messmer 1998 (*Continued*)

Item	Authors' judgement	Description
Allocation concealment?	Unclear	D - Not used

Ockene 1996

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	45 internists in a managed care setting, providing nutrition counselling in hyperlipidemia Behaviour complexity: HIGH Country: USA
Interventions	Mixed: 2.5 hours mixed session (role play, didactic) + patient dietary form, followed by .5 hour individualised tutorial
Outcomes	cholesterol screening/management activities measured up to 24 months post-intervention Baseline Compliance: NOT CLEAR
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Parker 1995

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: NOT CLEAR Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	35 registered nurses (RNs) and licensed practical nurses (LPNs) in 2 long-term care facilities with a minimum of 20 residents with diabetes Behaviour complexity: LOW Country: USA

Parker 1995 (*Continued*)

Interventions	Didactic: Seven 20-minute sessions each 2 weeks apart over a 12 week period (lecture with slides followed by question-and-answer period)
Outcomes	care for patients with diabetes (5 variables) Baseline compliance: LOW for 4/5 variables
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Pekarik 1994

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: NOT CLEAR Blinded assessment: DONE Overall protection against bias: MODERATE
Participants	22 therapists in 3 out-patient clinics providing therapy to 247 clients Behaviour complexity: MODERATE/HIGH Country: USA
Interventions	Mixed: 1 day workshop (didactic presentation, skills training, case review, 'homework' (taped session with actual patient)) follow-up: 1.5 hours held once
Outcomes	group counselling skills patient satisfaction outcomes measured at 10 weeks and 5 months post-intervention Baseline compliance: NOT CLEAR
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Perera 1983

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	26 doctors from 1 prepaid HMO, providing sigmoidoscopy to patients>40 years Behaviour complexity: HIGH Country: USA
Interventions	Mixed: ½ day preceptorship + didactic review + discussion held twice
Outcomes	rate of sigmoidoscopies per 1000 patients (40 years and older) Baseline compliance: NOT CLEAR (baseline rate was 9.8 and 6.2 sigmoidoscopies per panel size per 1000 patients 40 years and older)
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Roter 1995

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: NOT DONE Blinded assessment: DONE Overall protection against bias: MODERATE
Participants	88 general internists, family doctors in practices encouraged to improve communications skills for 648 patients Behaviour complexity: HIGH Country: USA
Interventions	Mixed: 4 hour sessions including didactic presentation and interactive discussion + EM + practice with simulated patient + homework + role-play held twice
Outcomes	communication skills to address emotional distress patient distress score at 6 months Baseline compliance: NOT CLEAR
Notes	

Roter 1995 (*Continued*)

Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Smith 1995a

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	35 obstetricians & midwives providing information to pregnant women about a screening test Behaviour complexity: MODERATE Country: UNITED KINGDOM
Interventions	Workshop: small group discussion and video + EM (1 hour)
Outcomes	communication skills with women about prenatal screening outcomes measured immediately and 3 months post-intervention Baseline compliance: LOW
Notes	

Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Strecher 1991

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	261 residents in 11 primary care training programmes providing smoking counselling Behaviour complexity: HIGH Country: USA

Strecher 1991 (*Continued*)

Interventions	Mixed: 1 hour tutorial including 10 minute lecture, 20 minute group discussion + 1 hour small group or individual follow-up
Outcomes	smoking counselling patient 6 month quit rate Baseline compliance: NOT CLEAR
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Sulmasy 1992a

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: NOT CLEAR Blinded assessment: NOT DONE Overall protection against bias: MODERATE
Participants	83 internal medicine residents and doctors providing care for 96 patients with 'do not resuscitate orders' Behaviour complexity: HIGH
Interventions	Didactic: 6 lectures (brief intervention)
Outcomes	care for patients with 'do not resuscitate' orders Baseline compliance: LOW
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Sulmasy 1992b

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: NOT CLEAR Blinded assessment: NOT DONE Overall protection against bias: MODERATE
Participants	83 internal medicine residents and doctors providing care for 96 patients with 'do not resuscitate' orders Behaviour complexity: HIGH
Interventions	Mixed: 6 lectures +6 case conferences +rounds +EM over 6 months (extensive)
Outcomes	care for patients with 'do not resuscitate' orders measured 2 to 3 months post-intervention Baseline compliance: MODERATE/ HIGH
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Sulmasy 1996

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: NOT DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	Approximately 88 internal medicine residents in a medical centre providing care for out-patients Behaviour complexity: HIGH Country: USA
Interventions	Mixed: One ½-hour lecture, videotape, practice, and feedback
Outcomes	advance directives recorded in charts advance care planning recorded in charts outcomes measured 18 months post-intervention Baseline compliance: LOW
Notes	

Risk of bias

Sulmasy 1996 (*Continued*)

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Ward 1996

Methods	RCT Randomisation concealment: DONE (random numbers table) Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	34 general practice trainees providing preventive care for 1500 patients Behaviour complexity: LOW Country: AUSTRALIA
Interventions	Mixed: 3 day workshop (didactic presentation, small group skill practice, role-play)
Outcomes	number of patients asked about smoking status number of patients asked about need for cervical smears Baseline compliance: LOW
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Westphal 1995

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	health professionals in 8 hospitals providing advice about breast feeding Behaviour complexity: HIGH Country: BRAZIL
Interventions	Mixed: full-time for 18 days over 3 weeks

Westphal 1995 (*Continued*)

Outcomes	breast-feeding practices in hospitals Baseline compliance: LOW
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

White 1985

Methods	RCT Randomisation concealment: NOT CLEAR Follow-up providers: NOT CLEAR Blinded assessment: DONE Overall protection against bias: MODERATE
Participants	103 family doctors or general internists in 12 communities caring for in-patients post myocardial infarction Behaviour complexity: MODERATE Country: USA
Interventions	Mixed: 2 hour workshop + discussion + EM
Outcomes	care for patients with acute myocardial infarction measured 6 months post-intervention Baseline compliance: MODERATE
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Wilson 1992

Methods	RCT Randomisation concealment: DONE (computer generated) Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	22 family doctors providing exercise counselling for 410 patients Behaviour complexity: LOW Country: CANADA
Interventions	Mixed: 2 hour workshop (discussion, practical teaching with videotaped patients) + patient materials
Outcomes	provision of exercise advice measured up to 6 weeks post-intervention Baseline compliance: LOW
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Wirtschafter 1986

Methods	RCT Randomisation concealment: NOT CLEAR (stratified on factors associated with neonatal mortality) Follow-up providers: DONE Blinded assessment: NOT CLEAR Overall protection against bias: MODERATE
Participants	172 doctors and 239 nurses in 40 hospitals caring for new-borns in a neonatal intensive care unit Behaviour complexity: LOW-MODERATE Country: USA
Interventions	Didactic: 1.5 hour lecture + case discussion + EM held twice 6-8 months apart
Outcomes	care provided for neonates neonatal mortality outcomes measured up to 1 year post-intervention Baseline compliance: NOT CLEAR

Wirtschafter 1986 (*Continued*)

Notes		
Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Wood 1989

Methods	NEGD Randomisation concealment: NOT DONE Follow-up providers: DONE Blinded assessment: DONE Overall protection against bias: MODERATE
Participants	13 paediatric residents in 1 out-patient department providing management over the telephone Behaviour complexity: MODERATE Country: USA
Interventions	Workshop: ½ hour sessions with role-play and discussion held 3 times
Outcomes	telephone communication skills with parents (3 variables) measured 3 months post-intervention Baseline compliance: MODERATE-HIGH
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	D - Not used

Characteristics of excluded studies *[ordered by study ID]*

Camp-Sorrell 1991	Control group received education
Campbell 1991	Outcomes were not measured in a clinical situation
Carlsson 1998	Outcomes were not measured in a clinical situation

(*Continued*)

Davidoff 1989	Control group received education
Dunn 1992	Outcomes were not measured in a clinical situation
Francke 1997	Outcomes were based on self-report
Langewitz 1998	Outcomes were not measured in a clinical situation
Ockene 1995	Outcomes were not measured in a clinical situation
Quirk 1991	Outcomes were not measured in a clinical situation
Roter 1990	Outcomes were not measured in a clinical situation
Saturno 1995	Outcomes were based on self-report
Stross 1983	Outcomes were not measured in a clinical situation
Terry 1981	Outcomes were not measured in a clinical situation
Zwar 1995	Outcomes were based on self-report

DATA AND ANALYSES

This review has no analyses.

FEEDBACK

Discrepencies in characteristics of included studi

Summary

1. In table 03 (overall results), the study by Hadiyono is entered as 'Hadiyono 1996 USA'; whereas in the table (characteristics of included studies) it is described as a study conducted in Indonsesia.
2. The text of the review (description of studies)states that '24 studies were based in North America, two in UK, and one each in Australia, Brazil, France, Indonesia and Sri Lanka'. However, in the table(characteristics of studies), the studies by Heale (1988), Jennett (1988), and Wilson (1992) are described as being conducted in Canada. Unless there is a reason for these studies to be classified as North American studies, it would be useful (for the reader) to distinguish between studies conducted in Canada and those in the USA.
I certify that I have no affiliations with or involvement in any organisation or entity with a direct financial interest in the subject matter of my criticisms.

Contributors

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WHAT'S NEW

Last assessed as up-to-date: 8 November 2000.

12 November 2008	Amended	Converted to new review format. Minor edits.

HISTORY

Review first published: Issue 2, 2001

9 November 2000	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

MAO and NF applied the inclusion criteria, assessed the quality and

extracted the data for the included studies. ADO, JH, and MAO conducted the qualitative analysis. NF and FW conducted the quantitative analysis. MAO drafted the manuscript with input from ADO and NF. JH,FW and DAD provided comments on the manuscript.

Acknowledgements: ATV and CF conducted the literature searches.

DECLARATIONS OF INTEREST

None known.

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- Chief Scientist Office, Scottish Office Home & Health Department, UK.
- Health Evidence Linkage & Application Network, Industry Canada, Canada.
- Society of Medical College Directors of Continuing Medical Education, USA.
- Health Services Research Unit, University of Aberdeen, UK.

INDEX TERMS

Medical Subject Headings (MeSH)

*Congresses as Topic; Education, Continuing [methods; *standards]; *Process Assessment (Health Care); Professional Practice [*standards]; Randomized Controlled Trials as Topic

MeSH check words

Humans