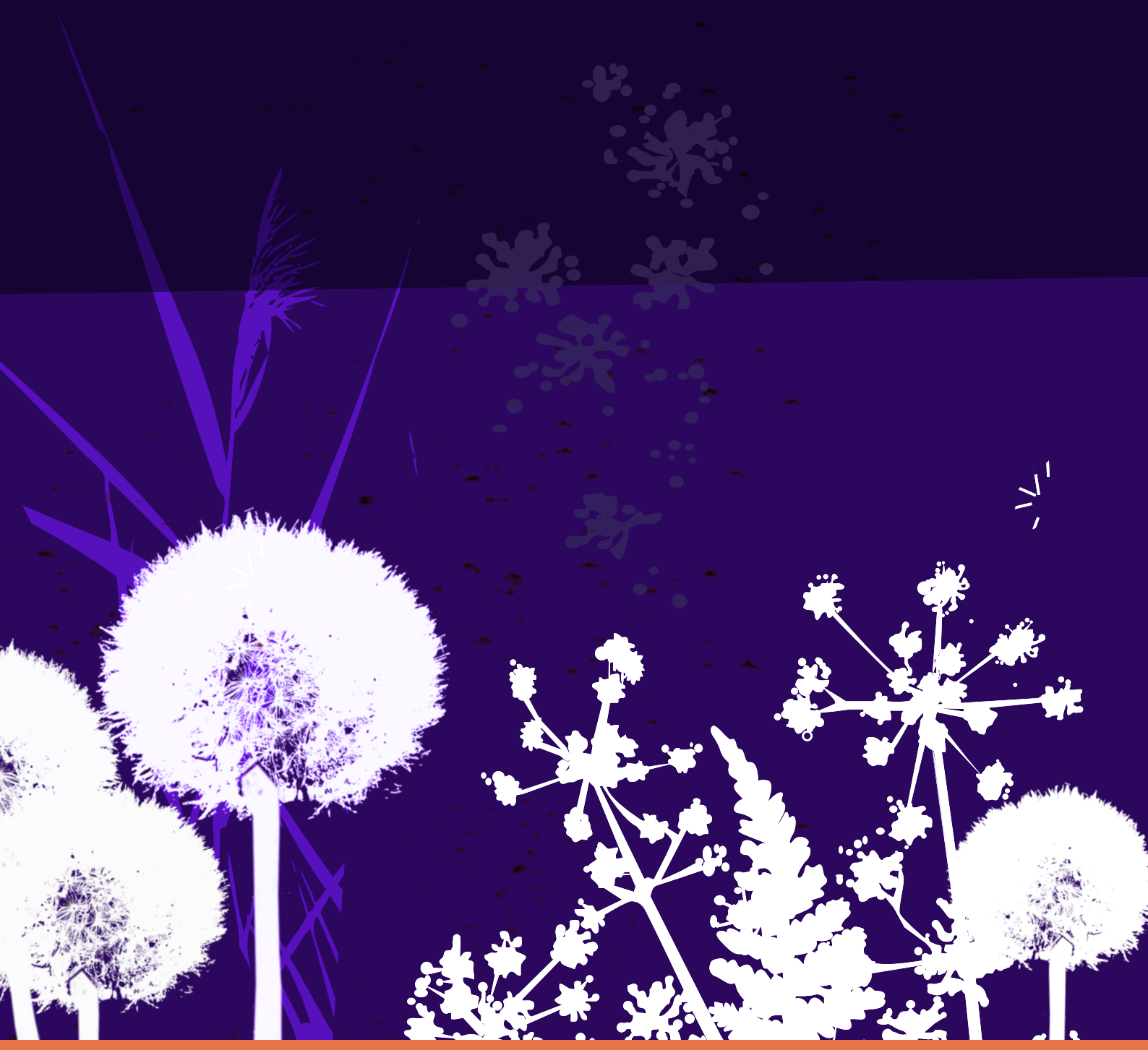
Effective Dissemination

A Systematic Review of Implementation Strategies for the AOD Field



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This report is the first part of a 3-part series.

Part One: Effective Dissemination: A Systematic Review of Implementation Strategies for the AOD Field

Part Two: Effective Dissemination: An Examination of the Costs of Implementation Strategies for the AOD Field

Part Three: Effective Dissemination: An Examination of the Theories and Models of Change for Research Dissemination

Reports can be downloaded from the NCETA website or hard copies are available on request.

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Related Publications

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Bywood PT. (2006) Judging the research: Tools for best practice. *Of Substance*, 4 (3): 28-29.

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1. Executive Summary

Introduction

Innovations, such as treatment interventions, programs and therapies, may be costly to develop and evaluate and there is increasing political and financial pressure to ensure that effective and cost-effective health care and professional services are available where needed. However, even when practitioners are aware of the evidence for best practice and are willing to change their behaviour, actually making the required changes in the context of long established patterns of behaviour can be difficult, particularly if the organisational environment is not conducive to change. Moreover, innovations are not self-executing. Even simple programs that require only small changes may benefit from an effective implementation strategy.

The National Centre for Education and Training on Addiction (NCETA) undertook a systematic literature review of the most commonly used strategies designed to increase the uptake of innovations into professional practice. Analyses were undertaken to evaluate their effectiveness and to determine their relevance and applicability for use in the alcohol and other drugs (AOD) field. By evaluating and synthesising the evidence from a wide range of sources, NCETA aimed to identify the key factors underlying successful dissemination strategies and develop a framework for dissemination and implementation of innovations in the AOD field.

Methods

A rigorous and systematic search of a wide range of electronic databases, journals, websites and bibliographies was undertaken, resulting in 4,650 citations. From these, a total of 651 potentially relevant articles were collected and examined. Pre-determined selection criteria were applied and the total evidence base for this review was 25 existing systematic reviews and 85 additional primary studies. Studies were critically appraised according to the strength of the evidence (level of evidence, quality of evidence and statistical precision), size of the effect and relevance of the evidence (NHMRC, 2000).

Sixteen dissemination and implementation strategies were evaluated.
These are listed in Table 1.

The effectiveness of dissemination interventions were assessed in terms of:

1. Process outcomes: changes in behaviour or practice, and compliance with recommended guidelines
2. Patient outcomes: the impact of an intervention on patients' or clients' health status, functional ability, management of their problem and quality of life.

For each of the 16 dissemination strategies examined, a brief description, summary of the evidence on their effectiveness, key success factors, and relevance to the AOD field is provided (see Chapters 7-9).

Table 1. Dissemination and implementation strategies

Professional interventions: to change knowledge / behaviour of individual health care professionals
1. Educational materials 2. Local consensus processes 3. Educational meetings 4. Educational outreach (academic detailing) 5. Local opinion leaders 6. Patient-mediated interventions 7. Prompts and reminders 8. Audit and feedback 9. Financial incentives 10. Electronic educational sources
Organisational interventions: to change the setting or systems in which health care professionals work
11. Record and office systems 12. Multi-disciplinary collaborative approaches 13. Alternative care approaches 14. Continuous quality improvement
Other interventions
15. Mass media 16. Multi-faceted interventions

Results

Overall, there was a paucity of evidence specific to the AOD field. Therefore, most evidence is drawn from the general health and medical fields. Available evidence was typically of average quality, with most studies prone to some degree of bias. Findings from the better quality studies indicated that some strategies may provide small improvements in professional practice, including preventive care, treatment, disease management and rehabilitation or palliative care.

Table 2 provides a summary of the 16 strategies assessed and their effectiveness for improving practitioners' behaviour and patients' outcomes in different clinical areas. Strategies that demonstrated more robust evidence of effectiveness, particularly in some clinical areas, are highlighted.

Table 2. Summary of effectiveness of all strategies across a range of clinical areas

Strategy	Clinical areas	Process outcomes	Patient outcomes
Professional interventions			
1. Educational materials	Disease management	NS	NS
	Prescribing	+	NA
	Preventive care	NS	NA
2. Local consensus processes	Disease management	+	+
	Preventive care	+	NA
3. Educational meetings	Disease/pain management	+	+
	Prescribing/test ordering	+	NA
	Preventive care	++	+
	Counselling/communication	++	NA
	Diagnosis	NS	NS
4. Educational outreach visits	Disease/pain management	+	NS
	Prescribing/test ordering	++	NS
	Preventive care	+	+
5. Local opinion leaders	Adherence to guidelines	+	NS
	Prescribing	NS	NS
	Referrals	+	NA
6. Patient-mediated interventions	Disease management	NS	+
	Prescribing	+	NA
	Preventive care	+	NS
7. Prompts and reminders	Disease/pain management	++	+
	Prescribing/test ordering	++	+
	Preventive care	+++	NS
	Diagnosis	+	NS
	Adherence to guidelines	+	NS
8. Audit and feedback	Disease management	++	+
	Prescribing/test ordering	++	NA
	Preventive care	++	NA
	Adherence to guidelines	+	NS
9. Financial incentives	Preventive care	NS	NS
	General medicine	NS	NS
10. Electronic educational resources	Preventive care	+	NA
Organisational interventions			
11. Record and office systems	Preventive care	+	NA
12. Multi-disciplinary collaborations	Disease management	+	+
13. Alternative care providers	Disease management	+	+
14. Continuous quality improvement	Disease management	+	+
Other interventions			
15. Mailouts and mass media	Referral	NS	NA
16. Multi-faceted interventions	Disease/pain management	+	NS
	Prescribing/test ordering	+	NA
	Preventive care	++	+
	Diagnosis	NS	NA
	Counselling	+	NA

+ indicates minimal effect in few outcomes; ++ indicates small improvement in most outcomes; +++ indicates robust improvement in most outcomes; NA = not assessed; NS = not significant.
indicates more effective strategies

From the available evidence, strategies found to be effective for changing the behaviour of individual health care professionals (professional interventions) were:

- Educational meetings
- Educational outreach
- Prompts and reminders
- Audit and feedback.

Educational materials alone were not shown to be very effective for improving professional practice. However, their effect was enhanced when delivered in conjunction with other more effective strategies.

Opinion leaders have shown little evidence of effectiveness in changing practitioner behaviour. However, of the few studies undertaken to evaluate the effectiveness of opinion leaders, study quality was generally poor to average.

Compared to the literature evaluating the effectiveness of professional interventions, there were few available studies evaluating organisational strategies. However, results indicated that change at the organisational level is facilitated if implementation strategies consider the following factors:

- Clarity of purpose of a program or innovation
- Limitations of time and resources within an organisation
- Existing workloads and expectations
- Staff cohesion, communication and openness to change
- Workplace culture.

Even if staff are aware of the need to change and accept that an innovation will fulfil their needs, the organisational culture may moderate the effectiveness of strategies used to facilitate uptake.

Multi-faceted interventions may also be useful across a broad range of AOD-related areas of practice. However, due to the heterogeneity of studies that comprised different combinations of interventions in diverse settings, it was not possible to identify which particular combination was most effective. Evidence showed that using more strategies was not necessary to improve practice; just a small number of well-chosen strategies targeted to the behaviour and tailored to the setting.

The strategies that were more consistently effective in areas that may be relevant for the AOD field are listed in Table 3:

Table 3. Summary of effective strategies for AOD-related activities in different clinical areas

Effective dissemination strategies	Clinical area (examples of AOD-related activities)
Educational meetings (interactive)	Preventive care • Advice on smoking cessation • Advice on AOD use in pregnancy • Advice on risky drinking • Alcohol and / or drug screening • AOD contraindications with medications
	Treatment • Pharmacotherapy • Brief interventions • Motivational interviewing • Cognitive behavioural therapy • Referral to specialist
Educational outreach visits	Preventive care
	Treatment
	Management and rehabilitation • Pharmacotherapy monitoring • Management of depression • Management of AOD-related illness • Management of relapse
Prompts and reminders	Preventive care
	Treatment
	Management and rehabilitation
Audit and feedback	Preventive care
	Management and rehabilitation
Multi-faceted interventions	Management and rehabilitation

Key findings

Of the 16 dissemination strategies evaluated in this review, the four most successful strategies that have shown benefits across different clinical areas were:

1. Interactive educational meetings
2. Educational outreach visits
3. Prompts and reminders
4. Audit and feedback.

Successful uptake of innovations into practice may be influenced by the characteristics of effective dissemination strategies and contextual factors that may facilitate or inhibit the implementation process. Knowing the key elements of successful implementation strategies means that time and resources will not be wasted on elements that do not enhance the implementation process. While the available evidence must be interpreted with caution, overall results indicate that the most successful implementation strategies include the following features:

- Clear and succinct message, with simple, focussed objectives that require small practical changes
- Reliable and credible source, with accurate, evidence-based information
- Interactive format that is appealing, persuasive and encourages participation
- Tailored information that is personalised and modified to the local setting
- Relevance of information to the practitioner and their client needs
- Clear identification of roles and activities
- Systems or procedures that are accessible and easy to use, with little effort required to comply
- Assessment of, and focus on barriers to change
- Address changes at multiple levels, including the individual practitioner behaviour, organisational structure and culture, and health system policy
- Organisational changes that require practitioners to respond or take action (e.g., automatic prompts and obligatory responses)
- Reinforced messages, with additional materials and support
- Sustainability of strategy over a prolonged period.

Contextual factors that may enhance the effectiveness of strategies included:

- Identifying the need for change
- Making the target audience aware of the need to change and motivating them to change
- Providing adequate resources and staffing to integrate changes into existing systems
- Evaluating and monitoring the fidelity of an innovation over time to ensure that all staff are “with the program”.

While few studies assessed the impact of dissemination strategies on client outcomes, those that did showed little or no benefit to clients' health, functional status, quality of life or satisfaction with treatment or service received. However, since studies were typically conducted over relatively short time periods, longer follow-up and reinforcement of changes may be necessary to detect sustained improvements at the level of the client.

In conclusion:

1. All strategies examined were effective to some extent
2. Some strategies appeared to be more effective than others in bringing about changes in practitioners' behaviour
3. No single strategy was effective in all situations.

Findings from this review highlight the need for the careful selection of dissemination strategies to ensure the best match with content area and target audience or behaviour. It also underscores the need for further and better quality research in the area of research dissemination in general, with the inclusion of suitable control groups. Given the lack of studies conducted in the AOD field, or pertaining to AOD-related issues, it is essential that dissemination and implementation strategies used in this area be evaluated appropriately where possible.

Evidence on costs of implementation strategies and the theoretical basis for using such strategies are addressed in two additional reports:

1. Effective dissemination: An examination of the costs of implementation strategies for the AOD field
2. Effective dissemination: An examination of the theories and models of change for research dissemination.

2. Rationale for the Review

Substantial resources, both financial and human, have been invested into research and development of innovations, such as interventions, programs, procedures, or guidelines to reduce harms associated with alcohol and other drug (AOD) use. As a result, much is known about which innovations are effective. However, despite evidence of effectiveness of good quality interventions and programs, often little use is made of them to achieve important outcomes for clients with AOD-related problems. That is, effective interventions and programs are not self-executing and require additional dedicated effort to facilitate their implementation. This has led to the development of a broad range of dissemination and implementation strategies to introduce good quality research into practice.

However, the selection of strategies to encourage uptake and implementation of innovations is rarely based on rigorous evaluation of the effectiveness of different approaches, but rather on a variety of factors, including motivational, organisational and fiscal pressures. Grol (1997) suggests that *"evidence-based medicine should be complemented by evidence-based implementation"* (Grol, 1997). That is, the same strength of evidence should be used for determining which implementation strategies to use to get innovations adopted into practice as is used for determining which innovations / interventions to use to address clients' needs.

To achieve evidence-based implementation, the National Centre for Education and Training on Addiction (NCETA) sought to identify and evaluate the effectiveness of dissemination and implementation strategies through the systematic literature review process, which aims to:

- Condense and integrate empirically-supported evidence gathered from a wide range of sources
- Minimise bias and the effects of chance, which are known shortcomings of non-systematic, narrative reviews
- Generate inferences that provide a basis for decision-making (Khan, Ter Riet, Glanville, Sowden, & Kleijnen, 2001).

This review focused on identifying and appraising dissemination strategies designed to increase the uptake and implementation of innovations by the alcohol and other drug (AOD) workforce. This project examined strategies designed to change professional and organisational practice at different phases of the research-to-practice process. In addition, this project sought to identify the key success factors of effective dissemination strategies that enable the innovations to be implemented.

3. Introduction

Evidence-based health care aims to deliver the best, most current evidence from research and apply it judiciously across the continuum of care, from prevention to palliation. However, one of the most consistent findings across all areas of health and medical research is the inevitable gap between evidence-based knowledge and the application of research findings in practice. This is due largely to the time lag between advances in clinical research and the dissemination of information that may improve the quality of health care. The terms “research-practice gap” or “failure of success” are commonly used to describe this trend (Backer, 2000; Robbins, Bachrach, & Szapocznik, 2002).

Although research may indicate that the use of specific innovations has the potential to provide significant benefits to patients or clients, the uptake and implementation of these innovations by practitioners is frequently limited. Even simple innovations require some degree of individual or organisational change stimulated by a dedicated implementation strategy. That is, information is a necessary but insufficient lever to induce change in professional practice or processes.

A key to the efficient adoption of research innovations into practice is determining:

> *“what works for whom, in what circumstances, and in what respects” (Pawson, 2006, p 25).*

3.1. Burden of disease and prevalence of AOD problems

Problems associated with the use of alcohol and other drugs (AOD), and the well-established comorbidity with mental illnesses (Kessler, 2004), impact on individuals’ health and the broader social environment, making a substantial contribution to morbidity and mortality across all age groups in Australia. The report, *Statistics on drug use in Australia 2006* (AIHW, 2007), showed that while smoking rates have declined over the period 1991 to 2004, drinking patterns have remained relatively unchanged over the last fifteen years. Use of various illicit drugs continues at worrying levels with substantial increases in some instances (as in the case of methamphetamine) and some recorded decreases (as in the case of cannabis). In 2003, approximately 8% of the burden of disease was attributable to the use of tobacco, 3% to alcohol use and 2% to illicit drug use (AIHW, 2007).

The impact of substance-related problems on individual health includes the development of cancers, heart disease, infectious diseases, road and workplace fatalities / injuries and danger to the health of infants born to mothers affected by substance-related problems. In the social environment, suicide, road fatalities and injuries (passengers, pedestrians, occupants of other vehicles), assaults, domestic violence and unemployment are potential consequences of alcohol and / or drug-related problems (Collins & Lapsley, 1996; NHMRC, 2001).

3.2. Management and treatment of AOD-related problems

A wide range of research-based innovations, such as treatment interventions, tools (e.g., those used for screening), programs and guidelines, have been developed to minimise harms related to AOD use. These innovations may be applied across the continuum of health care, including preventive health, treatment of acute or chronic dependence, substance use management and rehabilitation of clients with AOD problems and / or associated mental illnesses. Box 1 lists examples of AOD-related activities across the continuum of care that may benefit from effective dissemination of innovations.

Box 1. AOD-related activities

Level of Care	Examples in AOD field
Preventive care	Advice on smoking cessation Advice on alcohol or drug use in pregnant women Advice on risks of alcohol or drug use (e.g., risky and high risk drinking) Alcohol or drug screening Contraindications of alcohol use with other medication
Treatment	Prescribing of pharmacotherapies or therapeutic drugs for treatment of dependence (e.g., methadone, nicotine replacement therapy) Brief interventions Motivational interviewing Cognitive behavioural therapy
Management	Maintenance and management of clients on pharmacotherapies (e.g., outcome monitoring for opioid substitution treatment) Management of depression and other psychological conditions associated with use of AOD Management of chronic illness related to use of AOD (e.g., hepatitis C, liver cirrhosis, HIV)
Rehabilitation	Management of relapse in clients with AOD dependence
Palliative care	Treatment for clients with terminal illness related to use of AOD (e.g., cancer)

Effective innovations have the potential to minimise the deleterious effects of harmful AOD use. Although a number of successful interventions have been identified and, in some cases empirically validated, their adoption into clinical practice has often been limited. For example, brief interventions used as a secondary prevention strategy for problem drinkers, smokers and in some instances, illicit drug users, are generally effective. However, while brief intervention, which has also demonstrated cost-effectiveness (Effective Health Care Bulletin, 1993; Wutzke, Shiell, Gomel, & Conigrave, 2001), led to 10-16% reduction in alcohol use in intervention groups compared to no-intervention control groups (Moyer, Finney, Swearingen, & Vergun, 2002), its uptake into practice has been slow (Roche & Freeman, 2004). In contrast, regardless of evidence that school-based drug education interventions have little or no long-term effect on reducing or preventing drug and alcohol use in young people, they continue to be used extensively (Foxcroft, 2005; Kaner et al., 2007; White & Pitts, 1998).

Despite substantial investment of resources into the development, validation and evaluation of effective innovations (across all areas of research), once distributed, they frequently languish unused due to lack of investment into helping potential users understand, adopt and implement the innovation. That is, dissemination of validated innovations or best practice may not result in sustained changes at the individual, organisational, or community levels unless efforts are made to support and facilitate the uptake of the innovation.

3.3. Dissemination and implementation of innovations

3.3.1. Definitions and terms

For the purposes of this review, innovations are the treatments, programs, preventive care and other activities aimed at clients; whereas dissemination or implementation strategies are the efforts used to facilitate adoption of innovations into practice and are aimed at the level of the practitioner or organisation. While the term "intervention" is used to describe some clinical actions aimed at clients (e.g., brief intervention), in this review it refers primarily to the specific implementation interventions (strategies) evaluated in the studies.

Dissemination and implementation are two separate, yet related processes that represent the end-point goal of successful adoption of an innovation into practice. Dissemination is the process of informing others of an innovation, whereas implementation follows the decision to adopt an innovation and refers to how the innovation is put into practice (Gotham, 2004).

Information dissemination and implementation, knowledge transfer, knowledge translation, information transfer, technology transfer and diffusion of innovation are all terms used to describe the mechanisms needed to transmute research findings into effective changes in health practice or policy. Dissemination strategies are defined in this report as any strategy used to facilitate the dissemination and implementation of innovations, such as programs, tools, interventions, or guidelines, through a planned or systematic process. They include not only the distribution of innovations, but also the activities that occur between the development of an innovation and its application in an appropriate setting. Dissemination is an active process that involves a cascade of events, which are not necessarily linear in nature, and a collection of stakeholders, such as researchers, healthcare providers, program evaluators, administrators, frontline workers, organisations and public policy makers.

3.3.2. Research – to – practice gap

Research on dissemination strategies spans diverse fields from agriculture to manufacturing and medicine and includes both 'hard' technologies, such as specialised equipment or computer programs, and 'soft' technologies, such as educational techniques or training workshops (Schoenwald & Hoagwood, 2001). One of the most common tools for improving the quality of health care is clinical practice guidelines (CPGs). While the development of disease-specific CPGs is well-established, strategies for disseminating information and implementing change in health care practice have been applied inconsistently and studies indicate that the extent to which CPGs are incorporated into clinical practice is disappointing (Karuza et al., 1995). For example, gaps between the development of evidence-based best practice, such as CPGs, and the actual use of such guidelines has led to the underuse, overuse, or misuse of health care services (Chassin & Galvin, 1998). In a review of 48 studies on quality of care in the US, less than 50% of patients received the recommended care. Moreover, in 20-30% of cases, the care given ranged from ineffective to potentially detrimental (Schuster, McGlynn, & Brook, 1998).

The underlying reasons for the gulf between formulating best practice and implementing best practice have been debated at length. Uptake and implementation of innovations typically require changes in professional practice that may occur at several different levels – patient / client, health care provider, health care team, health care organisation, or the wider environment (e.g., public policy changes). Barriers to uptake may be related to knowledge, existing culture or belief system of a group, routine practices, available resources, or individual characteristics of the providers, end-users and the innovation to be implemented.

There are three key elements to consider when addressing the research – to – practice gap. They are:

1. Attributes of the evidence supporting a change in practice: While evaluation of such attributes is beyond the scope of this review, evidence supporting the use of dissemination strategies is drawn from studies that used dissemination strategies to implement a wide range of innovations. Such innovations vary in complexity from practice that is relatively easy to change, has clearly defined benefits and is well-accepted by practitioners, to practice that requires more effort to change behaviour and / or organisational systems and has less robust evidence base to support the change. In the latter case, practitioners may feel less willing to comply with changes that they are not convinced will be beneficial. Thus, the attributes of the innovation that is being implemented may impact on the results of studies evaluating the dissemination strategies used to facilitate implementation.
2. Barriers and facilitators to changing practice: Contextual factors including costs, availability of resources (human and financial) and the prevailing culture within a workplace may also impact on the capacity and commitment to change. While barriers and facilitators are discussed in the context of the evidence, a comprehensive and systematic examination of the barriers and facilitators to change was beyond the scope of this review.
3. Effectiveness of dissemination and implementation strategies.

3.3.3. Dissemination of AOD-related materials, programs and services

The dissemination challenge in the AOD field is complicated further by a combination of characteristics that distinguish the AOD workforce from other healthcare workers (Skinner, Freeman, Shoobridge, & Roche, 2003). Frontline workers in the AOD field come from a broad range of disciplines and backgrounds, including medicine, social work, psychology, teaching and the criminal justice system. As a result, their educational qualifications, training in AOD issues, and understanding or appreciation of research varies considerably. In some sections of the AOD workforce, other factors, such as the rapid turnover of staff, poor pay, and overall low status, may impact on their capacity and motivation to adopt new research concepts and implement innovations. Consequently, effective dissemination strategies must bridge the conceptual and cultural distance between the research centre and the AOD workforce. This may require tailoring dissemination strategies for the very disparate target audiences that make up the AOD workforce.

4. Objectives and Research Questions

4.1. Primary objectives

- To undertake a systematic literature review of the effectiveness of different dissemination and implementation strategies that are used in, or relevant to, the AOD field (i.e., dissemination of innovations used by the AOD workforce).
- To identify key success factors / components of the dissemination strategies that influence uptake and implementation.
- To develop a framework for dissemination strategies relevant to the AOD field.

4.2. Research questions

The primary research question was:

- Which dissemination and implementation strategies are most likely to be effective in encouraging uptake of innovations by workers in the AOD field?

Secondary research questions were:

- Which strategies have been used to influence changes in the work practices of health care professionals, allied health care workers, or frontline workers in the AOD field?
- Have these strategies been successful in changing individual behaviour and workplace practices?
- What are the key factors underlying the successful uptake and implementation of dissemination strategies?
- Which dissemination strategies are likely to be relevant to the AOD field?

5. Methods

Research on the effectiveness of dissemination strategies and the barriers to, or facilitators of, dissemination and implementation strategies is extensive. A scoping search revealed two important features in the literature:

- Systematic reviews and studies evaluating dissemination strategies specifically in an AOD setting or pertaining to AOD-related issues were sparse
- The literature evaluating dissemination strategies in the general medical field was abundant.

Therefore, this project was conducted in two stages:

Stage 1: A descriptive evaluation of *existing systematic literature reviews* of dissemination research in medical and health literature.

The scoping search revealed a number of existing systematic reviews that were used to inform this project. Although the focus of some reviews varied from that of this study (e.g., broad or specific strategies; targeted behaviours; characteristics of the target groups; barriers to implementation), studies that were included in those existing reviews were also deemed to be relevant to this project.

Since several existing reviews contained many of the same studies, another systematic review of essentially the same body of research was unwarranted. Therefore, to avoid unnecessary duplication of effort, existing systematic reviews were critically appraised and an overview of the findings from the highest quality reviews is presented. In particular, effective dissemination and implementation strategies pertaining to workers in the AOD field were examined.

Stage 2: A systematic search and evaluation of research on dissemination strategies relevant to the AOD field.

Literature searches were extended to include relevant *additional studies* that were not covered by existing systematic reviews and studies that focused specifically on AOD–related problems or were set in an AOD context. Given that AOD-related problems frequently co-occur with mental health problems, search terms were expanded to include the mental health literature.

For this report, dissemination interventions were allocated to categories that have been described previously by the Effective Practice and Organisation of Care (EPOC) review group taxonomy (EPOC, 2002). For interpretive purposes, these categories have been separated into 16 professional, organisational and ‘other’ strategies (see Table 4).

Table 4. List of interventions for dissemination and implementation (modified from EPOC taxonomy) [a]

Type of strategy	Description
1. Professional Interventions - oriented to changes in professional practice	
Educational materials	Distribution of published / printed recommendations for care, including clinical practice guidelines, audiovisual materials and electronic publications. Materials are delivered personally or through mass mailings.
Local consensus processes	Inclusion of participating providers in discussion to ensure that they agree that the chosen clinical problem is important and the approach to managing the problem is appropriate. E.g., modification of clinical practice guidelines to local setting.
Educational meetings (continuing medical education)	Healthcare providers participate in conferences, lectures, workshops or traineeships. *Didactic* – minimal participant interactions (lectures, seminars) *Interactive* – participation with discussion or practice (workshops)
Educational outreach visits (academic detailing)	Use of a trained person who meets with providers in their practice setting to give information with the intent of changing the provider's practice.
Local opinion leaders (includes product champions)	Use of providers nominated by their colleagues as 'educationally influential'. The investigators explicitly state that their colleagues identified the opinion leaders.
Patient-mediated interventions	New clinical information (not previously available) collected directly from patients and given to the provider.
Prompts and reminders (including decision support)	Patient- or encounter-specific information, provided verbally, on paper, or on electronically, which is designed to prompt a health professional to recall information. This usually occurs through general education, in medical records or by interactions with peers, reminding them to perform or avoid some action to aid individual patient care. Computer-aided decision support and drugs dosage are included.
Audit and feedback	Any summary of clinical performance of healthcare over a specified period. The summary may also include recommendations for clinical action. The information may be obtained from medical records, computerised databases or observations from patients.
Financial incentives	Any payment system that rewards health care providers for specified clinical actions. Examples include fee-for-service, target payments, and capitation.
Electronic educational sources	Healthcare providers use electronic, internet, ,or on-line databases to access information relevant to all levels of health care for patients.
2. Organisational interventions - oriented to changes in organisational practice	
Record and office systems	Any structured or unstructured system used for storage and exchange of information. Examples include electronic medical records, care plans, flow charts.
Multi-disciplinary collaborative approaches (integrated care)	Use of complementary inter-professional collaborations (nurses, physicians, psychologists, pharmacists, dieticians) to plan care for patients. Examples include integrated care, collaborative care, continuity of care.
Alternative care approaches	Use of alternative health professionals, such as nurse practitioners, or alternative settings, such as specialist clinics, to deliver specialised program of care. Examples include revision of professional roles; chronic care clinics; and therapeutic communities.
Continuous quality improvement	Any iterative process for improving the quality of health care that involves repeated cycles of "plan-do-check-act".
3. Other interventions	
Mass media	1. varied use of communication that reaches great numbers of people including television, radio, newspapers, posters, leaflets and booklets, alone or in conjunction with other interventions. 2. targeted at the population level.
Multi-faceted interventions	Use of more than one strategy in combination or sequentially.

[a] This table has been modified from the EPOC taxonomy (EPOC, 2002). Some strategies, which were described by EPOC, were not included here as no studies or existing reviews met the inclusion criteria for evaluation.

5.1. Inclusion criteria

Studies were included in the review if they satisfied predetermined inclusion criteria (Table 5) and provided relevant information addressing the research questions. Uncertainties about inclusion status were resolved by group consensus.

Table 5. Study selection criteria

Selection criteria	Inclusion criteria
Target audience	Health care organisations or groups of health care professionals that implement strategies to deliver health services. These health care organisations include hospitals, clinics, rehabilitation centres, or groups of staff working together as a team (doctors, nurses, mental health workers), social workers, psychologists, counsellors, youth workers, crisis care workers, ambulance officers, pharmacists, public health workers, general welfare workers, police, school counsellors, teachers, correctional services officers, drug treatment providers).
Intervention	Dissemination and implementation strategies to induce change in professional practice or process (see Table 4). Information is required on the method of dissemination, the process of implementation, the target group adopting the innovation, the materials used in the intervention, and the client group targeted for improved health outcomes. Studies evaluating the effectiveness of the individual innovations (e.g., brief interventions, cognitive behavioural therapy) being disseminated are excluded.
Comparator	"Usual" or standard dissemination strategies, including no intervention or passive dissemination strategies (e.g., mailout of clinical practice guidelines or standard training session).
Outcomes	Effectiveness: *Process outcomes:* - Any objective measures of utilisation of innovation – assessment of participation (change in practice or process, including surrogate outcomes (e.g., audit of records / charts, +/- feedback); measures of compliance with innovation (fidelity to intervention); assessment of participant satisfaction; assessment of efficiency (change in productivity of organisation). If objective measures are lacking – subjective measures, such as self-report questionnaires may be included if they include longer-term follow-up evaluation (e.g., >3 months after intervention). *Client outcomes:* Any objective measures of impact of implementing the innovation on clients – patient functional ability or health status, number of hospitalisations, patient / client ability to manage their disease / drug problem, patient / client quality of life, satisfaction with intervention.
Study design	*Limited to comparative studies:* systematic reviews of controlled studies; randomised controlled trials; quasi-experimental controlled studies (e.g., cohort studies), controlled before-and-after studies, interrupted time series with at least 3 measures before and 3 after implementation.
Study duration	A study period of at least 3 months is preferred to demonstrate a sustainable change. If unavailable, a shorter study period will be considered.
Language	Restrict to English language publications, unless the study provides a higher level of evidence.
Baseline performance	Baseline measurements or control group performance must be included when assessing effectiveness so that potential "ceiling effects" may be determined.

5.2. Search Strategy

The medical and health literature was searched to identify:

- relevant systematic reviews on dissemination strategies used to improve the uptake and implementation of innovations across all areas of health care (Stage 1).
- relevant recent research (not included in existing systematic literature reviews) that evaluated the effectiveness and cost-effectiveness [1] of dissemination strategies in the general and medical fields, including the AOD and mental health fields (Stage 2).

The search period was 1966 to March 2005. Table 6 lists the bibliographic databases that were used for these searches. Table 7 lists other potentially relevant sources of literature that were canvassed, including grey literature.

Table 6. Bibliographic databases

Electronic database	Time period
AustHealth	1997 – March 2005
Australian Medical Index	1996 – March 2005
Australian Public Affairs Information Service (APAIS) - Health (Informit)	1990 – March 2005
Cinahl	1977 – March 2005
Cochrane Library – including, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, the Cochrane Central Register of Controlled Trials (CENTRAL), the Health Technology Assessment Database, the NHS Economic Evaluation Database	1966 – March 2005
Current Contents	1993 – March 2005
Cochrane Effective Practice and Organisation of Care (EPOC) register	1995 – March 2005
Health Services/technology assessment text (HSTAT)	www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=hstat
National Coordinating Centre for Health Technology Assessment	www.hta.nhsweb.nhs.uk/
PubMed and Medline	1966 – March 2005
PapersFirst	1993 – March 2005
PsycInfo	1983 – March 2005
Web of Science – Science Citation Index Expanded	1995 – March 2005

[1] Cost considerations are included in a separate associated report.

Table 7. Other sources of information

Specialty Websites	Website address
National	
Alcohol and other Drugs Council of Australia (ADCA)	www.adca.org.au/resource/
Cooperative Research Centre for Aboriginal Health, Northern Territory	www.crcah.org.au
Drug and Alcohol Services of South Australia (DASSA)	www.dassa.sa.gov.au/site/page.cfm
Menzies School of Health Research, Darwin, Northern Territory	www.menzies.edu.au/
National Drug and Alcohol Research Centre (NDARC), Sydney	ndarc.med.unsw.edu.au/ndarc.nsf
National Drug Research Institute (NDRI), Perth	www.curtin.edu.au/curtin/centre/ncrpda/
National Institute of Clinical Studies (NICS), Melbourne	www.nicsl.com.au
Primary Health Care Research and Information Service (Australia)	www.phcris.org.au/resources/research/dissemination_frameset.html
International	
Addiction Technology Transfer Center (ATTC), Missouri, USA	www.nattc.org/resPubs/techTransfer.html
Canadian Health Services Research Foundation (CHSRF), Canada	www.chsrf.ca/
Canadian Institutes of Health Research (CIHR), Canada	www.cihr-irsc.gc.ca/e/8505.html
Centre for Reviews and Dissemination, (CRD), York, UK	www.york.ac.uk/inst/crd/
Getting Research into Policy and Practice (GRIPP), UK	www.jsiuk-gripp-resources.net/gripp/do/viewPages?pageID=1
Health Services Research Unit - University of Aberdeen (Scotland)	www.abdn.ac.uk/hsru/epp/index.shtml
Knowledge Integration and Network Expertise (Germany)	www.tim.rwth-aachen.de/forschung/kinx2/index.php
National Center for the Dissemination of Disability Research (NCDDR), Texas, USA	www.ncddr.org/
National Institute on Drug Abuse (NIDA), USA	www.nida.nih.gov/
North East Addiction Technology Transfer Network (NeATTC), Pittsburgh, USA	www.neattc.org/index2.html
Substance Abuse and Mental Health Services Administration (SAMHSA), USA	www.samhsa.gov/index.aspx
Specialty Journals	**Location**
Addiction	Library or electronic access
Alcohol and Alcoholism	Library or electronic access
Drug and Alcohol Review	Library or electronic access
Health Education Research	Library or electronic access
Health Services Research	Library or electronic access
Journal of Community Psychology	Library or electronic access
Journal of Continuing Education for Health Professionals	Library or electronic access
Journal of Drug Issues	Library or electronic access
Journal of Substance Abuse Treatment	Library or electronic access
Preventive Medicine	Library or electronic access
Social Science and Medicine	Library or electronic access

5.3. Search terms

Electronic databases were searched using a combination of MeSH headings and text words, including the following: *Dissemination* – information dissemination, diffusion of innovation, technology transfer, knowledge transfer, knowledge translation, implementation, continuing medical education, reminders, prompts, opinion leaders, academic detailing, educational outreach, feedback, decision support; *AOD and mental health* – substance-related disorders, addictive behaviour, substance abuse, substance use, addiction, dependence, alcohol abuse, mental health service; *Study population* – health personnel, professional practice, social work, police, doctor, nurse, physician, clinician, health worker, social worker, counsellor, teacher; and *Study design* – randomised controlled trial, comparative study, cohort study, multicenter study, random allocation, meta-analysis, review.

5.4. Critical appraisal

The evidence reported in studies that met the inclusion criteria were assessed according to the dimensions of evidence defined by the National Health and Medical Research Council (NHMRC, 2000). These dimensions of evidence (Table 8) contain three domains:

- Strength of the evidence, which includes the level of evidence, quality of evidence and statistical precision
- Size of the effect
- Relevance of the evidence.

Table 8. Dimensions of evidence

Type of evidence	Definition
Strength of the evidence	
Level of evidence	The study design used, as an indicator of the degree to which bias has been eliminated by design.
I	Evidence obtained from a systematic review of all relevant randomised controlled trials.
II	Evidence obtained from at least one properly-designed randomised controlled trial.
III-1	Evidence obtained from well-designed quasi-randomised controlled trials (alternate allocation or some other method).
III-2	Evidence obtained from comparative studies (includ8ing systematic reviews of such studies) with concurrent controls and allocation not randomised, cohort studies, case-control studies, or interrupted time series with a control group.
III-3	Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel control group.
IV	Evidence obtained from case series, either post-test or pre-test / post-test.
Quality of evidence	The methods used by investigators to minimise bias within a study design.
Statistical precision	The p-value or, alternatively, the precision of the estimate of the effect. It reflects the degree of certainty about the existence of a true effect.
Size of the effect	The distance of the study estimate from the “null” value and the inclusion of only clinically important effects in the confidence interval.
Relevance of evidence	The usefulness of the evidence in clinical practice, particularly the appropriateness of the outcome measures used.

Methodological components, such as concealment of allocation, blinding and completeness of data, have been shown to impact on treatment effect sizes (Moher et al., 1998; Schulz, Chalmers, Hayes, & Altman, 1995) and are included in the checklists, which are provided in Appendix A. These checklists were used to assess the quality of systematic reviews (Khan et al., 2001), comparative studies (EPOC, 2002) including randomised and concurrently controlled trials, controlled before-and-after studies and interrupted time series, and cohort studies (Downs & Black, 1998).

5.5. Data extraction and synthesis of evidence

Reference citations from all literature sources were collated into an Endnote 10.0 library and duplicates were removed. If it was clear from citation information that studies did not meet the inclusion criteria, they were excluded, without retrieval. All other studies were retrieved for full-text assessment. Additional studies were collected by pearling [2] the reference lists of articles that met the selection criteria. These additional relevant studies were critically appraised and all studies that satisfied the inclusion criteria formed the evidence base.

Using tables developed *a priori*, data for each of the relevant outcomes were extracted from the included studies by two researchers (PB and BL) and checked by each researcher for face validity. Tables of data from included studies for each of the 16 groups of dissemination interventions are provided in Appendix B.

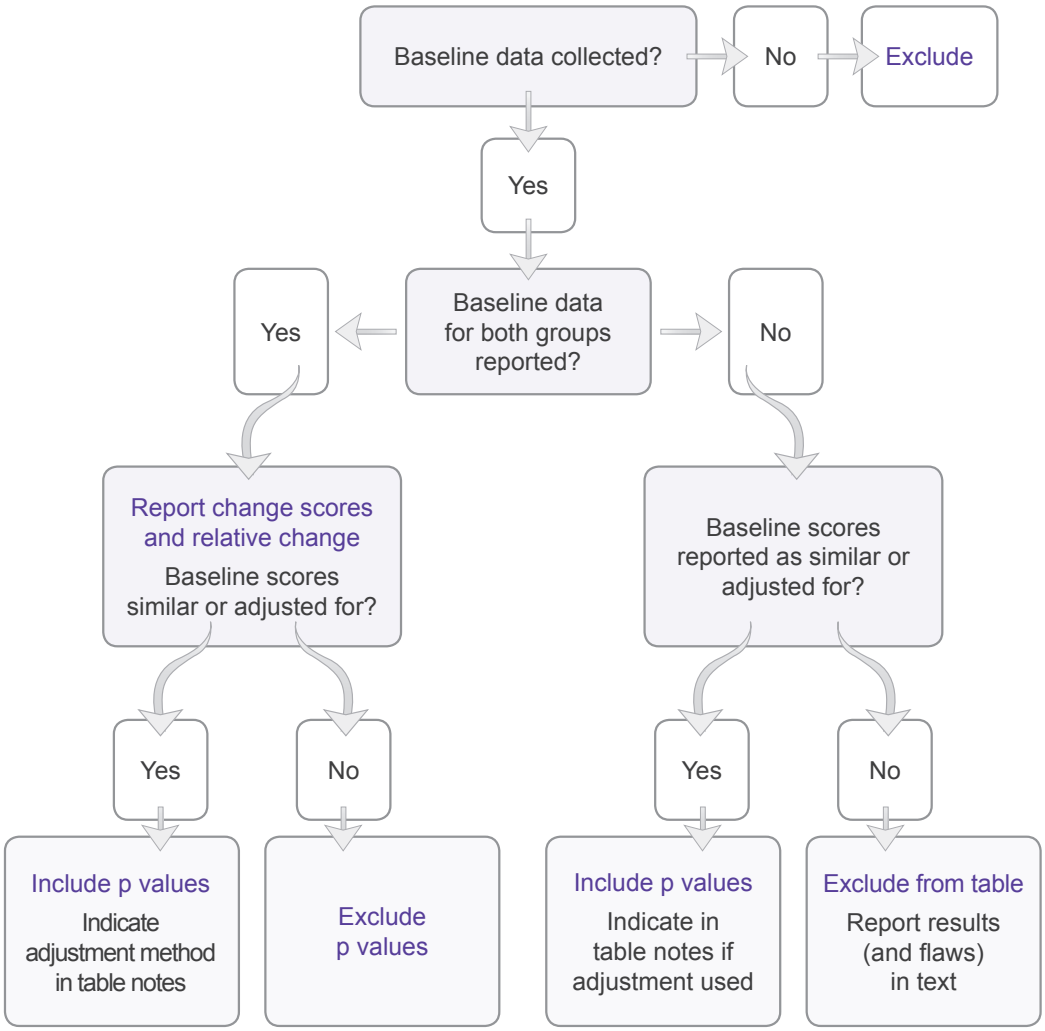
5.6. Statistical and methodological considerations

All studies were examined for potential unit of analysis errors. Unit of analysis errors occur when the unit of allocation is the health care organisation, or group, and the unit of analysis is the individual client, or patient, as if there were no clustering by organisation or provider. This type of error overestimates the power of the study unless the clustering effect is adjusted for. Although the point estimate is not affected by a unit of analysis error, making it possible to examine the size of an effect, it is not appropriate to determine its statistical significance as it results in spuriously low p-values or artificially narrow confidence intervals (Grimshaw et al., 2003), thereby potentially overestimating the effectiveness of an intervention.

A key factor in determining the effectiveness of particular strategies is to ensure that baseline scores between intervention and control groups are similar. Where they are not similar, it is important that such baseline differences be adjusted for, using appropriate statistical techniques. Thus, the final “post-intervention” measure reflects “real” changes, rather than differences that may have been present at baseline. Where baseline measures in intervention and control groups indicate that the usual procedures may be adequate (e.g., high percentage of participants already comply with best practice guidelines, demonstrating a “ceiling effect”), then the intervention used has little scope to demonstrate improvement. Studies that did not collect baseline measures were excluded. A decision tree regarding baseline measures was used by researchers when extracting data (see Figure 1).

[2] Pearling involves searching the reference lists of studies that were included for assessment to identify additional relevant studies that were not located through the initial search strategy. Potentially relevant additional studies were then subjected to the selection criteria and critical appraisal procedures.

Figure 1. Decision tree for managing baseline data



Where baseline and follow-up data were reported for both intervention and control groups, a within-groups change score and between-groups relative change was calculated.

Follow-up score – baseline score = change score
Change score (intervention group) / change score (control group) = relative change

If the same data were reported in more than one published paper, only results from the most comprehensive or most recent article were included. Members of the reference group were contacted and requested to provide information on additional published or unpublished reports that were not identified in the literature searches.

The heterogeneity in settings, interventions, populations and outcome measures of the included studies, and the frequency of potential unit of analysis errors precluded conducting a formal meta-analysis. Vote-counting methods (Table 9), which have been used in several systematic reviews to determine the effectiveness of strategies, were not used in this review. This approach has several weaknesses for interpreting research findings. It is an inefficient use of statistical information, which fails to consider the effect size or the precision of the estimate of the effect, and ignores some negative and inconclusive results.

Table 9. Vote-counting methods

Description of vote-counting methods	Limitations
Add positive and negative comparisons across included studies	Ignores some negative and inconclusive results
Add the number of comparisons with statistically significant effects Positive = statistically significant change in majority of outcomes measured (intervention is better than control) Negative = statistically significant change in the opposite direction (control is better than intervention) Inconclusive = no significant change or no overall positive findings	Fails to consider effect size Fails to consider the precision of the estimate Potential for publication bias as studies with unit of analysis errors are generally excluded

Source: (Gill et al., 1999; Grimshaw et al., 2004)

An alternative approach was used, whereby results were synthesised descriptively. All studies that were included and assessed for effectiveness were given a quality rating according to their efforts to minimise bias, as described in the EPOC checklist (EPOC, 2002) (Appendix A). Studies were described as:

- Good (i.e., good protection against bias) if more than five criteria (out of a total of seven criteria) were 'DONE'
- Average if 4-5 criteria were 'DONE'
- Poor if less than four criteria were 'DONE'.

Standard statistical principles were used to determine statistical precision. Where possible, the effect size associated with outcomes in the included studies was assessed qualitatively. Effect sizes were described as small (≤5% improvement in practice); modest (>5% and ≤10%); moderate (>10% and ≤20%); and large (>20%).

5.7. Evidence base

The initial search, which resulted in 6,100 citations published between 1966 and March 2005, was reduced to 4,650 following the removal of duplicates. Over 80% of citations were excluded during an initial screening of titles and abstracts.

The main reasons for article exclusion of articles included:

- Article type - narrative reviews, case reports, editorials, letters, or discussion / opinion papers
- Inappropriate study design – no controls, no baseline measures
- Inadequate data – no relevant outcomes reported (may be due to poor reporting of results or lack of adequate comparator)
- Inappropriate interventions – evaluation of individual interventions or treatments, such as psychopharmacotherapy (i.e., not dissemination strategy)
- Multiple reports – duplication of data in several articles.

A total of 651 full-text articles, including those from database searches, handsearching journals and pearling were retrieved for closer scrutiny. The total evidence base for this review comprised 25 systematic reviews and 85 studies. Data were not extracted for several studies (Mazmanian, Johnson, Zhang, Boothby, & Yeatts, 2001; Onion & Bartzokas, 1998; White et al., 2004) as baseline data were either not reported, baseline scores were not reported as similar, or differences in baseline data were not adjusted for, making it difficult to determine whether reported differences between groups were due to the intervention.

5.8. Methodological Quality

All studies included in this review were rated for methodological quality (good, average, poor) according to the appropriate checklist criteria (Appendix A). There was substantial variability in methodological quality of the available evidence base across all strategies examined. Poor reporting of methods was a common flaw in many studies, making it difficult to accurately assess study quality. That is, it was often unclear whether established methodological criteria (EPOC, 2002) had been employed. In many studies, interventions were poorly described, making it difficult to compare across studies and to identify common features that may have contributed to a strategy's success.

Overall, the risk of bias was low in only 20-25% of studies (good quality), with adequate randomisation, concealment of allocation, blinded objective outcomes, and good follow-up of participants. Approximately 15-20% had high risk of bias (poor quality), with moderate risk in the remaining 60-65% (average quality).

There were potential unit of analysis errors (potentially resulting in an overestimation of effect size) in cluster randomised controlled trials (RCTs) in 22% to 64% of the studies included in systematic reviews, and there was potential for contamination in several studies where patients were the unit of allocation. For example, studies included in one good systematic review (Thomson O'Brien et al., 2000a) had inadequate concealment of allocation (72%), unblinded assessment of outcomes (50%), unadjusted baseline differences (33%) and potential unit of analysis errors (33%). Other limitations in study quality included low statistical power due to small sample size and the presence of a possible 'ceiling effect' in some studies.

Studies of health care providers that relied on self-selection of participants were likely to be comprised of a sample of highly motivated participants, with more positive attitudes toward the innovation and greater skills and knowledge in the targeted area of practice (Bekkering et al., 2005; Forsetlund et al., 2003; Foy et al., 2004; Searle, Grover, Santin, & Weideman, 2002). Such characteristics imply a greater 'readiness to change' professional behaviour and may partly explain the apparent ceiling effect reported in some studies.

Studies with relatively short follow-up periods (≤6 months) may have difficulty in detecting changes in behaviour that may take time to emerge (Searle et al., 2002). Conversely, for studies that only reported effects at 3-6 months follow-up, sustainability of the effect could not be determined. In some studies, generalisability to settings that differ from the study populations may be limited due to the particular exclusion / inclusion criteria, and differences in health care systems between countries and jurisdictions (e.g., financial incentives).

6. Results – Summary of Evidence

This chapter provides a brief description of the evidence that was gathered from existing systematic literature reviews and additional primary research that was not included in existing reviews.

Strategies to increase the uptake of new research may be approached from different perspectives. These include:

- Changing the knowledge, attitudes or behaviour of health care professionals (**professional interventions**)
- Changing the environment in which health care professionals work, such as the health care system or practice setting (**organisational interventions**)
- Combination of both perspectives to either tailor strategies to a specific target behaviour, audience, or condition, or to apply a "scatter-gun" approach to reach a broader audience (**other interventions**).

Any one of a combination of these approaches has been utilised in a large variety of settings. The following chapters (7-9) provide more detailed evidence on the key findings from an evaluation of the effectiveness of 16 dissemination interventions:

- Professional interventions (Chapter 7)
- Organisational interventions (Chapter 8)
- Other interventions (Chapter 9).

Each intervention and the evidence of its effectiveness is outlined in chapters 7-9 in the following order: 1) a brief description of the intervention, with an overview of the number of existing systematic reviews and additional studies that have evaluated its effectiveness; 2) a brief summary of the evidence of effectiveness of the intervention; 3) key success factors of the intervention; and 4) the relevance of the findings to the AOD field. Where possible, evidence from the AOD setting has been presented. However, where none is available, the potential for a strategy's application in the AOD setting is discussed. For example, management of AOD-related problems has useful parallels with models of chronic disease and thus, successful strategies used to implement innovations for heart disease, diabetes, arthritis and depression may be transferable to the AOD context.

6.1. Stage 1: Existing systematic reviews

Twenty-five existing systematic literature reviews were located. Where it was clear that an earlier review had been updated, only the updated version is presented in this assessment. Some studies were included and evaluated in more than one review and approaches to assessment differed between reviews (see Table 10).

Table 10. Approaches to assessment in existing systematic reviews

Approach	Reference
Reviews that focussed on *one specific* dissemination strategy, but included a broad range of conditions and target behaviours	(Balas et al., 2000; Currell & Urquhart, 2003; Garg et al., 2005; Giuffrida et al., 2000; Hunt, Haynes, Hanna, & Smith, 1998; Jamtvedt, Young, Kristoffersen, Thomson O'Brien, & Oxman, 2003; Shiffman, Liaw, Brandt, & Corb, 1999; Thomson O'Brien et al., 2001; Thomson O'Brien et al., 2000a; Thomson O'Brien et al., 2000b)
Reviews that focussed on a *broad range* of dissemination strategies applied to more specific diseases or targeted behaviours	(Anderson & Jane-Llopis, 2004; Anderson, Laurant, Kaner, Wensing, & Grol, 2004; Gilbody, Whitty, Grimshaw, & Thomas, 2003; Gill et al., 1999; Gosden et al., 2000; Harvey, Glenny, Kirk, & Summerbell, 2002; Hulscher, Wensing, van Der Weijden, & Grol, 2001; Norris et al., 2002; Renders et al., 2001; Weingarten et al., 2002)
Reviews that focussed on specific strategies for targeted behaviours or conditions	(Bennett & Glasziou, 2003; Lancaster, Silagy, & Fowler, 2000; Tu & Davis, 2002; Walton, Harvey, Dovey, & Freemantle, 2001)
Reviews that focussed on broad strategies for multiple behaviours; specific conditions or targeted populations	(Beilby & Silagy, 1997; Grimshaw et al., 2004; Thomas, McColl, Cullum, Rousseau, & Soutter, 1999)

There was little consistency in the way the strategies were grouped in existing systematic reviews. For example, *professional interventions* included distribution of educational materials, educational meetings and seminars or training workshops in all reviews, while others also included combinations of educational outreach, audit and feedback, reminders, opinion leaders, and local consensus processes. Similarly, some reviews contrasted and compared *didactic* and *interactive* strategies, yet the types of interactive strategies varied between reviews.

6.2. Stage 2: Additional studies

Where possible, strategies evaluated in the additional studies were grouped according to the EPOC taxonomy described in Table 4. In many cases, studies (and reviews) have included strategies that could fit into a number of categories. Results are presented under the dissemination strategy category that most closely relates to the stated aim of the study. Cross-references between strategies have been added throughout this report, where possible.

Eighty-five additional studies were identified that met the selection criteria. These were critically appraised and sorted into groups (Table 11). The following sections report on the effectiveness of the 16 strategies listed in Table 11 and described more fully in Table 4.

Table 11. Summary of additional primary research

Strategy	Number of studies	References
Professional interventions		
Educational materials	1	(Dormuth et al., 2004)
Local consensus processes	3	(Baker et al., 2003; Butzlaff et al., 2004; Silagy et al., 2002)
Educational meetings	16	(Delvaux et al., 2004; Fallowfield et al., 2002; Fallowfield, Jenkins, Farewell, & Solis-Trapala, 2003; Glazier, Badley, Lineker, Wilkins, & Bell, 2005; Katz, Muehlenbruch, Brown, Fiore, & Baker, 2004; Kelly et al., 2000b; King et al., 2002; Mazmanian et al., 2001; Miller, Yahne, Moyers, Martinez, & Pirritano, 2004; Pill, Stott, Rollnick, & Rees, 1998; Premaratne et al., 1999; Razavi et al., 2003; Santoso, Suryawati, & Prawaitasari, 1996; Suggs et al., 1998; Young et al., 1998; Young & Ward, 2002)
Educational outreach visits	13	(Bernal-Delgado, Galeote-Mayor, Pradas-Arnal, & Peiro-Moreno, 2002; Cranney, Barton, & Walley, 1999; Crotty et al., 2004; Dey et al., 2004; Finkelstein et al., 2001; Goldstein et al., 2003; Hall, Eccles, Barton, Steen, & Campbell, 2001; Majumdar et al., 2003; New et al., 2004; Solomon et al., 2001; Watson, Gunnell, Peters, Brookes, & Sharp, 2001; Watson et al., 2002; Weller et al., 2003)
Local opinion leaders	2	(Finkelstein et al., 2005; Gifford et al., 1999)
Patient-mediated interventions [3]	1	(Thapar et al., 2002)
Prompts and reminders	12	(Bahrami et al., 2004; Frances, Alperin, Adler, & Grady, 2001; Goldberg, Mullen, Ries, Psaty, & Ruch, 1991; Goldberg et al., 2000; McMullin et al., 2004; Murtaugh, Pezzin, McDonald, Feldman, & Peng, 2005; Ramsay, Eccles, Grimshaw, & Steen, 2003; Sanders & Satyvavolu, 2002; Shaw, Samuels, Larusso, & Bernstein, 2000; Thapar et al., 2002; Tierney et al., 2005; Toth-Pal, Nilsson, & Furhoff, 2004)
Audit and feedback	3	(Eccles et al., 2001; Kiefe et al., 2001; McCartney, MacDowell, & Thorogood, 2001)
Financial incentives	1	(Hillman et al., 1998)
Electronic educational sources	1	(Di Noia, Schwinn, Dastur, & Schinke, 2003)
Organisational interventions		
Record and office systems	5	(Boekeloo et al., 2003; Boekeloo et al., 2004; Dietrich et al., 1992; Kinsinger, Harris, Qaquish, Strecher, & Kaluzny, 1998; McBride et al., 2000; Ockene et al., 1999)
Multi-disciplinary collaborative approach	1	(Diabetes Integrated Care Evaluation Team, 1994)
Alternative care approach	2	(Campbell et al., 1998; Sikka et al., 1999)
Continuous quality improvement	4	(Feifer & Ornstein, 2004; Irvine Doran et al., 2002; Rantz et al., 2001; Solberg et al., 2000)
Other interventions		
Mass media	1	(Matowe et al., 2002)
Multi-faceted interventions	19	(Bekkering et al., 2005; Cooke, Mattick, & Walsh, 2001; Flottorp, Havelsrud, & Oxman, 2003; Forsetlund et al., 2003; Foy et al., 2004; Frijling et al., 2003; Frijling et al., 2002; Heller, D'Este, Lim, O'Connell, & Powell, 2001; Joseph et al., 2004; Langham et al., 2002; Lemelin, Hogg, & Baskerville, 2001; Margolis et al., 2004; Nilsson et al., 2001; Philbin et al., 2000; Sanci et al., 2000; Schectman, Schroth, Verme, & Voss, 2003; Searle et al., 2002; Waldorff, Almind, Makela, Moller, & Waldemar, 2003; Wright et al., 2003; Young, D'Este, & Ward, 2002)
Total	**85**	

[3] Patient-mediated interventions have been included in this category as this strategy aims to indirectly influence practitioners to change their behaviour.

7. Professional Interventions

Professional interventions refer to strategies oriented directly toward increasing knowledge and changing the attitudes and behaviour of professionals. Those included here are:

- Educational materials
- Local consensus processes
- Educational meetings
- Educational outreach visits
- Local opinion leaders
- Patient-mediated interventions
- Prompts and reminders
- Audit and feedback
- Financial incentives
- Electronic educational resources.

7.1. Educational Materials

Educational materials, in printed or electronic format, are published recommendations for clinical care or other information that is provided either personally, electronically or via mass mailings. They are presented in a variety of formats including bulletins, summaries, information posters and guidelines. Such resources are an integral part of other educational interventions, such as continuing medical education (CME) workshops or seminars. Educational materials typically accompany other dissemination strategies; for example, as part of a 'usual care' control group. This section examines studies that have assessed specifically the impact of disseminating educational materials alone.

Six systematic reviews of 2-18 studies (Gilbody et al., 2003; Gill et al., 1999; Grimshaw et al., 2004; Grol & Grimshaw, 2003; Harvey et al., 2002; Hulscher et al., 2001; Tu & Davis, 2002) (Table 12) and one cluster RCT (Dormuth et al., 2004) (Table 13) assessed the effectiveness of educational materials.

Table 12. Effectiveness of distribution of educational materials - Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Client outcomes [c]
Disease management	(Tu & Davis, 2002)	Level I: poor quality SR 4 RCTs [d]	NS	NS
Disease management	(Gilbody et al., 2003)	Level II: good quality SR 22 average quality controlled studies	NS	NS
Prescribing	(Gill et al., 1999)	Level II: good quality SR 7 average – good quality controlled studies	+ in 3/7 studies	NA
Prevention (5) Prescribing (4) Disease management (6) Adherence to guidelines (3)	(Grimshaw et al., 2004)	Level II: good quality SR 18 poor quality controlled studies	+ in 7/18 studies § Not sustained	NS in 1 study
Disease management	(Harvey et al., 2002)	Level II: good quality SR 2 poor quality controlled studies	NS	NS
Preventive care	(Hulscher et al., 2001)	Level II: good quality SR 3 poor-average quality controlled studies	NS	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; [d] quality not assessed; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 13. Effectiveness of distribution of educational materials - Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Prescribing	(Dormuth et al., 2004)	Level II: good quality cluster RCT	+	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

7.1.1. How effective is distribution of educational materials?

One well-cited systematic review of 11 studies, which examined the distribution of educational materials, including clinical practice guidelines (CPGs), audio-visual materials, and electronic publications, reported that passive distribution of educational materials had no effect on improving professional practice (Freemantle et al., 1997). This review has since been withdrawn for updating and results have yet to be published.

More recently, a good quality systematic review re-examined the primary research using an explicit analytical framework, rather than the vote-counting approach described in Table 9 (Grimshaw et al., 2004). Despite overall weak methodological quality across the majority of

included studies, significant improvements were observed in the process of care, with most reporting small-moderate effects at best. However, with few head-to-head comparisons in good quality well-designed studies, the statistical significance of these improvements is not robust and subsequent follow-up measures taken in some studies resulted in decay effects (Grimshaw et al., 2004).

One additional good quality cluster RCT (Dormuth et al., 2004) assessed the effect of regular distribution of printed educational materials in the form of a series of "therapeutic letters' on physicians" prescribing behaviour (process outcomes) (Table 13 and Table 41, Appendix B). The impact of disseminating a series of 12 letters over a 2-year period was evaluated. A single letter distributed to physicians had no statistically significant effect on prescribing behaviour, whereas the combined effect of 12 letters was statistically robust ($p<0.001$). In contrast to the limited effectiveness demonstrated in the studies included in existing systematic reviews, findings from this RCT (Dormuth et al., 2004) suggest that regular repetition of key messages may weaken the barriers to changing behaviour. However, given the limited follow-up period (3-months) in most studies and lack of patient outcome data, neither the sustainability nor the effect on patient health outcomes can be predicted from this strategy when used alone.

7.1.2. Key success factors of educational materials

While the distribution of educational materials alone had limited impact on changing practitioners' behaviour, evidence from the available research suggested that educational material was more likely to be used by the target audience when:

- The content was relevant to the practitioner and derived from a trustworthy and credible source
- The information was clear, concise and persuasive
- The format was appealing and easy to read
- The message was repeated (reinforcement).

For example, improvement in practitioners' prescribing was achieved using a series of concise, colourful 2-4 page bulletins, which were developed using input from relevant specialist working groups and comprised an easy-to-read question-answer format to provide clear messages (Dormuth et al., 2004). Messages contained in the letters targeted therapeutic issues that were identified as problematic by the working groups.

The problem or clinical activity targeted by an intervention may also impact on the effectiveness of a strategy. For example, while distributing educational material was found to result in improvements in prescribing behaviour (Dormuth et al., 2004; Gill et al., 1999), there was limited or no impact on other areas of practice, such as management of depression (Gilbody et al., 2003), or hypertension (Tu & Davis, 2002). It is possible that less complex activities associated with prescribing practice are more amenable to change via this mechanism compared to more demanding behaviours required in chronic disease management.

7.1.3. Relevance to the AOD field

There was little evidence to support the use of educational materials *alone* to induce sustained changes in professional practice. Nevertheless, the value of distributing educational materials to the AOD field should not be underestimated and almost every dissemination strategy incorporates some form of educational materials. While distribution of educational materials alone was the least effective of a variety of education-based professional interventions designed to change doctors' prescribing behaviour, 43% (3/7) of studies yielded a positive effect (Gill et al., 1999). Moreover, given that educational materials are easy to distribute in a wide variety of settings, and the production and implementation costs are relatively low compared to other more interactive and / or resource-intensive strategies, they should not be dismissed as ineffective.

7.2. Local Consensus Processes

Local consensus processes involved "the inclusion of participating providers in discussion to ensure that they agreed that the clinical problem was important and that the approach to managing the problem was appropriate" (EPOC, 2002). The most common, well-accepted and well-studied example of a dissemination and implementation strategy developed via local consensus processes is clinical practice guidelines (CPGs)[4].

CPGs are defined as "systematically developed statements to assist practitioner decisions about appropriate health care for specific clinical circumstances" (Field & Lohr, 1990). However, 'systems' used to develop statements vary widely and frequently rely on expert opinion and established practice patterns. More 'systematic' methods include the use of structured consensus statements by Delphi[5] or similar techniques (nominal group technique, iterated consensus rating) that facilitate development of consensus of opinion among a group of experts (Lomas, 1991). Evidence-based medicine, which emphasises clinical decision-making based on thorough evaluation of available research evidence, is often lacking in the development of CPGs. The basic protocol for the development of CPGs involves the following steps:

- Clear definition of the clinical problem
- A comprehensive review of the available evidence
- Summary of the extracted data
- Presentation of the data as outcome contingencies for decision-making
- Clinical recommendations for practice (Canadian Taskforce on Preventative Health Care (CTFPHC), 1999).

Many organised health care bodies (e.g., Diabetes Australia, Haemophilia Foundation of Australia, Royal College of Surgeons), general health care agencies (e.g., National Health and Medical Research Council, National Health Priorities Action Council), and specific drug and alcohol services (e.g., Drugs and Alcohol Services South Australia, Australian National Council on Drugs) develop and disseminate guidelines for specific disorders, problems and procedures. Although successful implementation of CPGs into practice has been shown to improve medical practice by improving the quality of care, decreasing inappropriate and ineffective practice, reducing overuse of health services, and lowering costs of delivering health services (Grimshaw et al., 1995), studies indicate that the extent to which practitioners incorporate CPGs into their clinical practice is often minimal (Karuza et al., 1995). The aim of disseminating CPGs is to increase awareness, understanding, and acceptance of a specific guideline and change the relevant clinical behaviours.

Adequate dissemination is a prerequisite for successful implementation of CPGs and simple distribution does not guarantee their uptake and use. In order to turn knowledge into practice, other implementation strategies have been developed and used to disseminate and implement CPGS.

Where additional tools or strategies have been used to enhance compliance with CPGs, such as opinion leaders (Gifford et al., 1999) or feedback (Eccles et al., 2001) the effectiveness of the strategies has been evaluated separately in subsequent sections of this report. Recent investigations have been undertaken into whether altering the format, or process of development, of standard, paper-based guidelines may increase the likelihood of successful dissemination and implementation.

[4] Where CPGs were distributed in standard format, they have been included in the 'Educational Materials' section. Where they have been modified using local consensus processes and compared with standard guidelines, they have been evaluated in this section.

[5] The Delphi technique uses a systematic approach to develop criteria for the most appropriate medical procedures. Knowledge from the medical literature is combined with a systematic collation of multi-disciplinary expert opinion.

Two good quality randomised controlled trials (RCTs) (Baker et al., 2003; Butzlaff et al., 2004) and one poor quality RCT (Silagy et al., 2002), met the inclusion criteria for assessment of local consensus processes. Studies assessed whether modification of standard, paper-based CPGs increased practitioners' adherence to guideline recommendations (Table 14).

Table 14. Effectiveness of local consensus processes – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Primary health care provision	(Butzlaff et al., 2004)	Level II: RCT Good quality	±	NA
Disease prevention / management	(Baker et al., 2003)	Level II: Cluster RCT Good quality	± §	±
	(Silagy et al., 2002)	Level II: Cluster RCT Poor quality	±	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

7.2.1. How effective are local consensus processes?

The most common method of disseminating CPGs is via mass mailing to professional groups, even though evidence indicates that this is a less successful strategy for motivating behaviour change (Grimshaw et al., 2004).

Overall, evidence from the better quality studies showed no statistically significant improvement in compliance with, or knowledge of, CPG recommendations when CPGs were modified. That is, neither a concise 'prioritised' format (with or without feedback) (Baker et al., 2003), nor an electronic version of CPGs (Butzlaff et al., 2004) was more effective in changing practitioners' knowledge or behaviour compared to a full, paper version of CPGs. Baker et al. (2003) suggest that, although a more concise version of CPGs may have reduced the time physicians spent reading CPGs, it did not improve compliance with the CPG recommendations. Further, the inclusion of feedback had no additional benefit in achieving practitioners' adherence to CPGs (Table 14 and Table 42, Appendix B) (see section 7.8. Audit and Feedback for more detail).

In terms of improving patient outcomes, use of more concise CPGs resulted in overall better control of symptoms for angina, but the effects on symptoms for asthma were mixed in one study (Baker et al., 2003) (Table 14 and Table 43, Appendix B). Patient satisfaction with treatments for these conditions was unchanged by modifying CPGs. Patient satisfaction with medication for angina treatment was significantly reduced in groups where practitioners received review criteria, a concise version of CPGs with prioritised key recommendations for the majority of patients.

7.2.2. Key success factors of local consensus processes

Based on the available evidence, modifying CPGs to suit the local environment, or to present them in an alternative format, failed to significantly improve practitioners' adherence to CPG recommendations or impact significantly on patient health. From the practitioners' perspective, although a brief version of CPGs reduced reading time, it did not induce more practitioners to use them.

7.2.3. Relevance to the AOD field

All available studies were conducted in the primary health care setting with general practitioners as study participants. Studies tested the effectiveness of locally adapted CPGs versus standard national CPGs. The overall lack of effect and absence of testing in the AOD field make it difficult to predict how effective locally adapted CPGs may be for AOD professionals working in non-clinical settings. It is possible that CPGs, which are developed in consultation with the end-users in the AOD field, may be more acceptable if additional strategies were used to promote their uptake. Participatory action research techniques [6] could be used to assess this hypothesis.

7.3. Educational Meetings (Continuing Medical Education)

Continuing Medical Education (CME) consists of educational activities that aim to maintain, develop, or increase the knowledge, skills, and professional performance of practitioners to provide services for patients, the public, or the profession (Accreditation Council for Continuing Medical Education). Examples of CME include educational conferences, meetings, seminars, workshops, lectures and symposia. CME formats, including distribution of educational materials, varied across studies in intensity (frequency and duration of sessions), complexity (didactic / interactive), and content (targeting specific disease, behaviour, or group). Typically, educational interventions were incorporated in most single interventions to some degree and were always included in multi-faceted interventions (see section 9.2. for more detail).

The evidence base for specifically evaluating the effectiveness of CME comprised eight systematic reviews of 3-47 studies (Gilbody et al., 2003; Grimshaw et al., 2004; Hulscher et al., 2001; Lancaster et al., 2000; Renders et al., 2001; Thomson O'Brien et al., 2001; Tu & Davis, 2002; Weingarten et al., 2002) (Table 15) and 16 primary studies (Delvaux et al., 2004; Fallowfield et al., 2002; Fallowfield et al., 2003; Glazier et al., 2005; Katz et al., 2004; Kelly et al., 2000b; King et al., 2002; Mazmanian et al., 2001; Miller et al., 2004; Onion & Bartzokas, 1998; Pill et al., 1998; Premaratne et al., 1999; Razavi et al., 2003; Santoso et al., 1996; Suggs et al., 1998; White et al., 2004; Young et al., 1998; Young & Ward, 2002) (Table 16).

[6] Participatory Action Research involves iterative cycles of interaction between the researcher and target audience to identify and address problems, initiate new research and evaluate outcomes.

Table 15. Educational meetings – Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Disease management	(Tu & Davis, 2002)	Level I: poor quality SR 5 RCTs [d]	NS	NS
Disease management	(Gilbody et al., 2003)	Level II: good quality SR 6 poor-average quality controlled studies	NS	NS
Disease management (2) Diagnosis (1)	(Grimshaw et al., 2004)	Level II: good quality SR 3 poor-average quality controlled studies	NS §	NS
Preventive care	(Hulscher et al., 2001)	Level II: good quality SR 5 poor-average quality controlled studies	+ in 4/5 studies §	NA
Preventive care Prescribing Disease management	(Thomson O'Brien et al., 2001)	Level II: good quality SR 32 poor- average quality controlled studies	+ in 24/32 studies §	+ in 3/8 studies §
Disease management	(Renders et al., 2001)	Level II: good quality SR 13 poor-average quality controlled studies	± overall + in 5/13 studies §	± overall + in 5/13 studies §
Disease management Adherence to guidelines	(Weingarten et al., 2002)	Level II: average quality SR 47 poor-average quality controlled studies	+ in 12/24 studies §	+ in 12/32 studies §
Prevention	(Lancaster et al., 2000)	Level II: poor quality SR 10 average-good quality RCTs	+ in 9/10 studies	NS in 6/8 studies

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life;[d] Study quality not assessed; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 16. Effectiveness of educational meetings (CME) – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Drug prescribing / test-ordering / referral	(Santoso et al., 1996)	Level III-1: Quasi-RCT Average quality	±	NA
	(Suggs et al., 1998)	Level III-3: CBA design Average quality	±	NA
Preventive care	(Katz et al., 2004)	Level II: Cluster RCT Good quality	+	±
	(Kelly et al., 2000b)	Level II: Cluster RCT Poor quality	+	NA
	(Young et al., 1998; Young & Ward, 2002)	Level III-1: Quasi-RCT Average quality	±	NA
Counselling / communication skills	(Miller et al., 2004)	Level III-1: Quasi-RCT Good quality	+	NA
	(Fallowfield et al., 2003)	Level III-1: Quasi-RCT Average quality	+	NA
	(Razavi et al., 2003)	Level III-1: Quasi-RCT Average quality	NS	±
Disease / pain management	(Pill et al., 1998)	Level II: RCT Good quality	± not sustained	± not sustained
	(King et al., 2002)	Level II: Cluster RCT Average quality	NS	NS
	(Premaratne et al., 1999)	Level II: RCT Good quality	±	NS
	(Fallowfield et al., 2002)	Level III-1: Quasi-RCT Average quality	±	NA
	(Delvaux et al., 2004)	Level III-1: Quasi-RCT Average quality	NS	±
	(Glazier et al., 2005)	Level III-3: CBA design Average quality	±	NA
General practice	(Mazmanian et al., 2001)	Level III-1: Quasi-RCT Average / poor quality	±	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial. Data for two studies were not extracted as baseline scores were not reported or adjusted for (Onion & Bartzokas, 1998; White et al., 2004), therefore relative change could not be determined.

7.3.1. How effective are educational meetings (CME)?

Overall, the better quality studies included in systematic reviews showed small to moderate effects of CME, particularly where baseline scores were low (Hulscher et al., 2001; Thomson O'Brien et al., 2001). Similar results were reported in more recent primary studies. For example, using regression analysis to model and determine the magnitude of the relationship between variables, one quasi-RCT revealed that practitioners benefited most from an educational intervention if they had poorer knowledge or skills at baseline (Delvaux et al., 2004) and those attaining a high score pre-intervention also scored highly post-intervention (White et al., 2004)[7].

Compared to no-intervention controls, 75% of studies included in one systematic review (Thomson O'Brien et al., 2001) reported improvement in professional practice and 38% showed improvement in patient outcomes. Thomson O'Brien et al. (2001) also reported that educational strategies containing interactive elements showed small to moderate improvements while those that were primarily didactic had no significant effect.

Hulscher et al. (2001) reported mixed effects in studies that used group sessions, with improvements ranging between 11% and 194%. By comparison, studies that used individual sessions showed small to moderate effect sizes, with improvements varying between 7% and 21%. These results were consistent with findings from primary research (Santoso et al., 1996). Table 44 and Table 45 (Appendix B) provide results for process and patient outcomes, respectively.

Educational meetings produced improvements in drug prescribing (Santoso et al., 1996; Suggs et al., 1998; Thomson O'Brien et al., 2001), preventive care (Hulscher et al., 2001; Katz et al., 2004; Kelly et al., 2000b; Lancaster et al., 2000) and disease management (Renders et al., 2001; Thomson O'Brien et al., 2001; Weingarten et al., 2002). In addition, health care providers' counselling and communication skills (Miller et al., 2004) were improved significantly with CME (Table 16 and Table 44, Appendix B).

One study showed that including an additional element (telephone consultation) significantly increased the effectiveness of the intervention (Kelly, Sogolow, & Neumann, 2000a). In that study, it was found that a larger proportion of AIDs Service Organisations offered a research-based intervention to clients when their training workshop was followed up with a telephone consultation.

Of the few studies that measured patient effects, there was significant improvement in smoking cessation in one study (Katz et al., 2004), whereas others showed mixed effects, with small improvements in some outcomes, or no significant changes compared to controls (Table 45, Appendix B).

The presence of potential ceiling effects resulting from practitioners' self-selecting to participate in the educational intervention was a limiting factor in many studies. Study practitioners who volunteered to participate typically displayed above average levels of care or enthusiasm to improve, leaving little scope for further development or improved practice change (White et al., 2004).

The short follow-up period across most studies made it difficult to determine the sustainability of an intervention's effect. Post-intervention measures taken immediately following implementation of an intervention may merely assess immediate recall of knowledge as opposed to sustained learning / attainment of knowledge, and thus be less likely to reflect long-term behaviour change. A longer follow-up period may be needed to determine retention of additional skills and knowledge and sustained behaviour change. For example, a follow-up study that measured outcomes 12 months post-intervention revealed evidence of sustained improvement in communication skills (Fallowfield et al., 2003).

[7] Data for this study were not provided in the tables as baseline scores were not adjusted for, making it difficult to determine true differences between groups.

7.3.2. Key success factors of educational meetings (CME)

The highly variable results shown in the available studies examining the effectiveness of educational meetings may reflect the heterogeneity of the studies, particularly in the intensity and complexity of interventions, the mode of delivery, and the characteristics of the setting and target behaviour.

Intensity of interventions ranged from a single 10-15 minute session to a 1-2 day workshop, to multiple hour-long sessions over an extended period. Similarly, the intervention delivery mode varied from passive, didactic formats of lectures and seminars to highly interactive group discussions and workshops.

Evidence from the better quality studies indicates that educational meetings were more effective when they contained the following elements:

- More interactive (less didactic) or personalised format (e.g., small groups, face-to-face sessions)
- Simple (less complex) content, which requires smaller magnitude of change (e.g., drug dosage and prescribing vs multiple recommendations with complex clinical decision-making)
- More focused on a specific problem (tailored or personalised rather than generic)
- Additional interventions (e.g., follow-up telephone consultation) or incentives (e.g., feedback on performance, CME points [8])
- Motivated practitioners (self-selected practitioners may be more motivated to change).

As noted in section 7.1.2. above (see educational materials), the content / materials presented in CME should be appealing and readily-digestible, derived from a credible source, and contain content relevant to the health care provider.

A central tenet of effective training (and other forms of professional development gained through educational meetings) is health care providers' capacity to apply newly developed knowledge and skills to their current practice. Educational interventions that require only modest time, financial or staff resource commitments may be more likely to influence the implementation of best practice by health care providers working in a 'patient-rich, time-poor' environment.

It is important to note that the duration of effect, or decay over time has not been adequately assessed to determine the sustainability of change attributed to the use of CME.

7.3.3. Relevance to the AOD field

Educational meetings were effective in both treatment and preventive care in AOD-related health care settings. A tutorial plus feedback delivered in a community setting improved practitioners' adoption of guidelines for smoking cessation and resulted in improvements in the delivery of smoking cessation advice and nicotine replacement therapy (process outcomes) and higher abstinence among smokers (patient outcomes) (Katz et al., 2004). Similarly, a distance learning module used in a family practice (clinic) setting, improved the delivery of smoking cessation advice to patients (Young & Ward, 2002). Distance learning may be an effective option for health care providers who deliver AOD-related care in rural and remote locations.

Workshops were also found to be an effective strategy. For example, workshops enhanced with a range of additional strategies, including feedback and coaching sessions, increased health care providers' proficiency in motivational interviewing techniques for managing the care of patients / clients with AOD-related issues (Miller et al., 2004).

[8] CME points encourage health care professionals to provide better care for patients according to the current standards of their profession. Most health care professionals are required to satisfy criteria for CME points to retain registration in their practice.

7.4. Educational Outreach Visits (Academic Detailing)

Educational outreach, also termed academic detailing, involves enlisting a change agent, such as a trained health educator or specialist, to visit health care providers in their own setting and deliver evidence-based information sessions about a well-defined intervention or clinical practice guideline. Outreach sessions vary considerably across different interventions. Typically, physicians or pharmacists, who have undertaken training in communication and behaviour modification techniques, provide a brief face-to-face education and feedback session with the purpose of motivating improvements in practice. Outreach visits may also involve reduction of administrative barriers by streamlining procedures in the office setting or using practice-enabling techniques, such as role-play to develop specific skills.

Five systematic reviews containing 1-18 studies (Anderson & Jane-Llopis, 2004; Gilbody et al., 2003; Gill et al., 1999; Thomson O'Brien et al., 2000a; Tu & Davis, 2002) (Table 17), and 13 primary studies (Bernal-Delgado et al., 2002; Cranney et al., 1999; Crotty et al., 2004; Dey et al., 2004; Finkelstein et al., 2001; Goldstein et al., 2003; Hall et al., 2001; Majumdar et al., 2003; New et al., 2004; Solomon et al., 2001; Watson et al., 2001; Watson et al., 2002; Weller et al., 2003) (Table 18) assessed the effectiveness of outreach visits.

Table 17. Effectiveness of educational outreach visits – Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Disease management	(Tu & Davis, 2002)	Level I: poor quality SR 1 RCT [d]	NS	NS
Disease management	(Gilbody et al., 2003)	Level II: good quality SR 3 poor-average quality controlled studies	+	NS
Prescribing	(Gill et al., 1999)	Level II: good quality SR 4 average-good quality RCTs	+ in 2/4 studies §	NA
Prescribing (13) Preventive care (3) Disease management (2)	(Thomson O'Brien et al., 2000a)	Level I: good quality SR 18 poor-average quality RCTs	+ in 16/18 studies §	NA
Preventive care	(Anderson & Jane-Llopis, 2004; Anderson et al., 2004)	Level II: good quality SR 8 average quality controlled studies	+ Studies with outreach were significantly more effective in changing practitioners' behaviour compared to those without an outreach intervention	+

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; [d] quality not assessed; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 18. Effectiveness of educational outreach visits – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Drug prescribing / test-ordering	(Watson et al., 2001; Watson et al., 2002)	Level II: cluster RCT Good quality	NS	NA
	(Weller et al., 2003)	Level II: RCT Good quality	+ short-term only	NA
	(Finkelstein et al., 2001)	Level III-1: Quasi RCT Average quality	+	NA
	(Hall et al., 2001)	Level II: RCT Average quality	NS	NA
	(Solomon et al., 2001)	Level III-1: Quasi RCT Average / poor quality	±	NA
Preventive care	(Crotty et al., 2004)	Level II: RCT Good / average quality	NS	NS
	(Goldstein et al., 2003)	Level III-1: Quasi experimental Average quality	NS	NS
Disease / pain management	(Cranney et al., 1999)	Level II: Cluster RCT Good quality	+	NA
	(Dey et al., 2004)	Level II: RCT Good quality	NS	NA
	(Majumdar et al., 2003)	Level III-3: CBA design Good quality	±	±

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; CBA = controlled before and after study; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

7.4.1. Effectiveness of educational outreach visits

In general, educational outreach visits were effective for improving professional practice in a range of different settings. Overall effect sizes were moderate-large, with 24-50% improvement ($p<0.05$) reported in studies that demonstrated benefit (Thomson O'Brien et al., 2000a).

Evidence from both systematic reviews and primary research indicated that educational outreach visits produced improvements in practitioner behaviour (process outcomes) in prescribing / test-ordering, delivery of preventive care and disease management (Cranney et al., 1999; Finkelstein et al., 2001; Gilbody et al., 2003; Gill et al., 1999; Solomon et al., 2001; Thomson O'Brien et al., 2000a; Weller et al., 2003). Table 46 and Table 47 (Appendix B) provide data for process and patient outcomes, respectively.

In contrast, two RCTs reported no statistically significant improvement in appropriateness of prescribing when used in a community pharmacy setting (Hall et al., 2001; Watson et al., 2002). However, a possible ceiling effect may have masked potential improvements in these studies. Similarly, educational outreach visits did not significantly improve preventive care (falls reduction and stroke prevention) or pain management in two studies (Crotty et al., 2004; Dey et al., 2004).

Few studies have assessed the impact of outreach visits on patient outcomes, and those that did generally failed to provide clinical benefit. However, one study of a travelling diabetes management program (Majumdar et al., 2003) showed that outreach visits to rural regions (US) improved patients' blood pressure as well as their satisfaction with the care provided, but did not significantly improve patients' cholesterol or blood sugar levels.

The sustainability of the intervention effect was uncertain due to limited follow-up periods in the studies. For example, the improvement in test-ordering rates that was evident 6-months post-intervention (Weller et al., 2003) was not sustained at 12-months follow-up, suggesting a decay effect of the intervention. Other primary studies that demonstrated positive effects of outreach visits on prescribing behaviour (Finkelstein et al., 2001; Solomon et al., 2001) failed to report the period of follow-up.

Data were not extracted for two studies (Bernal-Delgado et al., 2002; New et al., 2004) as baseline data were not reported or not adjusted for.

7.4.2. Key success factors of educational outreach visits

Although educational outreach visits varied across studies, several attributes were identified that may increase their likelihood of success, including:

- Interactive format, with active participation by practitioners, particularly for more complex topic areas
- Use of specialist educators with credibility in the topic area
- Use of additional strategies, such as feedback or follow-up support (Cranney et al., 1999; Finkelstein et al., 2001; Solomon et al., 2001; Weller et al., 2003)
- Targeting a defined group of professionals
- Having clear educational and behavioural objectives
- Assessing and addressing barriers to change
- Identifying and repeating essential messages
- Positively reinforcing messages in follow-up visits.

In addition, materials provided to the target audience should contain clear, simple messages, and include concise, graphic educational material (see section 7.1.2., Educational Materials).

7.4.3. Relevance to the AOD field

Evidence from one study that examined the effectiveness of outreach visits in an AOD setting showed that outreach visits had no influence on practitioners' counselling for smoking cessation (as reported by patients) ($p=0.057$) and minimal effect on patient quit rates ($p=0.008$) (Goldstein et al., 2003). However, results may have been influenced by a strong secular trend in smoking cessation rates shown in the control group due to a number of factors that occurred during the study period. These factors, which are likely to have motivated physicians to change their behaviour, include academic detailing of physicians by pharmaceutical companies marketing nicotine patches, annual assessment of smoking cessation counselling rates in control practices, and self-nomination of participants, who are likely to be more motivated to change behaviour.

Educational outreach visits, which were effective for drug prescribing, test ordering and disease management, may be useful in the AOD field for a range of AOD-related activities, including encouraging practitioners to:

- Prescribe pharmacotherapies appropriately
- Provide AOD education and counselling
- Screen for AOD use or depression
- Monitor pharmacotherapy treatment
- Manage AOD-related illness and depression.

7.5. Local Opinion Leaders (including Product Champions)

Local opinion leaders, including 'product champions' and 'peer leaders' are health professionals identified by their colleagues in the community as 'educationally influential'. Hiss et al. (1978) defined the opinion leader as one who:

1) is recognised by his / her own community as an expert in their field (expertise)

2) is more likely than others to facilitate flow of new information (current knowledge)

3) has well developed interpersonal skills.

The rationale behind the use of opinion leaders as an educational strategy is that new information will be integrated more efficiently into practice if a respected peer trains a practitioner, particularly when the opinion leader has been selected by the practitioner.

One good quality systematic review (Thomson O'Brien et al., 2000b) of 8 studies (Table 19), and two good quality RCTs (Finkelstein et al., 2005; Gifford et al., 1999) (Table 20) assessed the effectiveness of local opinion leaders or product champions (peer leaders) to change practice behaviour.

Table 19. Effectiveness of local opinion leaders – Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Adherence to guidelines	(Thomson O'Brien et al., 2000b)	Level I: good quality SR 8 poor-average quality RCTs	+ in 2/8 studies §	NS

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 20. Effectiveness of opinion leaders – Primary research summary

Research area	References	Level and quality of evidence[a]	Process outcomes[b]	Patient outcomes[c]
Referral	(Gifford et al., 1999)	Level II: RCT Good quality	±	NA
Medication dispensing	(Finkelstein et al., 2005)	Level II: Cluster RCT Good quality	NS	NS

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

7.5.1. Effectiveness of opinion leaders

Overall the evidence was mixed. Effectiveness of opinion leaders varied from not significant to small-modest effects in some process outcomes in the better quality studies. Patient outcomes were similar in both control and intervention groups. Thomson O'Brien et al. (2000) reported some improvement in at least one outcome in most studies, but statistically significant improvement in only two (of eight) trials, with small-modest effect sizes (i.e., <10% improvement in adherence to recommended practice). Two studies in Thomson O'Brien et al. (2000) reported that opinion leaders were more effective than audit and feedback at changing practice.

While use of opinion leaders had no significant impact on practitioners' adherence to asthma guidelines (Finkelstein et al., 2005), there was improved adherence to three of six guideline recommendations for managing dementia (Gifford et al., 1999; Holloway, Gifford, Frankel, & Vickrey, 1999), where the guidelines related to procedural or referral clinical actions (Table 48, Appendix B). In contrast, there was no effect on adherence to recommendations that pertained to testing, diagnosis or treatment. However, it is worth noting that adherence to two of the recommendations that showed no statistically significant change, were high at baseline indicating a potential ceiling effect that was likely to limit any scope for further improvement.

Overall, patient outcomes were not significantly improved with the use of local opinion leaders (Table 49, Appendix B).

Most studies lacked information on how opinion leaders were identified and selected (Thomson O'Brien et al., 2000b), making it difficult to determine whether they were appropriate and comparable across studies. By comparison, one good quality RCT (Holloway et al., 1999) provided comprehensive details of the recruitment process for 12 local opinion leaders used as part of a multifaceted educational program to improve practitioners' adoption of practice guidelines (Gifford et al., 1999). An overview of the opinion leader's active involvement in the intervention, including membership on an expert advisory panel, review of the practice guidelines being implemented, and involvement in educational seminars was provided. Logistic regression was used to adjust for differences between opinion leaders in different geographical regions (Table 48, Appendix B). Evidence from Gifford et al. (1999) indicates some potential for benefit derived from using opinion leaders to change professional practice, notably in procedural and referral areas of clinical practice; while opinion leaders did not improve medication dispensing (Finkelstein et al., 2005) (Table 20).

7.5.2. Key success factors of local opinion leaders

Since the evidence assessed here is sparse and shows equivocal results, it is difficult to determine which factors may increase the likelihood of this strategy's success. Most studies lacked detail of the characteristics, recruitment methods and role of opinion leaders (Thomson O'Brien et al., 2000b). However, Gifford et al. (1999) outlined various aspects of using opinion leaders which may increase their effectiveness. These include:

- Process of identification and selection of opinion leaders. Opinion leaders are more likely to be effective, respected peer educators if the population of clinicians whom they are to serve selects them.
- Role and activities of the opinion leaders. Involving the opinion leader, as a recognised trusted source of information, in the review and development of the innovation (e.g., training) to be disseminated may ensure sustained commitment from the opinion leader, and therefore a greater likelihood of success from use of the strategy.

7.5.3. Relevance to the AOD field

Evidence that opinion leaders may change professional practice was shown in some clinical actions (such as referral) that may be relevant to practitioners in the AOD field.

One study undertaken in the AOD field that explored the characteristics of opinion leaders in substance abuse treatment agencies was useful for descriptive purposes, but did not meet the inclusion criteria for evaluation of effectiveness (Moore et al., 2004). Moore et al. (2004) reported that peer co-workers were identified as "a key source of information related to

treatment approaches for co-occurring mental health and substance abuse disorders and for substance use treatment in general". Information sourced from peers was used more frequently and valued more highly than other sources of information, such as books, websites and external staff / consultants. Compared to their colleagues, peer co-workers identified as opinion leaders had:

- Significantly more work experience in a specific field (e.g., mental health)
- More postgraduate education
- More confidence and willingness to work with problem clients (e.g., comorbidities)
- Greater knowledge of diagnosis and treatment of clients with comorbidities.

Importantly, Moore et al. (2004) reported that more than 50% of opinion leaders were not formal supervisors and, as such, represented an underutilised credible resource within treatment agencies.

7.6. Patient-Mediated Interventions

Patient-mediated, or patient-directed, interventions involve any information given to or received from patients, which is intended to influence professional practice. Examples of patient-mediated interventions include patient education concerning a specific disease or condition, or patient-specific preventive care information in the form of leaflets, brochures, reminder letters, postcards and telephone calls (e.g., appointments or screening tests).

Three average-good quality systematic reviews of 7-16 studies (Gill et al., 1999; Grimshaw et al., 2004; Weingarten et al., 2002) assessed the effectiveness of patient-mediated interventions (Table 21). One additional primary study (Thapar et al., 2002) evaluated the effectiveness of a patient-held reminder card for epilepsy management (Table 22).

Table 21. Effectiveness of patient-mediated interventions – Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Preventive care & prescribing (5) Disease management (2)	(Grimshaw et al., 2004)	Level II: good quality SR 7 average quality studies	+ in 4/7 studies §	NS
Prescribing	(Gill et al., 1999)	Level II: good quality SR 8 average-good quality RCTs	+ in 5/8 studies §	NA
Disease management	(Weingarten et al., 2002)	Level II: average quality SR 16 average quality controlled studies	NA	+ in 6/16 studies Small effect size

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 22. Effectiveness of patient-mediated interventions – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Disease management	(Thapar et al., 2002)	Level II: good quality RCT	NS	±

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

7.6.1. How effective are patient-mediated interventions?

All studies contained in existing reviews observed improvements in the process of care, with moderate-large effects in cluster RCTs (21%, [95% confidence intervals 10.0, 25.4]) in one SR (Grimshaw et al., 2004); and 63% of studies in the other showing statistically significant improvements (Gill et al., 1999). In particular, patient-mediated interventions were effective for improving screening and vaccination rates. However, all cluster RCTs had potential unit of analysis errors, which may overestimate effects.

Results from an additional RCT showed that practitioner behaviour was not influenced when patients held a reminder card for management of epilepsy care. Overall, patient outcomes were mixed, with non-significant or small effects on disease control.
Data extracted from Thapar et al. (2002) are provided in Table 50 and Table 51 (Appendix B).

7.6.2. Key success factors of patient mediated interventions

There were few evaluations of patient-directed interventions that met the selection criteria and all cluster RCTs contained potential unit of analysis errors. Therefore, evidence on the effectiveness of this strategy is not robust. However, factors that may contribute to effectiveness include:

- Obligatory response – practitioners cannot ignore a patient's direct request or question about their treatment, thereby compelling the practitioner to take action or justify why action is not needed
- Simple content – small change required
- Relevant and patient-specific.

7.6.3. Relevance to the AOD field

Patient-mediated interventions may be effective for delivering preventive care services in the AOD field and for prescribing medication (e.g., depression and AOD-related disorders or pharmacotherapy). AOD-related information disseminated to clients may encourage them to discuss the information with their practitioner where it pertains to their circumstances.

7.7. Prompts and Reminders (including Decision Support)

A *reminder* (computerised or manual) is any intervention that provides an evidence-based summary of key clinical information to aid decision-making and to *prompt* the health care professional or practitioner to perform a clinical action or to record key information for effective client / patient management. Examples include concurrent or inter-visit reminders to health care professionals about recommended actions, including screening, chronic disease management, counselling or other preventive services, appropriate laboratory tests or enhanced administrative support (e.g., paper-based reminder messages attached to reports or in medical records, computerised decision support prompts incorporated in patient electronic records). Every visit to a practitioner is viewed as an opportunity to promote good health maintenance, such as immunising a child (Shaw et al., 2000) or performing a mammography when the records indicate they are due (Goldberg et al., 2000).

Decision support systems are included in this intervention group as they serve a similar function by providing practitioners with key clinical information on which evidence-based decisions may be based. Decision support systems, which are often based on protocols or CPGs, may be computerised or manual, and are aimed at assisting the health care provider to make health-related decisions. The growing sophistication of computer hardware and software enables the information technology field to play a key role in decision-making for health care providers, including:

- Matching evidence-based medical knowledge accessed from large databases to patient-specific information stored in electronic medical records
- Performing complex evaluations
- Calculating drug dosages
- Generating reminders for a variety of preventive health care messages.

Eleven systematic reviews of 2-100 studies (Balas et al., 2000; Bennett & Glasziou, 2003; Garg et al., 2005; Grimshaw et al., 2004; Harvey et al., 2002; Hulscher et al., 2001; Hunt et al., 1998; Shiffman et al., 1999; Tu & Davis, 2002; Walton et al., 2001; Weingarten et al., 2002) (Table 23) and 12 additional primary studies (Bahrami et al., 2004; Frances et al., 2001; Goldberg et al., 1991; Goldberg et al., 2000; McMullin et al., 2004; Murtaugh et al., 2005; Ramsay et al., 2003; Sanders & Satyvavolu, 2002; Shaw et al., 2000; Thapar et al., 2002; Tierney et al., 2005; Toth-Pal et al., 2004) (Table 24) evaluated the effectiveness of prompts, reminders and decision support.

Table 23. Effectiveness of prompts and reminders – Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Prescribing	(Walton et al., 2001)	Level I: good quality SR 15 average-good quality RCTs	+ in 5/15 studies §	+ in 5/13 studies §
Preventive care	(Balas et al., 2000)	Level I: average quality SR 33 average quality RCTs	+ in 26/33 studies §	NA
Prescribing	(Bennett & Glasziou, 2003)	Level I: average quality SR 17 good quality RCTs	+ in 7/17 studies §	NA
Disease management	(Tu & Davis, 2002)	Level I: poor quality SR 3 RCTs[d]	+ in 3/3 studies §	
Preventive care (21) Prescribing (29) Disease management (40) Diagnosis (10)	(Garg et al., 2005)	Level II: good quality SR 100 average – good quality controlled studies	+ in 58/100 studies § Preventive care: 16/21 Prescribing: 15/24 Disease mgt: 23/37 Diagnosis: 4/10	+ in 9/38 studies § Preventive Care: 0/1 Prescribing: 4/5 Disease mgt: 5/27 Diagnosis: 0/5
Preventive care (17) Prescribing (5) Disease management (15) Diagnosis (1)	(Grimshaw et al., 2004)	Level II: good quality SR 38 average quality controlled studies	+ in 24/38 studies § Moderate effect size	NS (4)
Disease management	(Harvey et al., 2002)	Level II: good quality SR 2 average quality cluster RCTs	+ in 2/2 §	+ in 1/2 §
Preventive care	(Hulscher et al., 2001)	Level II: good quality SR 11 poor-average quality controlled studies	+ in 9/11 studies §	NA
Preventive care (19) Prescribing (15) Disease management (26) Diagnosis (5)	(Hunt et al., 1998)	Level II: good quality SR 68 average-good quality controlled studies	+ in 43/65 studies § Preventive care: 14/19 Prescribing: 9/15 Disease mgt: 19/26 Diagnosis: 1/5	+ in 6/14 studies §
Disease management	(Weingarten et al., 2002)	Level II: average quality SR 19 average quality controlled studies	+ in 6/10 studies § Moderate effect size	+ in 6/14 studies § Small effect size
Preventive care (7) Disease management (13)	(Shiffman et al., 1999)	Level II: poor quality SR 25 average quality controlled studies	+ in 15/25 studies §	+ in 3/8 studies §

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; [d] quality not assessed; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 24. Effectiveness of prompts and reminders – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Preventive care	(Shaw et al., 2000)	Level II: RCT Good quality	NS	NA
	(Goldberg et al., 1991)	Level III-1: Quasi-RCT Average quality	+ alcoholism screening rates	NS
	(Goldberg et al., 2000)	Level III-2 Good quality	+ mammogram NS - faecal occult blood; cholesterol	NA
	(Toth-Pal et al., 2004)	Level III-2: non-RCT Poor quality	+ screening rates (e.g., diabetes, hypertension)	NA
Disease management	(Frances et al., 2001)	Level II: RCT Average quality	NS	NA
	(Thapar et al., 2002)	Level II: RCT Good quality	±	±
	(Goldberg et al., 1991)	Level III-1: Quasi-RCT Average quality	±	NA
	(Murtaugh et al., 2005)	Level III-1: Quasi-RCT Average quality	±	NA
Adherence to guidelines	(Bahrami et al., 2004)	Level II: RCT Good quality	NS	NS
	(Ramsay et al., 2003)	Level II: RCT Good quality	+	NS
	(Tierney et al., 2005)	Level II: RCT Poor quality	NS	NS
Drug dosing / prescribing and medication management	(Frances et al., 2001)	Level II: RCT Average quality	NS	NS
	(Sanders & Satyvavolu, 2002)	Level II: RCT Average quality	NS	NS
	(McMullin et al., 2004)	Level III-2: Cohort study Average quality	±	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

7.7.1. How effective are prompts and reminders?

In general, results from the best available evidence showed mixed effects for prompts and reminders for both process and patient measures (Table 52 and Table 53, Appendix B). Among the different research areas, reminders were most effective for preventive care across a variety of clinical settings. In other areas, results were mixed (e.g., prescribing, disease management and adherence to guidelines), with improvement in some outcomes and no significant difference compared to controls in others.

Most good quality studies in the existing reviews showed significant improvement in process outcomes in several research areas. Reminders were most effective for delivering key messages for:

- Preventive care, with approximately 75% of studies demonstrating significant improvement (Balas et al., 2000; Garg et al., 2005; Grimshaw et al., 2004; Hulscher et al., 2001; Hunt et al., 1998)
- Drug dosing and prescribing, with 35-60% of studies showing improvement (Bennett & Glasziou, 2003; Garg et al., 2005; Grimshaw et al., 2004; Hunt et al., 1998; Walton et al., 2001)
- Disease management, with over 70% of studies showing improvement (Balas et al., 2000; Garg et al., 2005; Hunt et al., 1998).

In contrast, less than 20% of studies demonstrated improvements in diagnostic practice (Garg et al., 2005; Hunt et al., 1998).

Effect size varied across studies, with most reporting moderate to large effects for process outcomes in drug dosing, prescribing, referrals, preventive care and knowledge of practice guidelines, while patient outcomes showed mixed or non-significant effects.

Few studies measured patient outcomes, such as improved health status or patient compliance with medication and medical advice. Of the studies that did, only 13% documented significant improvements (Garg et al., 2005).

The better quality additional primary studies revealed statistically significant improvement in radiology referrals by GPs (i.e., referrals reduced) with the use of educational reminder messages (this effect was sustained at the same level from inception throughout the intervention period) (Ramsay et al., 2003). Similarly, the quality of care for patients with epilepsy improved when a reminder card was completed by the practitioner (Thapar et al., 2002). In contrast, prompts and reminders had no significant effect on practitioner behaviour in administering routine preventive procedures, such as vaccinations, and no effect on improving knowledge of (as opposed to adherence to) clinical guidelines (Shaw et al., 2000).

Improvements in practitioner adherence to practice guidelines and disease management were found for some outcomes, but not consistently across clinical settings. For example, uncomfortable or inconvenient procedures, such as sigmoidoscopy, were performed at lower rates compared to those which were less invasive (Balas et al., 2000). A decision support system in the form of a computer aided learning (CAL) package was unsuccessful in improving compliance with a dental treatment guideline, despite being specifically developed for the target group (Bahrami et al., 2004). Further, the CAL package was no more successful than a simple mailout of the guideline with opportunity to attend an education course. However, as pre-intervention guideline compliance was high (ceiling effect), this result should be interpreted with caution.

Although most prompts were delivered prior to decision-making, those generated directly following a clinical decision also demonstrated some effect (Ramsay et al., 2003). In addition, different modes for generating or presenting prompts (tagged medical records or computer display) were equally effective in improving practice (Balas et al., 2000). Therefore, the effectiveness of prompts and reminders was not dependent on narrow time frames or specific modalities.

Decision support systems may also have a positive effect on practitioners' assessment of a health issue and identification of appropriate management for the identified health risk or condition, such as alcohol screening instruments to improve rates of patient referral to counselling (Goldberg et al., 1991).

Data were not extracted for one poor quality RCT (Tierney et al., 2005) as, although baseline scores were taken, they were not reported as being similar or adjusted for, making it difficult to ascertain the true effect of the intervention.

7.7.2. Key success factors of prompts and reminders (including decision support)

The studies that provided the evidence base for prompts and reminders were highly heterogeneous, both in quality and content (e.g., population, setting, design). However, several elements emerged that may enhance the strategy's success, including:

- Ease of use. Strategies should be incorporated into existing systems and response to a prompt (accept or reject suggested course of action) should involve minimal input from the practitioner or patient (McMullin et al., 2004).
- Clear and simple messages. Providers complied more readily with simple prompts for drug prescribing / dosing and preventive care services compared to more complex clinical decision-making for disease management or diagnosis. Educational reminder messages may be an easy-to-deliver response to information overload.
- Relevant to practitioner's needs. Context-specific prompts can shift practice directions to more evidence-based care (Shiffman et al., 1999). Limitations of settings should be taken into account (e.g., time, resources, space, organisational infrastructure).
- Credibility and accuracy of information. Recommendations should be evidence-based and practical, so practitioners are persuaded to comply.
- Automatic reminders. When the choice to see the message is eliminated, practitioners are more likely to respond (Garg et al., 2005; McMullin et al., 2004).
- Obligatory response. Acknowledgement of prompts may increase the likelihood of action (Hunt et al., 1998). Unsolicited reminders may ease workloads by directing the provider to priority tasks (McMullin et al., 2004; Murtaugh et al., 2005).
- Use of additional tools assisted provider uptake. Decision support systems were more effective in the presence of additional tools, such as feedback on performance, and educational materials.

Whether improvements in care have a direct effect on improved health status of patients is uncertain as the few studies that measured the impact on patients showed mixed or no significant effects (Table 53, Appendix B).

7.7.3. Relevance to the AOD field

Prompts and reminders, which were effective for improving patient care in a range of areas in the clinical setting, may be useful for delivering appropriate preventive care and treatment for clients with AOD-related problems.

Potential AOD treatment and management areas that may benefit from the use of reminders include:

- Appropriate prescribing of pharmacotherapies (e.g., NRT, methadone) to eligible clients during routine appointments
- Advice on risks of AOD use during pregnancy (e.g., smoking cessation, alcohol and risks of Foetal Alcohol Spectrum Disoder)
- Monitoring of AOD-related problems (e.g., opioid substitution therapy, screening for depression; measuring severity of dependence)
- Appropriate use of brief interventions for eligible clients
- Referral to specialist treatment (e.g., counselling)
- Advice on relapse prevention, coping skills
- Treatment for dependence
- Treatment for conditions / complications associated with harmful AOD use (Hep C, HIV)
- Management and treatment of comorbidity (e.g., depression, anxiety disorders).

Problem areas that may be less amenable to the influence of reminders are those that tend to be more sensitive or embarrassing, or ones that deal with more contentious issues in AOD-related care (Balas et al., 2000), such as issues related to domestic violence or sexually transmitted diseases.

7.8. Audit and Feedback

Audit and feedback is "any summary of clinical performance of health care over a specified period, with or without recommendations for clinical action. The information may have been obtained from medical records, computerised databases, patients or by observation" (Oxman, Thomson, Davis, & Haynes, 1995). Practitioners receive reports of their performance that is compared to a benchmark standard of care stipulated by CPGs and / or to the mean performance of a peer group (Kiefe et al., 2001). Thus, audit and feedback works on the premise that practitioners will reflect on their past performance, recognise shortfalls in their practice and change their behaviour for future practice.

In contrast to prompts and reminders, which are delivered before, or at the time a clinical decision is made, feedback is delivered *after* decisions have been made. Thus, an evaluation of the consequences of decisions entails aggregating information on performance in order to change future decision-making (Bennett & Glasziou, 2003). Feedback may be:

- Passive – Unsolicited information is provided, without the expectation that action will follow
- Active – Clinicians are actively engaged in the particular practice under review (Mugford, Banfield, & O'Hanlon, 1991).

The rationale for audit and feedback is that health professionals, who may not be aware that their behaviour is not optimal, are more likely to change their behaviour if feedback shows that their clinical practice deviates from that of their peers or the recommended guidelines. Feedback involves providing individual practitioners with a report of their own specific professional practice, such as prescribing behaviour. A profile of their performance is presented, including a description of the discrepancies between their actual performance and that recommended by "gold standard" guidelines or compared to their peers.

Seven good to poor quality systematic reviews of 7-85 studies (Beilby & Silagy, 1997; Bennett & Glasziou, 2003; Gill et al., 1999; Grimshaw et al., 2004; Hulscher et al., 2001; Jamtvedt et al., 2003; Weingarten et al., 2002) (Table 25) and three additional primary studies (Eccles et al., 2001; Kiefe et al., 2001; McCartney et al., 2001) (Table 26) evaluated the effectiveness of audit and feedback.

Table 25. Effectiveness of audit and feedback – Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Preventive care (16) Prescribing (18) Disease management (30) Test ordering (10) Adherence to guidelines (11)	(Jamtvedt et al., 2003)	Level I: good quality SR 85 poor-good quality RCTs	Compliance with desired practice ranged from 9% absolute decrease to 71% absolute increase in performance [d] §	NS
Prescribing	(Bennett & Glasziou, 2003)	Level I: average quality SR 7 average quality RCTs	+ in 1/7 studies §	NA
Prescribing and test ordering	(Beilby & Silagy, 1997)	Level I: poor quality SR 3 RCTs[e]	+	NA
Prescribing	(Gill et al., 1999)	Level II: good quality SR 33 average-good quality controlled studies	+ in 17/33 studies	NA
Preventive care (3) Test ordering (3) Disease management (4)	(Grimshaw et al., 2004)	Level II: good quality SR 10 average quality controlled studies	+ in 6/10 studies § Modest effect size	NS (1)
Preventive care	(Hulscher et al., 2001)	Level II: good quality SR 11 poor-average quality controlled studies	+ in 2/3 studies §	NA
Disease management	(Weingarten et al., 2002)	Level II: average quality SR 32 average quality controlled studies	+ in 9/16 studies § Moderate effect size	+ in 9/23 studies § Small effect size

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; [d] Increase in practitioner performance pertains to better compliance with recommended practice; decrease in performance is less compliance with recommended practice; [e] Study quality not assessed; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 26. Effectiveness of audit and feedback – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Prescribing / referral	(McCartney et al., 2001)	Level III-1: Average quality quasi-RCT	+ appropriate prescribing ± inappropriate prescribing	NA
Adherence to guidelines	(Eccles et al., 2001)	Level II: Good quality Cluster RCT	NS	NA
Disease management	(Kiefe et al., 2001)	Level III-1: Average quality quasi-cluster RCT	±	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

7.8.1. How effective is audit and feedback?

Process outcomes were significantly improved with the use of feedback in 14-60% of studies, whereas the impact on patients' control of their disease was non-significant or small in the few studies that measured patient outcomes. Relevant studies were mostly included in two systematic reviews (Grimshaw et al., 2004; Jamtvedt et al., 2003). Grimshaw et al. (2004) reported small to moderate effects of 1-16% improvement in professional practice in 10 studies, whereas Jamtvedt et al. (2003) examined 85 studies (5 studies were common to both reviews) and found highly variable results ranging from 9% reduction in performance to 71% improvement in practice.

The better quality studies in Jamtvedt et al. (2003) showed significant improvements in process outcomes, such as delivery of preventive care, prescribing behaviour and level of hygiene in practice. In contrast, relatively small improvements were apparent in the few studies that measured patient outcomes, such as patients' control of their disease (Weingarten et al., 2002). Jamtvedt et al. (2003) also reported that audit and feedback was most effective in conditions where the baseline adherence to recommended practice was low. An update of the Jamtvedt et al. review, comprising 118 studies, is now available (Jamtvedt, Young, Kristoffersen, O'Brien, & Oxman, 2006). Some of the studies added to the updated review are included in the additional primary studies in the present review. Results from the update confirm the association of low baseline performance with greater improvement, and showed an additional finding that higher 'intensity' of feedback was associated with greater effectiveness. Intensity of feedback was categorised in terms of:

- The recipient
- The format
- The source
- The frequency
- The duration
- The content of feedback.

These categories were then combined to describe "intensive", "moderately intensive" and "non-intensive" feedback types. For example, "intensive" feedback comprised individual recipients and verbal format; or prolonged feedback, with a senior colleague as the source of feedback. In contrast, "non-intensive" feedback comprised group recipients with a less experienced colleague as the source of feedback; or written format without personal incentives (e.g., simple costs or numbers of tests).

One good quality cluster RCT (Eccles et al., 2001) and two average quality quasi-RCTs (Kiefe et al., 2001; McCartney et al., 2001) investigated the effect of audit and feedback on changing practitioners' clinical performance. Results from these additional studies indicated mixed effects for audit and feedback interventions on the behaviour of health professionals (process outcomes). Two studies showed significant improvement in practice, with modest effect size (Kiefe et al., 2001; McCartney et al., 2001) (Table 54). Both studies combined audit and feedback with additional elements, such as distribution of benchmark data to improve practitioners' care for patients with diabetes mellitus (Kiefe et al., 2001), or educational material plus support for practitioners auditing patients to improve their hormone replacement therapy prescribing to women with a history of hysterectomy (McCartney et al., 2001).

No significant improvement in practice was demonstrated with the standard audit and feedback strategy. However, due to the limited follow-up time (3-4 months) in both studies, sustainability of the benefits of an *enhanced* feedback intervention is unknown. It is also worth noting that study subjects (Kiefe et al., 2001) were recruited from a population of physicians participating

in the Ambulatory Care Quality Improvement (ACQI) project – an intensive quality improvement program that informed physicians of their individual performance compared to that of their peers. Study physicians may have performed higher than their counterparts not involved in the ACQI intervention, due to a heightened awareness of their performance. In contrast, Eccles et al. (2001) reported that an initial positive effect (compliance with guidelines) was eliminated once sources of random variation were added in data analysis.

7.8.2. Key success factors of audit and feedback

While there was variability between studies in the format, content, timing and source of the feedback provided and in the complexity of the behaviour targeted for change, none of these factors explained the variation in relative effects across studies. However, analyses by Jamtvedt et al. (2003) showed that feedback was most effective in circumstances where baseline adherence to recommended practice was low. That is, poorly performing professionals were more likely to change after becoming aware of the need to improve their practice, while those already performing well had little need or scope to change. Therefore, feedback strategies are more likely to be successful in settings where professionals' practice has been identified as inadequate.

Other factors that may increase the effectiveness of audit and feedback include:

- Intensity of feedback. Intensive feedback is more interactive (individual recipients; verbal feedback), uses a credible source (senior colleague), and is delivered over a prolonged period. Non-intensive feedback is delivered to a group by a less credentialled person, in written format, and contains information on costs or data without personal incentives for improvement (Jamtvedt et al., 2006; Jamtvedt et al., 2003).
- Additional strategies. Standard feedback should be enhanced with other interventions (e.g., educational materials, audit support, public health promotion) (Eccles et al., 2001; Kiefe et al., 2001).

It has been suggested that other factors, such as the content, complexity and frequency of feedback, or the motivation of professionals, may impact on the effectiveness of this strategy. For example, if feedback is infrequent, or the interval between action and feedback is too long, it is possible that the feedback becomes disassociated from the initial activity and may fail to influence subsequent actions. In contrast, if the feedback is too frequent and the interval too short, it may become tedious and be ignored. In addition, some practitioners / practices may be more responsive to improvement efforts. Few studies have specifically examined these factors and Jamtvedt et al. (2003) reported no evidence to support or refute the suggestion that these factors contribute to the effectiveness of audit and feedback strategies.

7.8.3. Relevance to the AOD field

Overall, while the evidence was mixed, feedback may be most effective in organisations or groups of professionals where professional practice is poor.

Audit and feedback strategies are feasible in both clinical and non-clinical environments within the AOD field, provided that some objective measure of performance can be recorded for assessment. AOD areas where feedback may be useful are in delivery of preventive care, prescribing and test ordering.

7.9. Financial Incentives

Financial incentives involve some form of payment system, whereby individual practitioners receive remuneration that directly affects their personal disposable income.
Financial incentives include:

- Capitation – The practitioner receives a payment for the services provided to each registered patient.
- Salary – The practitioner receives an annual salary for a specified number of hours per week, irrespective of the services provided or the number of patients attending.
- Fee-for-service (FFS) – Practitioners are paid a fee for each item of care provided, such as consultations, immunisations, and prescriptions.
- Target payments – Practitioners are remunerated for items of care (as in fee-for-service) only if they reach a certain target level of service (Gosden et al., 2000).

It must be noted that financial incentives depend largely on the health care system that exists in a country. That is, effective financial incentive systems in one country may not be reproduced in another country, which has a different healthcare infrastructure. In addition, other non-financial measures, such as CME and mandatory use of practice guidelines, may affect health professionals' incomes and behaviour. The causal relationship between financial and non-financial incentives is complex.

Two systematic reviews of 2-4 studies (Giuffrida et al., 2000; Gosden et al., 2000) and one good quality quasi-RCT (Hillman et al., 1998) evaluated the effectiveness of financial incentives (Table 27 and Table 28.)

Table 27. Effectiveness of financial incentives – Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Preventive care	(Giuffrida et al., 2000)	Level II: good quality SR 1 average quality RCT and 1 average quality ITS	NS	NS
General medicine	(Gosden et al., 2000)	Level II: good quality SR 4 average quality controlled studies	± § NS over time	± NS over time

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 28. Effectiveness of Financial Incentives – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Preventive care	(Hillman et al., 1998)	Level III-1: Good quality Quasi-RCT	NS	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

7.9.1. How effective are financial incentives?

Two systematic reviews examined the effectiveness of different financial incentives on professional practice (Giuffrida et al., 2000; Gosden et al., 2000). The use of target payments for professional practice was inconclusive or improvements were non-significant (Giuffrida et al., 2000). Gosden et al. (2000) reported some evidence for higher services under fee-for-service (FFS) compared to capitation or salary; decreased practitioner visits with salary compared to capitation; and increased costs with capitation compared to FFS. Patient outcomes were not assessed in these studies. Practitioners paid by FFS provided higher quality of primary care services compared with capitation or salary, but evidence was not robust or generalisable to different settings. Overall, financial incentives showed some evidence of effectiveness at reducing drug costs, reducing the number of days in hospital, and improving prescribing performance (Giuffrida et al., 2000). Giuffrida et al. (2000) (2 studies) reported overall positive (non-significant) effects of target payments for immunisation.

On the other hand, Gosden et al. (2000) (4 studies) reported significant positive effects of capitation (compared to FFS) in the areas of: prescribing; days spent in hospital; recommended clinician visits; appropriate referrals; diagnostic services; hospitalisations; and emergency visits. However, several outcomes (clinician visits, emergency visits and hospitalisations) were non-significant at 12 months follow-up. There was also evidence of a larger number of services provided under FFS compared to capitation or salary; fewer recommended practitioner visits with salary compared to capitation; and higher administrative costs associated with capitation compared to FFS (Gosden et al., 2000). Importantly, settings, outcome measures and interventions varied substantially between studies that also lacked statistical power and had relatively high baseline rates (Giuffrida et al., 2000).

Evidence from one additional primary study (Hillman et al., 1998) indicated that performance-based financial incentives did not improve practitioners' compliance with cancer screening guidelines in four screening areas: Pap smear test; colorectal screening; mammography and breast examination in a preventive care setting (Table 55, Appendix B).

7.9.2. Key success factors of financial incentives

The available evidence on effectiveness of financial incentives was neither robust nor generalisable to different settings. Overall, studies that assessed the effectiveness of using performance-based financial incentives as a tool for raising practitioners' awareness and compliance with evidence-based preventive practice showed inconclusive or mixed effects.

However, several factors should be taken into consideration, including:

- Magnitude of the financial incentive. The level of reward should be appropriate relative to their overall income, yet must be sustainable by the organisation providing the incentive.
- Concurrent incentives. Competing incentives or disincentives may diminish the impact of a particular financial incentive scheme.
- Mode and frequency of payments. Regular vs one-off payments. Uncoupling the action and consequence may occur if financial incentives are not paid at regular intervals. A financial incentive that is offered until an optimal level of care has been reached or certain practice has been undertaken may bring about progressive behaviour change toward sustainable evidence-based practice, whereas implementing a 'withdrawal from payment until an optimal level of care has been achieved' strategy may serve as a disincentive to change practice.

Further research is required to examine these and other factors in the Australian setting.

7.9.3. Relevance to the AOD field

The transferability and generalisability of results that contain geographic-specific characteristics is problematic. This is particularly the case for financial incentive strategies, which are constrained by the political and legislative infrastructure of a particular health system. Capitation and target-based incentives operate on a limited scale in Australia.

However, some form of strategy involving financial incentives is feasible in both clinical and non-clinical environments provided that some objective measure of performance can be recorded for assessment. Australian health professionals receive some financial incentives as recognition of good performance, for example through programs established by the Australian Government such as the General Practice Immunisation Incentives (GPII) Scheme, the Service Incentive Payments Scheme (SIPS), which is associated with the management of some chronic conditions, and the Practice Incentives Program (PIP), which aid the implementation of national health-related strategies by supporting health professionals to provide quality care (www.hic.gov.au). These programs remain under continual review to ensure they are effective in improving health care outcomes. It is currently premature to make judgements regarding the effect of such programs, yet they may have applicability to the AOD field in future. For example, NSW Health currently administers the Pharmacy Incentive Scheme, which provides payment to pharmacists who provide Methadone / Buprenorphine pharmacotherapy dispensing services.

Within the AOD field, financial resources are typically sparse, making the use of performance-based financial incentives unlikely. Although limited availability of resources for the AOD field may preclude the use of financial incentives to induce behaviour change, other non-financial performance-based incentives, such as recognition of effort and contribution and support for professional development activities (CME) may be appropriate alternatives.

7.10. Electronic Educational Sources

Due to the vast development of communication technologies and modalities, electronic educational sources, such as the Internet, on-line databases and CD-ROMs, are being used increasingly to disseminate information. In comparison to conventional print or paper-based modes of disseminating educational information, electronic sources offer a multitude of advantages such as:

- time (quick access)
- usability (convenient)
- reduced cost for the party disseminating information and the intended user.

For example, the CD-ROM has the advantage of storing large volumes of high quality information in the form of text, graphics and other visual and audio media contained in a compact format that may be readily transferred from researcher / communicator to health care provider. In comparison to telephone, fax and postal services, the Internet, including communication through email and instant messaging, also has advantages, such as providing information in a convenient, unrestricted format that may be instantly exchanged and at low cost (once the system has been established).

Electronic information may be interactive and presented in a format that is visually appealing. It enables the user to navigate independently through the information in their preferred order and pace and to access information relevant to their practice needs.

Not only is the Internet capable of digitalising conventional formats of information dissemination through the conversion of written reports into pdfs, for example, but technologies such as videoconferencing enable face-to-face interactions whilst overcoming the problem of geographic distance.

Telemedicine, which is defined as "the use of telecommunications technology for medical diagnosis and patient care" (Currell, Urquhart, Wainwright, & Lewis, 2001), involves use of telecommunications to deliver medical services to sites distant from the health service provider. It utilises conventional telephone services, computer modems, satellites and other equipment to transmit and receive data.

Potential limitations of using electronic sources to disseminate information are the need for a minimum level of computer literacy for locating and retrieving information and access to a computer.

There were no available systematic reviews evaluating the effectiveness of electronic educational sources.

One primary study met the inclusion criteria for the electronic educational sources category (Table 29 and Table 56, Appendix B). A quasi-RCT (Di Noia et al., 2003) examined the effectiveness of electronic educational sources by comparing the Internet and CD-ROMs to pamphlets as strategies for disseminating drug use prevention programs to social workers in a community setting.

7.10.1. How effective are electronic educational sources?

Evidence from one average quality quasi-RCT showed that, when used in a community-based setting, disseminating prevention program materials via electronic sources including CD-ROMs and the Internet in comparison to pamphlet form provided a short- and long-term (sustained) benefit to practice (Di Noia et al., 2003). At 12-months follow-up, dissemination via the Internet resulted in the greatest improvement in process outcomes including agency workers' perceived self-efficacy for obtaining and recommending prevention programs, and their likelihood of recommending effective prevention programs to clients. Patient outcomes were not assessed.

Table 29. Effectiveness of electronic educational sources – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Preventive care	(Di Noia et al., 2003)	Average quality Quasi-RCT	+	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

7.10.2. Key success factors of electronic educational sources

The factors that are important to the success of educational materials more generally (see section 7.1.2, Educational materials) are also important to the success of electronic educational sources, with some additional elements, including:

- Accessibility. Information was more accessible via the Internet compared with CD-ROM or pamphlet format.
- Tailored to individuals. Information was tailored to individuals within the broader target group to enhance the relevance and appeal of the content (Di Noia et al., 2003).

7.10.3. Relevance to the AOD field

Di Noia et al. (2003) explored the dissemination of adolescent drug abuse prevention programs to agency workers in community-based settings including policy makers, school personnel and community service providers that influence public attitudes and support for youth-oriented programs. When disseminated via the Internet and CD-ROM, information about effective substance use prevention programs and best practice had a greater likelihood of increasing agency workers' access to prevention program materials, self-efficacy for identifying and obtaining prevention programs and likelihood of requesting, implementing and recommending prevention programs to clients compared to pamphlets. Although this study was undertaken in the USA, it contains no geographical specificities and the findings are generalisable to the Australian AOD setting.

Given that there was only one study that met the inclusion criteria, the evidence is not robust. However, results suggested that dissemination of best-practice information to AOD workers via electronic sources may be effectively used in preventive care settings. In addition, while dependent on the availability of Internet facilities, this strategy may be particularly useful for those in rural and remote communities in Australia.

8. Organisational Interventions

Organisational interventions refer to interventions that are oriented to change in organisational practices (see Table 4). Interventions included here are:

- Record and / or office systems
- Multi-disciplinary collaborations (integrated care)
- Alternative care providers / settings
- Continuous quality improvement.

Organisational factors impact on individuals' participation and adoption of innovations. Moreover, a recent study has shown that even when staff are aware of the need for change and accept that an innovation will meet their needs, organisational culture moderates the likelihood of adopting the innovation (Simpson, Joe, & Rowan-Szal, 2007).

8.1. Record and Office Systems

Record and office systems store and manage information that may be accessed and used to inform patient care. These systems aim to improve the flow of information within an organisation, and provide comprehensive up-to-date patient details and clear and precise care plans for individual patients. This strategy involves structural changes within an organisation to accommodate the system and procedures, as well as changes in staff behaviour to maintain and operate the system.

"A nursing record system is the record of care planned and / or given to individual patients / clients by qualified nurses, or by other care givers under the direction of a qualified nurse" (Currell & Urquhart, 2003). Used for the storage and exchange of information, nursing record systems vary considerably and include manual or computerised versions, centrally-held or patient-held records, and structured or unstructured systems. While the structured nursing record system involves entering data in a structured format (e.g., care plans and flow charts), with standardised phrasing and unambiguous terminology, the unstructured system allows unrestricted entry of information in freer format.

Record systems may be one component of a multi-faceted office system (e.g., patient flow chart). An office-system is "an organised approach within a medical practice for routinely providing a given service (for example, cancer screening) to patients for whom this service is indicated" (Kinsinger et al., 1998).

Office systems require that practice staff take an organisational level approach and work in a team. As a consequence, the onus for change does not lie with individual health care providers. The key to this strategy is segmenting an activity or health procedure into clearly defined steps, and then developing and implementing a process involving both practitioners and office staff to ensure the steps are performed for every appropriate patient. For example, one office system established the division of responsibilities amongst staff, clearly defined expectations and routines, and provided explanations for the use of medical record flow sheets (Dietrich et al., 1992). Office systems typically comprise various tools such as:

- flow sheets
- chart prompts
- patient care algorithms
- patient education brochures
- wall posters
- patient held cards.

These tools are integrated within usual practice procedures and adopted by all practice staff – both practitioners and office staff – to track patient care, prompt appropriate clinical actions, and provide patient education. Ideally, all steps are documented, activities are revised for improvement and the office system is tailored to the needs and work patterns of the individual practice.

Two systematic reviews of 1-8 studies (Currell & Urquhart, 2003; Hulscher et al., 2001) assessed the effectiveness of record systems (Table 30) and five additional studies (Boekeloo et al., 2003; Boekeloo et al., 2004; Dietrich et al., 1992; Kinsinger et al., 1998; McBride et al., 2000; Ockene et al., 1999) [9] (Table 31) assessed the effectiveness of office systems or office-based interventions.

Table 30. Effectiveness of record systems – Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Preventive care	(Currell & Urquhart, 2003)	Level II: good quality SR 8 poor quality controlled studies	NS	NS
Preventive care	(Hulscher et al., 2001)	Level II: good quality SR 2 poor-average quality controlled studies	+	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 31. Effectiveness of office systems – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Preventive care	(Boekeloo et al., 2003; Boekeloo et al., 2004) (adolescent alcohol use)	Level II: RCT Good quality	± improvement in most but not all outcomes	-
	(McBride et al., 2000) (heart disease prevention)	Level II: RCT Good quality	+	NA
	(Kinsinger et al., 1998) (breast cancer screening)	Level II: RCT Good quality	±	NA
	(Ockene et al., 1999) (nutrition counselling)	Level III-1: Quasi RCT Average quality	NA	+
	(Dietrich et al., 1992) (cancer prevention)	Level III-1: Quasi RCT Good quality	± improvement in most but not all outcomes	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

[9] Outcomes from one study were reported in two separate papers (Boekeloo et al., 2003, 2004).

8.1.1. How effective are record and / or office systems?

One systematic review (Currell & Urquhart, 2003) evaluated the effectiveness of client-held records (compared with centrally-held) and computerised patient records (compared with manual record keeping). Record systems had no significant effect on nursing practice and patient outcomes, except in the following circumstances:

- Identification of children's pain intensity improved with the use of a paediatric pain management sheet
- Documentation standards improved after implementing two paper-based nursing record systems
- Nurses' recording of care planning increased when a computerised planning system was implemented (but with no significant change to patient outcomes).

One study in an existing systematic review (Hulscher et al., 2001) reported a significant improvement in the delivery of preventive health services after changing the flow of patients by booking appointments at 10 minute intervals. All review results should be considered with caution, however, as included studies were generally of poor to average quality and comprised small sample sizes.

Office systems or office-based interventions evaluated in the five additional primary studies (Boekeloo et al., 2003; Boekeloo et al., 2004; Dietrich et al., 1992; Kinsinger et al., 1998; McBride et al., 2000; Ockene et al., 1999) comprised a wide variety of different components, which made evaluating effectiveness and identifying attributes of effectiveness challenging (Table 57 and Table 58, Appendix B). The process used to facilitate the development and implementation of office systems also differed. All studies were conducted in preventive health care settings.

Office-based interventions had mixed effects for process outcomes, with most studies reporting improvement in some, but not all outcomes. Most studies showed improvements in the delivery of preventive health services, particularly for heart disease (McBride et al., 2000) and three out of five indicators for cancer (Kinsinger et al., 1998; Ockene et al., 1999) (Table 57, Appendix B). There was no additional effect gained in the presence of other strategies, such as educational meetings or materials (Dietrich et al., 1992). However, when two office systems were implemented concurrently and combined with a relevant conference, improvement in practice was greater than either system alone, which were better than controls (conference alone), and the improvement was sustained at 18 months follow-up (McBride et al., 2000).

One study (Boekeloo et al., 2003) demonstrated no statistically significant improvements in patient-provider communication using a 'patient-priming' [10] program for improving patient-provider communication. However, when combined with provider prompts, young people were more likely to talk to, and ask questions of, their health care provider during checkups than were young people in the control group.

Patient outcomes also showed mixed effects, with improvements in saturated fat intake, weight loss and cholesterol levels in one study when a training program was combined with an office system (Ockene et al., 1999), yet a potentially adverse effect in another, where greater intent to drink and more binge drinking was reported in groups receiving an intervention (Boekeloo et al., 2004) (Table 31 and Table 58, Appendix B).

[10] Patient priming involved patients listening to a 15 minute tape recording about alcohol risk behaviours prior to consultation.

8.1.2. Key success factors of office systems

Record and office systems typically address several potential practice environment barriers to change, such as the need for staff to work as a cohesive team and to develop strategic plans for consistent and thorough patient care. Record and office systems varied substantially across the studies.

- Characteristics of the record or office system. Office-systems are typically multi-faceted and involve the simultaneous implementation of multiple activities. Each component that constitutes the office system appears to add value to different aspects of the overall desired behaviour change. For example, McBride et al. (2000) found different effects for two office systems implemented as part of the same study. One system, which used a quality improvement consultation intervention, set more goals, whereas the other, which used a dedicated prevention coordinator, achieved greater increases in the use of medical record tools and in the documentation of screening and management. Each intervention group demonstrated significant improvement compared to controls, yet in different practice areas.
- Implementation environment. The environment or setting in which office systems are implemented may impact on the effectiveness of this strategy. Practice change requires a team effort; system changes are needed to foster a supportive office environment that is receptive to change and that will improve services. One office system had a modest effect on performing breast cancer screening, despite tailoring the system to both breast cancer screening and the unique organisational needs of the practice (Kinsinger et al., 1998). This study also evaluated the process of development and implementation of the office system. Results suggested that complete development and full acceptance of the system within a practice was a prerequisite for an effective office system.
- Complexity of behaviours to be changed. When implementing record or office systems, health care organisations set goals for change. The complexity of behaviours to be changed may impact on the success of the intervention. For example, McBride et al. (2000) found that screening goals, particularly smoking screening, were more commonly set by organisations than were management goals. McBride et al. speculated that screening goals may be easier to achieve compared with more complex changes in provider and patient behaviour required for management goals. Similarly, smoking screening is deemed a less complex screening activity compared to cholesterol or cancer screening procedures as far as the level and type of patient-provider interaction required.
- Tailoring system to needs. Office systems can be tailored to the unique and diverse needs of individual practices and health care providers. This is an important factor for establishing motivation for change and maintenance of that change.
- Including additional functionality by combining an office system with other tools (multi-faceted). For example, a patient-mediated intervention was more effective when enhanced with provider prompts (Boekeloo et al., 2003).

It should be noted that Kinsinger et al. (1998) examined a number of factors to identify associations with improvement in performance over time. Results showed that change in performance over time was not associated with providers' attitudes to, or beliefs in the effectiveness of the intervention (breast cancer screening), their stated readiness to change, or their perceptions of community standard of practice.

8.1.3. Relevance to the AOD field

While no available studies specifically tested record or office systems in the AOD field, many were conducted in preventive health settings and may be transferable to preventive health care pertaining to AOD issues.

Office systems may be a useful tool to improve health care providers' skills in screening for alcohol and / or other drug (AOD) use. Screening and routine history-taking may assist health care providers to:

- identify an AOD problem
- monitor changes in clients' behaviour or health condition
- identify the need for early intervention
- establish and implement a care and / or treatment plan depending on the needs of the client.

In an exploratory sub-study of a longitudinal study on young people's alcohol behaviours, Boekeloo et al. (2003) assessed the effect of priming young patients to discuss alcohol with their primary care providers. They also examined whether additional effect was gained by prompting providers to discuss alcohol during a consultation. Alcohol-related discussion topics included: avoiding alcohol; effects of alcohol on decisions; resisting peer pressure to drink; dangers of drinking and driving; avoiding places where teenagers drink; avoiding other teenagers when they are drinking; and the risk of combining drinking and sex. Young patients were 'primed' to discuss alcohol-related topics via a 15-minute audio program created by the investigators. The program addressed communication and confidentiality issues as well as information regarding the risks of excessive alcohol consumption. Evidence suggests that priming alone was not effective in encouraging young people to communicate with their health care provider on alcohol-related matters, but communication improved when priming was reinforced with provider prompts.

8.2. Multi-Disciplinary Collaborative Approaches (Integrated care)

Multi-disciplinary collaborative strategies include any health care approach that involves complementary inter-professional collaboration (clinicians, nurses, pharmacists, social workers, psychologists), working together as a team to care for patients. This includes collaborative team care, continuity of care and case-management, which is frequently used in the management of patients with chronic diseases. The efficiency and quality of health care may depend on the extent to which inter-professional relationships are collaborative.

Three systematic reviews of 1-12 studies (Gilbody et al., 2003; Grimshaw et al., 2004; Harvey et al., 2002; Renders et al., 2001) (Table 32) and one additional primary study (Diabetes Integrated Care Evaluation Team, 1994) (Table 33) evaluated the effectiveness of using a multi-disciplinary, inter-professional collaboration (or integrated care) approach to improve the delivery of health services.

Table 32. Effectiveness of multi-disciplinary approaches – Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Disease management	(Gilbody et al., 2003)	Level II: good quality SR 12 average quality controlled studies	+	+
Disease management	(Grimshaw et al., 2004)	Level II: good quality SR 1 average quality RCT	NA	+ §
Disease management	(Renders et al., 2001)	Level II: good quality SR 4 average quality controlled studies	± §	+ §

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 33. Effectiveness of multi-disciplinary interventions (integrated care) – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Disease management (diabetes)	(Diabetes Integrated Care Evaluation Team, 1994)	Level III-1: Quasi-RCT Poor quality	±	NS

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

8.2.1. How effective is the multi-disciplinary approach (integrated care)?

As with other dissemination strategies, multi-disciplinary interventions varied substantially in their content, complexity, and targeted behaviours as well as the disciplines involved in the collaboration. Overall, multi-disciplinary team approaches were no more effective at changing professional practice or improving the health status, quality of life or disease-management of patients, than traditional care.

Enhancing the role of one health care professional in the mix [11] yielded mixed results, with some studies demonstrating a deterioration in performance (Grimshaw et al., 2004) and others showing no significant improvement or small significant improvement with some roles (e.g., pharmacists and dieticians) (Renders et al., 2001). There was also a wide range of effects on patients, with reduced hospital stay, reduced costs and increased satisfaction with care (Gilbody et al., 2003).

Studies contained in one good quality review revealed positive effects on patient outcomes for multi-disciplinary care in a variety of formats, including combinations with revision of professional roles (i.e., improving the role of the nurse), formal integration of services, changes in medical record systems and patient education (Renders et al., 2001).

[11] Revision of professional roles

Using computer-coordinated 'integrated care' for diabetes care, patients were given more frequent metabolic monitoring and screening for diabetic complications than patients who received conventional care (Diabetes Integrated Care Evaluation Team, 1994) (Table 59, Appendix B). However, overall the integrated care model had no distinct advantage over standard, conventional hospital care. Data were not extracted for process outcomes as baseline scores were not provided, nor reported as similar or adjusted for using appropriate statistical procedures.

Patient outcomes relating to metabolic control and psychological wellbeing were not significantly different between integrated care and conventional care. Since baseline levels for psychological wellbeing were not reported nor recorded as similar or adjusted for using appropriate statistical procedures, outcome data were not extracted.

8.2.2. Key success factors of multi-disciplinary (integrated care) interventions

Overall, evidence revealed mixed effects for a multi-disciplinary collaborative care approach, with poor study quality and heterogeneity between study interventions, settings, and populations. However, there are some characteristics that may increase the likelihood of success of a collaborative care approach:

- Enhanced with additional strategies. Including patient education with a collaborative care approach for management of depression symptoms improved treatment adherence and patient recovery (Gilbody et al., 2003).
- Coordination of patient appointments with reminders to patient and provider. Computer-generated reminders about due consultations were sent to patients receiving integrated care. In addition, providers received the most recent clinical details (Diabetes Integrated Care Evaluation Team, 1994).

From the patient's perspective, the most commonly perceived advantages of integrated care were (improved) accessibility, time savings, continuity of care, and reduced cost of attending appointments. However, the most commonly perceived disadvantage was reduced quality of care.

8.2.3. Relevance to AOD field

The most relevant evidence for the AOD field is derived from one systematic review on management of depression – a common disorder associated with AOD-related problems. Gilbody et al. (2003) concluded that collaborative care approaches, including case management, were generally effective in improving the management of depression and patients' adherence to medication. However, improvements were only sustained during the period of enhanced care.

Given the high incidence of co-morbidities, and the complexity of AOD-related problems, clients commonly require assistance in a broad range of areas, including health, social services, housing, employment and legal services. Therefore, sound working relationships between these services are important. Good quality studies are needed to test the effectiveness of collaborative approaches between relevant services in the AOD field.

8.3. Alternative Care Approaches

Traditionally, health care services are provided by health professionals in a general practice or hospital setting. A different approach is to introduce an alternative health care provider or setting in which patients receive treatment, recover from treatment, or manage a chronic disease. For example, tasks or consultations usually provided by a practitioner may be undertaken by a nurse practitioner. In diabetes management, it is common practice for a nurse educator to advise patients on lifestyle changes and disease management skills.

Three systematic reviews (Grimshaw et al., 2004; Harvey et al., 2002; Renders et al., 2001) (Table 34) and two additional primary studies (Campbell et al., 1998; Sikka et al., 1999) (Table 35) evaluated the effectiveness of using alternative care approaches to improve health care.

Table 34. Effectiveness of alternative care approaches – Systematic review summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Disease management	(Harvey et al., 2002)	Level II: good quality SR 13 poor-average quality controlled studies	+ in 2/13 studies §	+ in 2/13 studies §
Disease management	(Grimshaw et al., 2004)	Level II: good quality SR 1 average quality CBA	-	NA
Disease management	(Renders et al., 2001)	Level II: good quality SR 4 average quality controlled studies	+ (1 study)	+ in 2/4 studies §

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 35. Effectiveness of alternative care approach – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Secondary prevention (heart disease)	(Campbell et al., 1998)	Level II: RCT Average quality	+	NA
Disease management (diabetes)	(Sikka et al., 1999)	Level II: RCT Average quality	+	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

8.3.1. How effective is the alternative care approach?

Evidence revealed mixed effects using an alternative approach to improve patient care. While some studies showed significant improvement in the management of obesity, including greater weight loss in patients treated by a dietician or professional therapist, most studies had small sample sizes, high drop-out rates and limited follow-up (Harvey et al., 2002). Results were similar for the management of diabetes, with small effect sizes in studies where improvements in the intervention group were significantly better than control (Renders et al., 2001).

Nurse-led clinics implemented in general practice improved secondary prevention outcomes, with the exception of smoking cessation (Campbell et al., 1998) and a nurse case manager (as opposed to usual care provided by a primary care physician) improved renal assessment in patients with diabetes (Sikka et al., 1999) (Table 60, Appendix B).

8.3.2. Key success factors of alternative care approach

Evidence suggests that the effectiveness of an alternative care approach may be dependent on several factors:

- Dedicated staff and clinical support for the approach: Sikka et al. (1999) attributed the success of their alternative care intervention to the support and participation of respected clinical staff, which created high comfort and confidence levels in patient safety and program value among general practitioners.
- Behaviour amenable to change: Campbell et al. (1998) noted that some behaviours may be more difficult to change than others. For example, medical treatment may be 'easier' to change than lifestyle components (e.g., smoking cessation in patients with diagnoses of heart disease).

8.3.3. Relevance to AOD field

No studies in the existing systematic reviews or the additional studies specifically assessed the alternative care approach in an AOD setting. Of most relevance is the Campbell et al. (1998) study, which found that nurse-led clinics improved all aspects of secondary prevention except smoking cessation. However, no strong conclusions can be drawn due to the paucity of AOD-related evidence.

There is a range of tasks and procedures, particularly preventive health, screening and monitoring activities, which could be conducted by alternative care providers within an AOD setting. For example, methadone / buprenorphin maintenance treatment for eligible clients is dispensed by authorised pharmacists. Other potential tasks for alternative care providers include: implementing alcohol or other drug screening tools; providing advice on AOD use to pregnant women; and implementing outcome monitoring programs, such as pharmacotherapies dispensed through pharmacies.

8.4. Continuous Quality Improvement

Continuous quality improvement (CQI) usually involves an iterative process of problem-solving and group decision-making that centres on the analysis of organisational systems and work processes, and is designed to achieve improvements in health outcomes. CQI focuses on improving processes that influence the flow of three principal factors – information (paper or electronic records), material (e.g., blood samples sent to a lab for testing), and patients. It is also widely used to implement CPGs (Brown et al., 2000).

CQI models typically entail three phases:

- Diagnostic phase – Identify a specific problem and use data analysis, brainstorming, process flowcharts to identify and prioritise the root causes of the problem, such as failure to adhere to recommended practice.
- Remedial phase – Identify measurable outcomes (e.g., functional health, quality of life, satisfaction); define and test possible "solution tracks"; and recommend a selected number for implementation.
- Implementation phase – Recommendations are put into practice using a series of limited changes. The product of this model then progresses through another cycle of the above phases.

Rapid cycle improvement is a similar format, used primarily in the Institute for Health Care Improvement Breakthrough Series for reducing adverse drug events and medication errors. Changes in the rapid cycle improvement method are tested on a smaller scale, without flowchart processes and extensive measuring. Studies assessing the effectiveness of rapid cycle improvement typically lacked control groups and failed to meet the inclusion criteria for the present review.

One existing systematic review (Gilbody et al., 2003) (Table 36) and four additional primary studies (Feifer & Ornstein, 2004; Irvine Doran et al., 2002; Rantz et al., 2001; Solberg et al., 2000) (Table 37) evaluated continuous quality improvement (CQI).

Table 36. Effectiveness of continuous quality improvement – Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Disease management	(Gilbody et al., 2003)	Level II: good quality SR 2 average quality controlled studies	+	+ NS at 24 months

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 37. Effectiveness of continuous quality improvement – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Preventive care	(Solberg et al., 2000)	Level II: RCT Good quality	±	NA
Disease management (cardiovascular and stroke)	(Feifer & Ornstein, 2004)	Level III-1: quasi-RCT Average quality	NS	NA
Patient care / management (nursing home care facilities)	(Rantz et al., 2001)	Level III-1: quasi-RCT Average quality	±	NA
Disease management and general medicine	(Irvine Doran et al., 2002)	Level III-1: quasi-RCT Poor quality	NS	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

8.4.1. How effective is continuous quality improvement?

One systematic review included two studies that evaluated CQI interventions in the management of patients with depression (Gilbody et al., 2003). The CQI interventions were very complex, with educational and organisational components, including clinician education, opinion leaders, patient-specific reminders, revision of professional roles, and multi-disciplinary integration of care. Both studies showed statistically significant improvement in medication adherence ($p<0.001$) and depression symptoms ($p=0.03$) at both six and 12 months. By 24 months, the benefit for patient outcomes was no longer evident, although medication adherence persisted ($p=0.04$).

Data were extracted for only two additional primary studies (Irvine Doran et al., 2002; Rantz et al., 2001) (Table 61, Appendix B). Rantz et al. (2001) tested the effectiveness of two quality improvement interventions and found that simply providing comparative performance feedback was not sufficient to change clinical practice, but when feedback was combined with academic detailing in the form of expert clinical consultation, this resulted in improvement, although not at a statistically significant level.

One good quality RCT (Solberg et al., 2000) provided incomplete data (except in graph format), hence data for this study has not been extracted. Solberg et al. (2000) reported statistically significant improvement in delivering preventive care in only one of seven preventive care services. Data were not extracted from the Feifer and Ornstein (2004) study as baseline scores were not provided, nor reported as similar or adjusted for.

The paucity of good quality empirical studies that evaluated whether CQI is effective in improving the quality of health care limited conclusions that could be drawn regarding the overall effectiveness of this approach.

8.4.2. Key success factors of continuous quality improvement

Solberg et al. (2000) suggest that the limited effect of their CQI intervention may be because the clinics recruited to this study were atypical and possibly resistant to change; the intervention was resource-intensive / time-consuming; CQI was not an appropriate mechanism for making preventive service improvements; and the intervention was not delivered satisfactorily.

Rantz et al. (2001) proposed that CQI was more likely to be effective under the following conditions:

- Clear standards of practice – Improvements in practice occurred in areas where the standards are well understood and "staff could grasp the clinical changes needed for better management of these clinical problems" (Rantz et al., 2001, p. 535)
- Limited number and scope of change required - "While we can generate a myriad of quality indicator information for teams to examine, they can only focus on one or two areas for improvement at a time…there is a limit to the time and energy of staff that can be harnessed to implement and sustain change" (Rantz et al., 2001, p. 535)
- Adequate staffing and resources to implement change - "The problems of staff turnover and too few staff to participate in a quality improvement team also interfere with the number of areas that can be addressed, changed and sustained as an acceptable clinical practice" (Rantz et al., 2001, p. 535).

8.4.3. Relevance to AOD field

CQI interventions are typically time and resource intensive and are not supported by empirical evidence. CQI interventions that seek to alter workplace processes may not be appropriate / feasible in the AOD field that is often under-resourced and experiences high staff turnover. Staff who are retained are frequently under considerable time pressure.

9. Other Interventions

Other strategies that have emerged from the literature include marketing, mass media and multi-faceted strategies. These address the problem of dissemination and implementation by using a more general "scatter-gun" approach (mass media, mass mailouts), combining strategies (multi-faceted) or tailoring the strategy by identifying and breaking down the barriers to implementation.

Other interventions that were evaluated included:

- Mailouts
- Multi-faceted interventions.

9.1. Mailouts

Mass media and mailouts are simple strategies that aim to deliver information to the general public or large groups of people in a specific target audience (e.g., general practitioners, AOD professionals). Television, radio and print media are used for dissemination of information that is of interest to public health in the general population. Other media include listservs, websites and email lists, particularly for disseminating information to target groups.

One primary study evaluated the effectiveness of mailouts to facilitate change in practitioners' behaviour (Matowe et al., 2002) (Table 38).

9.1.1. How effective are mailouts?

Using the same population of general practitioners (GPs) as described previously by Eccles et al. (2001) (audit and feedback and reminder messages on GPs' requests for lumbar spine and knee x-rays), Matowe et al. (2002) reported no significant effect of postal distribution of guidelines on GPs' referral behaviour as determined by time series regressions (Table 62, Appendix B). This is congruent with other evidence that simple, passive dissemination strategies are often less effective for changing behaviour and increasing uptake of evidence (Freemantle et al., 1997; Grimshaw et al., 2004). While significant improvements were observed for reminder messages with this population, audit and feedback and mass mailouts of guidelines had no effect.

Table 38. Effectiveness of mail outs – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Referral (radiography)	(Matowe et al., 2002)	Level III-3: Interrupted time series - no control Good quality	NS	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

9.1.2. Key success factors of mailouts

There were insufficient studies with methodological rigour to make a conclusive statement of effect.

9.1.3. Relevance to AOD field

While mailouts to the AOD field are common, there were no available studies that evaluated the effectiveness of this strategy in this area. Moreover, evidence in other health areas was sparse and precluded making firm conclusions about the effectiveness of this strategy.

9.2. Multi-faceted Interventions

Multi-faceted interventions employ two or more strategies (as detailed throughout this report) to address several aspects of health care from a variety of perspectives. Combining strategies is thought to address more of the barriers to change and thus increase the likelihood of influencing a wider group of individuals with different learning styles, values and motivation levels.

Seven systematic reviews of 8-115 studies (Anderson & Jane-Llopis, 2004; Currell & Urquhart, 2003; Gill et al., 1999; Grimshaw et al., 2004; Hulscher et al., 2001; Jamtvedt et al., 2003; Renders et al., 2001) (Table 39) and 19 additional primary studies (Bekkering et al., 2005; Cooke et al., 2001; Flottorp et al., 2003; Forsetlund et al., 2003; Foy et al., 2004; Frijling et al., 2003; Frijling et al., 2002; Heller et al., 2001; Joseph et al., 2004; Langham et al., 2002; Lemelin et al., 2001; Margolis et al., 2004; Nilsson et al., 2001; Philbin et al., 2000; Sanci et al., 2000; Schectman et al., 2003; Searle et al., 2002; Waldorff et al., 2003; Wright et al., 2003; Young et al., 2002) (Table 40) evaluated the effectiveness of multi-faceted interventions.

Table 39. Effectiveness of multi-faceted interventions – Systematic reviews summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Preventive care (12) Prescribing / test ordering (8) Disease management (20)	(Jamtvedt et al., 2003)	Level I: good quality SR 40 average quality RCTs	+ in 19/40 studies § 	NA
Preventive care	(Anderson & Jane-Llopis, 2004; Anderson et al., 2004)	Level II: good quality SR 16 average quality controlled studies	+ studies using multi-faceted interventions were more effective in changing practitioners' behaviour compared to those with single interventions	+
Preventive care	(Currell & Urquhart, 2003)	Level II: good quality SR 8 poor quality controlled studies	NS	NS
Prescribing	(Gill et al., 1999)	Level II: good quality SR 22 average quality controlled studies	+ in 11/22 studies § 	NA
Preventive care (34) Prescribing/test ordering (43) Disease/pain management (27) Counselling (2) Diagnosis (1) Organisational change (8)	(Grimshaw et al., 2004)	Level II: good quality SR 115 average quality controlled studies	+ in 54/115 studies § 	+ in 8/25 studies §
Preventive care	(Hulscher et al., 2001)	Level II: good quality SR 25 poor-average quality controlled studies	+ Small-moderate effect size	NA
Disease management	(Renders et al., 2001)	Level II: good quality SR 20 poor-average quality controlled studies	± §	± §

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; NA = not assessed; NS = not significant; RCT = randomised controlled trial; SR = systematic review.

Table 40. Effectiveness of multi-faceted interventions – Primary research summary

Research area	References	Level and quality of evidence [a]	Process outcomes [b]	Patient outcomes [c]
Disease prevention / management	*Diabetes:* (Frijling et al., 2002)	Level II: RCT Good quality	+ in 3/7 outcomes	NS
	Heart disease: (Frijling et al., 2003)	Level II: RCT Good quality	+ in 5/12 outcomes	NA
	Heart disease: (Langham et al., 2002)	Level II: RCT Good quality	+	NS
	Heart disease: (Philbin et al., 2000)	Level III-1: quasi-RCT Good quality	NS	NS
	Heart disease: (Heller et al., 2001)	Level III-1: quasi-RCT Good quality	NS	NA
	Asthma and angina: (Wright et al., 2003)	Level III-2: Non-randomised study Average quality	NS §	NA
Preventive health care	*Smoking cessation:* (Young et al., 2002)	Level II: cluster RCT Good quality	+ in 2/13 outcomes	NA
	(Lemelin et al., 2001)	Level III-1: quasi-RCT Good quality	+	NA
	Adolescent health: (Sanci et al., 2000)	Level II-1: quasi-RCT Good quality	+	+
	Smoking cessation: (Cooke et al., 2001)	Level III-1: quasi-RCT Average quality	NS	NA
	Smoking cessation: (Joseph et al., 2004) [d]	Level III-1: quasi-RCT Average quality	+ in 2/7 outcomes	NS
	Paediatrics: (Margolis et al., 2004)	Level II: RCT Good quality	+	NA
Evidence-based public health practice	(Forsetlund et al., 2003)	Level II: RCT Good quality	±	NA
Pain management	*Lower back pain:* (Bekkering et al., 2005)	Level II: cluster RCT Average quality	+ §	NA
	Lower back pain: (Schectman et al., 2003)	Level II: RCT Good quality	+	NA
Referral for / performance of surgical procedure	*Gynaecology:* (Searle et al., 2002)	Level II: RCT Average quality	NS	NA
	Gynaecology (abortion): (Foy et al., 2004)	Level II: cluster RCT Poor quality	NS §	NA
Prescribing	*Infection:* (Flottorp et al., 2003)	Level III-1: quasi-RCT Poor quality	+	NA
	Hypertension, peptic ulcer/dyspepsia & depression: (Nilsson et al., 2001)	Level III-1: quasi-RCT Poor quality	+ in 1/8 outcomes	NA
Diagnostic evaluations	*Dementia:* (Waldorff et al., 2003)	Level III-3: CBA design Average quality	NS	NA

[a] Quality of primary studies is determined by EPOC (2002) criteria; [b] process outcomes = measures of implementation of an intervention, such as assessment of participation, compliance and efficiency; [c] Client outcomes = measures of impact on clients' or patients' health, such as health status, length of hospitalisation, and quality of life; [d] Data were not extracted for Cooke et al (2001) as baseline and post-intervention scores for relevant outcomes were not provided; + indicates intervention was significantly more effective than control or usual care; ± indicates mixed effects (significant change in some, but not all outcome measures); § = potential unit of analysis errors in cluster RCTs; CBA = controlled before and after study; NA = not assessed; NS = not significant; RCT = randomised controlled trial.

9.2.1. How effective are multi-faceted interventions?

Studies varied widely not only in their settings, quality and targeted behaviours, but also in the type and number of components combined in the intervention. This high degree of variability between studies made synthesis and interpretation of results difficult.

One of the most well-cited reviews (Wensing, van der Weijden, & Grol, 1998), which has been updated more recently (Grimshaw et al., 2004), suggests that "some, but not all multi-faceted interventions are effective in inducing change in general practice". However, there was no evidence to suggest that there are any additive effects when strategies are applied concurrently. For example, Grimshaw et al. (2004) evaluated 117 multi-faceted intervention studies with 136 comparisons against controls (no intervention). With up to 11 strategies combined in one intervention, analysis showed no evidence of increased effectiveness with increased numbers of strategies per intervention.

The additional primary studies combined two to seven different strategies (Table 63 and Table 64, Appendix B). They typically involved a mix of professional (including educational) interventions and were occasionally complemented with organisational interventions (e.g., office systems). Consistent with findings from Grimshaw et al. (2004), there was no evidence of greater effectiveness in interventions containing more strategies. Moreover, complex multi-faceted interventions may be implementing strategies with little evidence of effectiveness.

Overall, there were mixed effects, which probably reflected the heterogeneity of the interventions and the diversity of the targeted behaviours. Thus, it was not possible to isolate the effects of individual strategies. No particular combination of strategies was always effective; and no single common strategy appeared in all the successful multi-faceted interventions. Successful interventions generally demonstrated small to modest improvements in process outcomes, but benefits to patients were negligible in the few studies that measured patient outcomes.

9.2.2. Key success factors of multi-faceted interventions

Due to the heterogeneity of studies that showed some effect, it was difficult to determine which components or combination of components were critical to the success of the intervention.

Several successful studies reported consultation with representatives from the target population, or local consensus processes used in selecting the components of the multi-faceted intervention (Bekkering et al., 2005; Forsetlund et al., 2003; Joseph et al., 2004; Lemelin et al., 2001; Searle et al., 2002; Waldorff et al., 2003). In addition, interventions that addressed specific barriers to change, used a comprehensive plan, and / or used strategies aimed at different levels (professional, team, patient, organisation) showed improvements in outcomes (Joseph et al., 2004; Lemelin et al., 2001; Sanci et al., 2000).

The factors that are most likely to increase the effectiveness of multi-faceted interventions are:

- tailoring the intervention to the work environment and context
- using interactive strategies
- providing reinforcement
- including patient educational materials (for improved patient outcomes).

9.2.3. Relevance to AOD field

Two studies were focussed primarily on AOD issues (smoking cessation) (Joseph et al., 2004; Young et al., 2002), while another three included delivering smoking cessation advice as part of a suite of preventive health measures (Langham et al., 2002; Lemelin et al., 2001; Wright et al., 2003). Each intervention aimed to increase health care providers' skills in delivery of smoking cessation services and support during routine consultations, and resulted in an overall moderate effect with improvement in some, but not all, study outcomes. Target populations included physicians, nurses, psychologists and pharmacists. Use of educational outreach and feedback on performance improved practitioners' provision of advice about the use of nicotine replacement therapy in one study (Young et al., 2002). In another study (Joseph et al., 2004), educational outreach, CME, and organisational support improved one (documentation of smoking status) of seven process outcomes, with no effect on smoking cessation rates among smokers.

Given the high degree of variability within the AOD workforce and the complexity of AOD issues, a multi-faceted intervention implemented in the AOD field would benefit from consensus or consultation with the local AOD professionals, tailoring for specific targeted populations and behaviours, and support at the organisational and individual level.

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Appendix A Checklists

Systematic review critical appraisal checklist

Source: (Khan et al., 2001)

Title of assessment:

Title of systematic review:

Author(s):

Year:

Comparators:

Score : **/6**

1. What is the review's objective?
   What were the population/participants, interventions, outcomes and study designs?
2. What sources were searched to identify primary studies?
   What sources (eg databases) were searched and were any restrictions by date, language and type of publication used? Were other strategies used to identify research?
3. What were the inclusion criteria and how were they applied?
4. What criteria were used to assess the quality of primary studies and how were they applied?
5. How were the data extracted from the primary studies?
6. How were the data synthesised?
   How were differences between studies investigated?
   How were the data combined? Was it reasonable to combine the studies?
   What were the summary results of the review?
   Do the conclusions flow from the evidence reviewed?

EPOC checklist – assessment of methodological quality

Source: (EPOC, 2002)

Quality criteria for randomised controlled trials (RCTs & CCTs)

Seven standard criteria are used for randomised controlled trials and controlled clinical trials included in EPOC reviews:

a) Concealment of allocation (protection against selection bias)

Score DONE if the unit of allocation was by institution, team or professional and any random process is described explicitly, e.g., the use of random number tables or coin flips; the unit of allocation was by patient or episode of care and there was some form of centralised randomisation scheme, an on-site computer system or sealed opaque envelopes were used. Score NOT CLEAR if the unit of allocation is not described explicitly; the unit of allocation was by patient or episode of care and the authors report using a 'list' or 'table', 'envelopes' or 'sealed envelopes' for allocation. Score NOT DONE if the authors report using alternation such as reference to case record numbers, dates of birth, day of the week or any other such approach (as in CCTs); the unit of allocation was by patient or episode of care and the authors report using any allocation process that is entirely transparent before assignment such as an open list of random numbers or assignments; allocation was altered (by investigators, professionals or patients).

b) Follow-up of professionals (protection against exclusion bias)

Score DONE if outcome measures obtained for 80-100% of subjects randomised. (Do not assume 100% follow up unless stated explicitly.); Score NOT CLEAR if not specified in the paper; Score NOT DONE if outcome measures obtained for less than 80% of subjects randomised.

c) Follow-up of patients or episodes of care

Score DONE if outcome measures obtained for 80-100% of subjects randomised or for patients who entered the trial. (Do not assume 100% follow up unless stated explicitly.) Score DONE if there is an objective data collection system; Score NOT CLEAR if not specified in the paper; Score NOT DONE if outcome measures obtained for less than 80% of subjects randomised or for less than 80% of patients who entered the trial.

d) Blinded assessment of primary outcome(s)* (protection against detection bias)

Score DONE if the authors state explicitly that the primary outcome variables were assessed blindly OR the outcome variables are objective, e.g., length of hospital stay, drug levels as assessed by a standardised test; Score NOT CLEAR if not specified in the paper; Score NOT DONE if the outcome(s) were not assessed blindly.

* Primary outcome(s) are those variables that correspond to the primary hypothesis or question as defined by the authors. In the event that some of the primary outcome variables were assessed in a blind fashion and others were not, score each separately and label each outcome variable clearly.

e) Baseline measurement

Score DONE if performance or patient outcomes were measured prior to the intervention, and no substantial differences were present across study groups; Score NOT CLEAR if baseline measures are not reported, or if it is unclear whether baseline measures are substantially different across study groups; Score NOT DONE if there are differences at baseline in main outcome measures likely to undermine the post intervention differences (e.g., are differences between the groups before the intervention similar to those found post intervention).

f) Reliable primary outcome measure(s)*

Score DONE if two or more raters with at least 90% agreement or kappa greater than or equal to 0.8 OR the outcome is obtained from some automated system e.g., length of hospital stay, drug levels as assessed by a standardised test; Score NOT CLEAR if reliability is not reported for outcome measures that are obtained by chart extraction or collected by an individual; Score NOT DONE if agreement is less than 90% or kappa is less than 0.8.

* In the event that some outcome variables were assessed in a reliable fashion and others were not, score each separately on the back of the form and label each outcome variable clearly.

g) Protection against contamination

Score DONE if allocation was by community, institution or practice and it is unlikely that the control received the intervention; Score NOT CLEAR if professionals were allocated within a clinic or practice and it is possible that communication between experimental and group professionals could have occurred; Score NOT DONE if it is likely that the control group received the intervention (e.g., cross-over trials or if patients rather than professionals were randomised).

Quality criteria for controlled before and after (CBA) designs

Seven standard criteria are used for CBAs included in EPOC reviews:

a) Baseline measurement

Score DONE if performance or patient outcomes were measured prior to the intervention, and no substantial differences were present across study groups (e.g., where multiple pre intervention measures describe similar trends in intervention and control groups); Score NOT CLEAR if baseline measures are not reported, or if it is unclear whether baseline measures are substantially different across study groups; Score NOT DONE if there are differences

at baseline in main outcome measures likely to undermine the post intervention differences (e.g., are differences between the groups before the intervention similar to those found post intervention).

b) Characteristics for studies using second site as control

Score DONE if characteristics of study and control providers are reported and similar; Score NOT CLEAR if it is not clear in the paper e.g., characteristics are mentioned in the text but no data are presented; Score NOT DONE if there is no report of characteristics either in the text or a table OR if baseline characteristics are reported and there are differences between study and control providers.

c) Blinded assessment of primary outcome(s)* (protection against detection bias)

Score DONE if the authors state explicitly that the primary outcome variables were assessed blindly OR the outcome variables are objective e.g., length of hospital stay, drug levels as assessed by a standardised test; Score NOT CLEAR if not specified in the paper; Score NOT DONE if the outcomes were not assessed blindly.

* Primary outcome(s) are those variables that correspond to the primary hypothesis or question as defined by the authors. In the event that some of the primary outcome variables were assessed in a blind fashion and others were not, score each separately and label each outcome variable clearly.

d) Protection against contamination

Studies using second site as control - Score DONE if allocation was by community, institution, or practice and is unlikely that the control group received the intervention; Score NOT CLEAR if providers were allocated within a clinic or practice and communication between experimental and group providers was likely to occur; Score NOT DONE if it is likely that the control group received the intervention (e.g., cross-over studies or if patients rather than providers were randomised).

e) Reliable primary outcome measure(s)*

Score DONE if two or more raters with at least 90% agreement or kappa greater than or equal to 0.8 OR the outcome is obtained from some automated system e.g., length of hospital stay, drug levels as assessed by a standardised test; Score NOT CLEAR if reliability is not reported for outcome measures that are obtained by chart extraction or collected by an individual; Score NOT DONE if agreement is less than 90% or kappa is less than 0.8.

* In the event that some outcome variables were assessed in a reliable fashion and others were not, score each separately and label each outcome variable clearly.

f) Follow-up of professionals (protection against exclusion bias)

Score DONE if outcome measures obtained 80-100% subjects allocated to groups. (Do not assume 100% follow-up unless stated explicitly.); Score NOT CLEAR if not specified in the paper; Score NOT DONE if outcome measures obtained for less than 80% of patients allocated to groups.

g) Follow-up of patients

Score DONE if outcome measures obtained 80-100% of patients allocated to groups or for patients who entered the study. (Do not assume 100% follow-up unless stated explicitly.); Score NOT CLEAR if not specified in the paper; Score NOT DONE if outcome measures obtained for less than 80% of patients allocated to groups or for less than 80% of patients who entered the study.

Quality criteria for interrupted time series (ITSs)

The following seven standard criteria should be used to assess the methodology quality of ITS designs included in EPOC reviews. Each criterion is scored DONE, NOT CLEAR or NOT DONE. The results of the quality assessment for each study are reported in the Table of Included Studies in RevMan. Examples can be obtained from the EPOC review group co-ordinator.

a) Protection against secular changes

The intervention is independent of other changes. Score DONE if the intervention occurred independently of other changes over time; Score NOT CLEAR if not specified (will be treated as NOT DONE if information cannot be obtained from the authors); Score NOT DONE if reported that intervention was not independent of other changes in time.

b) Data were analysed appropriately

Score DONE if ARIMA models were used OR time series regression models were used to analyse the data and serial correlation was adjusted/tested for; Score NOT CLEAR if not specified (will be treated as NOT DONE if information cannot be obtained from the authors); Score NOT DONE if it is clear that neither of the conditions above not met.

Reason for the number of points pre and post intervention given - Score DONE if rationale for the number of points stated (e.g., monthly data for 12 months post-intervention was used because the anticipated effect was expected to decay) OR sample size calculation performed; Score NOT CLEAR if not specified (will be treated as NOT DONE if information cannot be obtained from the authors); Score NOT DONE if it is clear that neither of the conditions above met.

Shape of the intervention effect was specified - Score DONE if a rational explanation for the shape of intervention effect was given by the author(s); Score NOT CLEAR if not specified (will be treated as NOT DONE if information cannot be obtained from the authors); Score NOT DONE if it is clear that the condition above is not met

c) Completeness of data set

Score DONE if data set covers 80-100% of total number of participants or episodes of care in the study; Score NOT CLEAR if not specified (will be treated as NOT DONE if information cannot be obtained from the authors); Score NOT DONE if data set covers less than 80% of the total number of participants or episodes of care in the study.

d) Reliable primary outcome measure(s)*

Score DONE if two or more raters with at least 90% agreement or kappa greater than or equal to 0.8 OR the outcome is obtained from some automated system e.g., length of hospital stay, drug levels as assessed by a standardised test; Score NOT CLEAR if reliability is not reported for outcome measures that are obtained by chart extraction or collected by an individual (will be treated as NOT DONE if information cannot be obtained from the authors); Score NOT DONE if agreement is less than 90% or kappa is less than 0.8.

* In the event that some outcome variables were assessed in a reliable fashion and others were not, score each separately.

e) Protection against detection bias

Intervention unlikely to affect data collection - Score DONE if reported that intervention itself was unlikely to affect data collection (for example, sources and methods of data collection were the same before and after the intervention); Score NOT CLEAR if not reported (will be treated as NOT DONE if information cannot be obtained from the authors); Score NOT DONE if the intervention itself was likely to affect data collection (for example, any change in source or method of data collection reported).

Blinded assessment of primary outcome(s)* - Score DONE if the authors state explicitly that the primary outcome variables were assessed blindly OR the outcome variables are objective e.g., length of hospital stay, drug levels as assessed by a standardised test; Score NOT CLEAR if not specified (will be treated as NOT DONE if information cannot be obtained from the authors); Score NOT DONE if the outcomes were not assessed blindly.

* Primary outcome(s) are those variables that correspond to the primary hypothesis or question as defined by the authors. In the event that some of the primary outcome variables were assessed in a blind fashion and others were not, score each separately and label each outcome variable clearly.

Appendix B Data Tables

Table 41. Effectiveness of educational materials – Process outcomes

Reference	Level and quality of evidence	Target population	Intervention	Process outcomes (practitioners' behavioural change)							
(Dormuth et al., 2004)	Level II: Cluster RCT Quality: good	Physicians (n=499), 24 local health areas, British Columbia, Canada	Series of evidence-based drug therapy letters mailed to physicians	**Physicians' prescribing behaviour [a], number of newly treated patients [b] prescribed the analysis drug [c]**							
				Analysis drug advocated for in the *therapeutic letters*:	**Control** n=241 (received letters 3-8 months after intervention group)			**Drug therapy letters** n=258			**Effect measure**
					Before [d]	**After [e]**	**% change**	**Before [d]**	**After [e]**	**% change**	**Adjusted [f] relative risk**
				Cimetidine	23	25	+8.7	27	45	+66.7	1.5
				Metronidazole (amoxicillin or tetracycline)	20	10	-50.0	7	9	+28.6	2.6
				ASA/buprofen/naproxen	116	121	+4.3	100	131	+31.0	1.3
				Isosorbide dinitrate	7	4	-42.9	7	7	0	1.8
				Thiazide diuretics	114	50	-56.1	104	69	-33.7	1.5
				Inhaled corticosteroids	13	4	-69.2	15	11	-26.7	2.4
				Calcium-channel blockers	47	69	+46.8	38	87	+129.0	1.5
				Long-acting benzodiazepines	191	161	-15.7	161	165	+2.5	1.3
				Hormones	87	70	-19.5	106	89	-16.0	1.1
				Calcium-channel blockers	65	51	-21.5	57	60	+5.3	1.4
				Clonazepam, alprazolam or diazepam	40	45	12.5	47	63	+25.4	1.2
				Finasteride	6	10	+66.7	13	12	-7.7	0.6
				Combined effect	729	620	-15.0	682	748	+9.7	1.3 p<0.001

[a] changes in prescribing were measured for each therapeutic letter by counting the number of newly treated patients who received the analysis drug before and after the intervention; [b] patients were considered 'newly treated' if none of the analysis drugs for their condition had been dispensed to them for at least the previous 365 days; [c] the analysis drug is the key drug for which prescription numbers were most likely to change as a result of exposure to the therapeutic letter; [d] baseline differences were adjusted for; [e] analysis was undertaken by intention-to-treat and generalised estimating equations (GEE) were used to adjust for clustering at the level of the local health area, physician and letter; [f] the relative risk was adjusted for before-patient volume versus after-patient volume in both groups to allow for varying numbers of patients at risk of becoming new patients in the intervention and control groups; ASA = acetylsalicylic acid; RCT = randomised controlled trial.

Table 42. Effectiveness of local consensus process – Process outcomes

Reference	Level and quality of evidence	Target population	Intervention	Process outcomes (practitioners' behavioural change)						
(Baker et al., 2003)	Level II: cluster RCT Quality: good	General practices (n=81) Northern England, UK	*Intervention 1*: Prioritised review criteria CPGs *Intervention 2:* Review criteria enhanced with feedback	**Practice adherence to guideline recommendations for asthma, % of patients**						
				Guideline recommendation	**Standard CPGs** n=27	**Review criteria** n=27		**Review criteria + feedback** n=27		**Effect measure**
					% change [ab]	**% change** [ab]	**Relative change**	**% change** [ab]	**Relative change**	**p-value**
				Appropriate basis of diagnosis	+1.3	+4.5	3.5	+1.0	0.8	0.82
				Appropriate diagnosis when symptoms equivocal	+2.0	-0.6	0.3	-2.3	1.2	0.70
				Patients prescribed beta-2 agonist	-0.1	-1.5	15.0	-1.4	14.0	0.89
				Beta-2 agonist compliance checked	-0.3	-5.4	18.0	-0.8	2.7	0.36
				Beta-2 agonist doses checked	+11.3	+1.6	0.1	+5.2	0.5	0.21
				Cheapest beta-2 agonist prescribed	-6.4	+0.3	0.05	-1.9	0.3	0.75
				Cheapest inhaled steroid prescribed	+0.1	+11.2	112.0	+15.9	159.0	0.04
				Patient's inhaler technique checked	+0.6	-2.5	4.2	-3.6	6.0	0.56
				Patients advised on passive smoking	-1.3	+0.3	0.2	+1.9	1.5	0.72
				Patient's smoking status checked	+1.8	+7.6	4.2	+7.7	4.3	0.74
				Practice adherence to recommendations for angina, % of patients						
				Appropriate basis of diagnosis	+2.7	+1.1	0.4	-7.5	2.8	0.23

				Patients' serum cholesterol checked	+5.6	+13.9	2.5	+5.8	1.0	0.26
				Patients' bloody pressure checked	+6.8	+4.2	0.6	+5.2	0.8	0.54
				Hypertensive patients managed appropriately	+1.3	-13.8	10.6	+8.8	6.8	0.02
				Smoking status recorded at diagnosis	+3.1	-2.7	0.9	+2.3	0.7	0.27
				Patient's compliance with angina medication checked	+3.4	-2.5	0.7	+7.5	2.2	0.02
				Cheapest beta-blocker prescribed	+14.0	+5.9	0.4	+13.5	1.0	0.45
				Aspirin prescribed	+3.7	+6.5	1.8	+7.4	2.0	0.76
				Advice on nitrate use	+4.6	-1.0	0.2	+1.0	0.2	0.32
				Patient given information on time to use nitrate	+9.7	+2.1	0.2	+2.0	0.2	<0.001
				Blood pressure tested in past 12 months	+13.8	+5.1	0.4	+5.9	0.4	0.18
				Smoking status recorded in past 12 months	+3.1	+1.1	0.4	+1.0	0.3	0.43
				Weight recorded in past 12 months	+10.1	+4.2	0.4	-0.2	0.02	0.29
(Butzlaff et al., 2004)	Level II: RCT Quality: Good	General Practitioners (n=72), academic teaching network, University of Witten-Herdecke, North Rhine-Westphalia, Germany	Computerised CPGs disseminated via Internet/CD-ROM	**GPs' knowledge consistent with guidelines [c], number of physicians, (median [25th and 75th] percentile of correctly answered questions)**						
					No CPGs n=34			**Electronic CPGs** n=38			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value**
				Knowledge gain	13 [10-15.3]	13 [11-15.3]	0	13 [12-2]	15 [12-17]	+15.4	0 p=0.69

(Silagy et al., 2002)	Level II: RCT Quality: poor	GPs (n=243) within 2 Divisions of General Practice, Adelaide, Australia	Locally adapted CPGs for stroke prevention (SP) and management of Lower Urinary Tract Symptoms (LUTS) in Men	**GPs' knowledge consistent with LUTS guidelines, % of physicians**							
				Topic addressed by CPG:	**Control Group Division A [d] (SP CPGs)** n=121			**Intervention Group Division B [e] (LUTS CPGs)** n=122			**Effect measure**
					Before [f]	**After**	**% change [95% CI]**	**Before [f]**	**After**	**% change [95% CI]**	**Relative change**
				Role of prostate size	31.9	40.3	+8.4 [3, 14]	26.2	37.7	+11.5 [5, 17]	1.4
				Use of PSA estimation	52.9	61.3	+8.4 [3, 14]	56.6	62.3	+5.7 [1, 10]	0.7
				Use of Finasteride	39.1	46.0	+6.9 [1, 13]	51.0	33.6	-17.4 [-24, -9]	2.5
				Criteria for surgery	26.0	35.1	+9.1 [4, 19]	34.4	92.6	+58.2 [48, 66]	6.4
				GPs' knowledge consistent with SP guidelines, % of physicians							
					Control Group Division B [g] (LUTS CPGs)			**Intervention Group Division A [h] (SP CPGs)**			**Effect measure**
					Before	**After**	**% change [i] [95% CI]**	**Before**	**After**	**% change [i] [95% CI]**	**Relative change**
				Use of appropriate screening	59.6	58.8	-0.8 [-3, 2]	67.7	66.1	-1.6 [-5,1]	2.0
				Use of aspirin	81.5	87.4	+5.9 [1, 11]	80.8	81.7	+0.9 [-2, 4]	0.2
				Treatment options	15.3	22.1	6.8 [2, 12]	17.4	23.1	+5.7 [1,11]	0.8
				Criteria for carotid endartectomy	69.8	63.4	-6.4 [-12, 2]	70.2	65.3	-4.9 [-9, 1]	0.8
				Investigations for carotid stenosis	86.4	93.2	+6.8 [2, 13]	92.6	91.8	-0.8 [-4, 3]	0.1

[a] pre- and post-intervention scores were not included due to space restrictions – available on request; [b] multivariate regression analysis using generalised estimating equations (GEE) to account for baseline differences; [c] a questionnaire referring to 4 clinical topics covered by the CPGs (dementia, congestive heart failure, urinary tract infection and prevention of colorectal carcinoma) tested the physician's knowledge and determined if it was consistent with the CPGs for each clinical topic; [d] Division A received the standard/original version of LUTS CPGs and acted as a control group for Division B; [e] Division B received locally adapted CPGs for LUTS and acted as a control group for Division A; [f] authors stated no significant differences between groups at baseline; [g] Division B received the standard/original version of SP CPGs and acted as a control group for Division A; [h] Division B received locally adapted CPGs for SP; [i] Newcombe's test for differences in paired proportions was used for within-Division changes in knowledge between the first and second survey; CI = confidence interval; CPG = clinical practice guideline; GPs = general practitioners; LUTS = lower urinary tract symptoms; NS = not significant; PSA = prostate specific antigen; RCT = randomised controlled trial; SD = standard deviation; SP = stroke prevention.

Table 43. Effectiveness of local consensus processes – Patient outcomes

Reference	Level and quality of evidence	Target population	Intervention	Patient outcomes (health status)						
(Baker et al., 2003)	Level II: Cluster RCT Quality: good	General practices (n=81) Northern England, UK	*Intervention 1*: Prioritised review criteria CPGs *Intervention 2:* Review criteria enhanced with feedback	**Assessment of patient disease symptoms**						
					Standard CPGs n=27	**Review criteria** n=27		**Criteria + feedback** n=27		**Effect Measure**
				Outcome measures	**% change** [a]	**% change** [a]	**Relative change**	**% change** [a]	**Relative change**	**p-value** [b]
				Symptoms for asthma, mean score ±SD [c]						
					-5.8	-2.7	0.5	+11.2	1.9	0.02
				Symptoms for angina, mean score ±SD [d]						
				Physical limitation	+2.5	-4.9	2.0	-3.5	1.4	0.15
				Angina stability	-3.0	+8.7	2.9	+4.1	1.4	0.03
				Angina frequency	-2.4	+15.1	6.4	+4.6	2.0	<0.001
				Disease perception	-4.9	+13.0	2.7	+6.8	1.4	<0.001
				Asthma treatment, % of patients satisfied						
				Asthma treated satisfactorily	+0.8	-0.3	0.4	-1.4	1.8	0.83
				Satisfactory explanations about asthma	+1.6	+0.7	0.4	-1.4	0.9	0.75
				Angina treatment, % of patients satisfied						
				Satisfaction with medication	+0.9	-6.1	6.8	-0.3	0.3	0.03
				Satisfactory explanations about angina symptoms	+1.8	+3.2	1.8	+3.0	1.7	0.91

[a] pre- and post-intervention scores were not included due to space restrictions – available on request; [b] multilevel modelling using a random effects model at the practice level; [c] self-report Asthma Symptoms Questionnaire, high score indicates severe symptoms; [d] self-report Seattle Angina Questionnaire, low score indicates severe symptoms; CPG = clinical practice guideline; RCT = randomised controlled trial; SD = standard deviation.

Table 44. Effectiveness of educational meetings (CME) – Process outcomes

Reference	Level and quality of evidence	Target population	Dissemination Strategy	Process outcomes (practitioners' behavioural change)							
(Katz et al., 2004)	Level II: Cluster RCT Quality: Good	Community-based primary care clinics (n=8), Southern Wisconsin, USA	Tutorial enhanced with individual feedback, prompts, an offer of free nicotine replacement therapy, proactive telephone counselling	**Proportion of patients receiving recommended counselling activities, % [95% CI] patients**							
					Control			**Tutorial**			**Effect measure [a]**
					Before n=509	**After** n=499	**% change**	**Before** n=513	**After** n=642	**% change**	**Relative change p-value**
				Counselling by any clinician [b]							
				Asked about smoking status	61 [57, 65]	67 [63, 71]	+6.0	58 [53, 62]	87 [84, 90]	+29.0	4.8 p=0.02
				Asked about willingness to quit	26 [22, 30]	30 [26,34]	+4.0	28 [25, 32]	73 [69, 76]	+45.0	11.3 p<0.001
				Advised to quit	32 [28,36]	38 [34, 43]	+6.0	41 [36, 45]	47 [44, 51]	+6.0	1.0 p=0.29
				Given quit literature	4 [2, 5]	3 [2, 5]	-1.0	3 [1, 4]	38 [34, 42]	+35.0	35.0 p<0.001
				Set quit date	1 [0, 2]	1 [0, 2]	0.0	2 [1, 3]	27 [24, 31]	+25.0	0 p<0.001
				Discussed pharmacotherapy	14 [11, 17]	14 [11, 17]	0.0	15 [12, 18]	39 [35, 43]	+24.0	0 p<0.001
				Counselling by intake clinician [c]							
				Asked about smoking status	34 [30, 38]	46 [41, 50]	+12.0	30 [27, 35]	81 [77, 84]	+51.0	4.3 p<0.001
				Asked about willingness to quit	6 [4, 7]	10 [8, 13]	+4.0	5 [3, 7]]	65 [61, 68]	+60.0	15.0 p<0.001
				Advised to quit	7 [5, 9]	10 [8, 13]	+3.0	4 [3, 6]	31 [28, 35]	+27.0	9.0 p<0.001
				Given quit literature	0 [0, 1]	0 [0, 1]	0.0	0 [0, 1]	36 [32, 40]	+36.0	0
				Set quit date	0 [0, 1]	0 [0, 1]	0.0	0 [0, 1]	23 [20, 26]	+23.0	0

				Discussed pharmacotherapy	0 [0, 1]	0 [0, 3]	0.0	0 [0, 1]	29 [26, 33]	+29.0	0 p<0.001
(Pill et al., 1998)	Level II: Cluster RCT Quality: Good	General practitioners and practice nurses from general practices (n=29), South Glamorgan, UK Diabetic patients (n=252)	Training (supported by previous 2-year participation in CME enhanced with audit) enhanced with follow-up support by a research nurse, newsletters, group meetings	**Proportion of nurse consultations where key behaviours occurred, %**							
					Control n=32 consultations			**Tailored educational training** n=36 consultations analysed			**p-value [d]**
				Patient decides topic to discuss	72.0			83.0			NS
				Patient affirms current behaviour	81.0			100.0			0.006
				Patient initiates discussion of change	25.0			50.0			0.03
				Any target set	41.0			58.0			NS
				Patient actually sets target	28.0			36.0			NS
				Patient takes lead in target setting	22.0			28.0			NS
(King et al., 2002)	Level II: Cluster RCT Quality: Average	General practitioners (n=84), North London, UK	Training package: 4 half day cognitive behavioural therapy workshops at one-week intervals	**Physicians' skills in the application of brief cognitive behavioural therapy for patients with depression, mean ±SD**							
					Control GPs [e] n=42			**Trained GPs [e]** n=42			**Effect measure Mean difference [95% CI]**
				Depression Attitude [f]							
				Treatment attitude [g]	48.2±8.8			46.3±10.9			-1.6 [-6.9, 3.7]
				Professional ease [h]	47.3±13.9			42.2±14.0			-5.1 [-11.9, 1.7]
				Depression malleability [i]	28.1±12.9			30.8±9.7			2.0 [-2.9, 6.8]
				Depression identification [j]	36.3±14.4			36.3±11.4			-0.5 [-7.1, 6.0]
				CBT Knowledge [k]							
				Confidence in treating depression	29.2±17.4			20.9±8.3			-8.2 [-15.4, -1.0]
				Confidence in treating anxiety [l]	36.5±15.9			30.3±14.5			-7.8 [-15.3, -0.2]
(Kelly et al., 2000b)	Level II: Cluster RCT Quality: Poor	AIDS service organisations (n=77) USA	Technical assistance manuals plus Training workshop Training workshop with follow-up	**Percentage of AIDS Service Organisations offering research-based intervention to clients, %**							
					Manual only n=26			**Manual + workshops** n=22			**Manual + workshops + consultation** n=26
				6 months follow-up	**% change [m]**			**% change [m]**	**Relative change**	**% change [m]**	**Relative change p-value [n]**

				Gay men	+7.7	+22.7	2.9	+50.4	6.5 p<0.05	
				Women	-3.8	+27.3	7.2	+25.0	6.7	
				Any client population	+15.4	+40.9	2.7	+50.4	3.3 p<0.05	
				12 months follow-up	% change [a]	% change [a]	Relative change	% change [a]	Relative change	
				Gay men	+19.2	+36.4	1.9	+56.2	2.9 p<0.05	
				Women	+11.6	+45.5	3.9	+36.0	3.1	
				Any client population	+34.5	+59.1	1.7	+71.2	2.1 p<0.05	
(Miller et al., 2004)	Level III-1: Quasi-RCT Quality: Good	Substance abuse clinicians (licensed in counselling, psychology, medicine, nursing or social work). New Mexico, USA	Training in clinical motivational interviewing (MI) MI training workshop Workshop plus feedback Workshop plus coaching Workshop plus feedback and coaching Self-training (control)	Counsellor proficiency in Motivational Interviewing, mean ±SD						
					Self-Training Control [a]	Workshop		Workshop + Feedback		Workshop + Coaching		Workshop + Feedback + Coaching	
					% change	% change	Relative change	% change	Relative change	% change	Relative change	% change	Relative change
				Overall Motivational Interviewing spirit [b]									
				Post-training	+34.5	+38.9	1.1	+30.9	0.9	+25.6	0.7	+38.1	1.1
				4 months	+13.2	+25.8	2.0	+34.3	2.6	+33.0	2.5	+49.0	3.7
				12 months	+41.1	+33.7	0.8	+39.5	1.0	+36.3	0.9	+33.7	0.8
				% Motivational Interviewing consistent [b]									
				Post-training	+8.7	+10.3	1.2	+4.5	0.5	+9.5	1.1	+4.9	0.6
				4 months	-0.9	+7.0	7.9 p<0.005	+7.2	8.0 p<0.005	+9.4	10.4 p<0.005	+6.3	7.0 p<0.005
				12 months	+6.2	+9.4	1.5	+7.5	1.2	+9.3	1.5	+4.5	0.7
(Fallowfield et al., 2002; Fallowfield et al., 2003)	Level III-1: Quasi-RCT Quality: Average	Oncologists of specialist-registrar status (n=150) working in cancer	Intensive 3-day training course on communication skills Written feedback	Communication skills, RR [a] (p-value)									
						Course Groups A and B vs Groups C and D [c]				Feedback Groups A and C vs Groups B and D [c]			
				Use of leading questions		0.7	p=0.012			0.8	p=0.049		

		centres (n=34), UK	followed by course Course only Written feedback only	Use of focussed questions	1.3	p=0.003	0.9	p=0.075	
				Use of open questions	1.2	p=0.020	0.9	p=0.13	
				Expressions of empathy	1.5	p=0.005	0.8	p=0.07	
				Summarises information	1.1	p=0.63	10.0	p=0.73	
				Appropriate responses to patient cues	0.9	p=0.63	0.9	p=0.58	
				Interruption of patients	0.8	p=0.24	0.9	p=0.30	

(Santoso et al., 1996)	Level III-1: Quasi-RCT Quality: Average	Physician prescribers, PHC centres (n=90) within 6 districts, Yogyakarta and Central Java, Indonesia	*Intervention 1:* Small-group face-to-face intervention *Intervention 2:* Formal seminar followed by question-answer time conducted at District level * Each intervention accompanied by written educational materials	**Prescribing practices, % of prescriptions**					
					Control n=30 health centres	**Small-group session** n=30 health centres		**Seminar** n=30 health centres	
					% change [s]	**% change [s]**	**Relative change**	**% change [s]**	**Relative change**
				Therapy using ORS	+2.4	+7.1	3.0 NS	+5.7	2.4 NS
				Use of antimicrobials [t]	-3.3	-17	5.2 p<0.001	-10	3.0 p<0.001
				Use of antidiarrhoels [u]	-0.4	-7.8	19.5 p<0.01	-21.5	53.8 p<0.01
				Polypharmacy: average number of drugs prescribed per case	-0.2	-0.1	0.5 NS	-0.2	1.0 NS

(Young et al., 1998)	Level III-1: Quasi-RCT Quality: Average	Family physicians (n=50), 2 regions 50-150km from Toronto, Canada	Educational package implemented via workshop	**Management of breast cancer problems, mean score±SD**						
					Home study n=25 physicians			**Workshop** n=25 physicians			**Effect measure**
					Before n=23	**Change in mean score** n=19	**% change**	**Before** n=25	**Change in mean score** n=24	**% change**	**Relative change p-value**
				Knowledge [v]	16.4±2.5	3.4±3.4	+20.7	16.4±1.9	2.0±2.7	+12.2	0.6 p=0.15
				Skills [w]	52.4±11.2	-4.7±9.3	+9.0	55.3±8.7	-4.5±9.6	-8.1	0.9 p=0.92

(Delvaux et al., 2004)	Level III-1: Quasi-RCT Quality: Average	Oncology nurses (n=115) with >6 months experience in cancer care; Cancer patients >18 years old (n=115) Belgium or Brussels, France	Psychological training program + regular post-training	**Communication skills [x], mean scores±SD**						
					Control - Delayed training n=6 groups; 58 participants			**Training** n=6 groups; 57 participants			**Effect measure**
					Before	**After 6 months**	**% change**	**Before**	**After 6 months**	**% change**	**Relative change**
				Form of utterance [y]:							
				Open directive and screening questions	6.8±5.2	4.7±4.2	-30.9	5.1±4.4	5.6±4.6	+9.8	0.3 NS
				Function of utterance [z]:							
				Eliciting information, clarification and checking	34.5±13.3	37.7±13.9	+9.3	36.5±15.1	37.9±11.6	+3.8	0.4 NS
				Psychological depth of interview [aa]:							
				Feelings hinted at or mentioned explicitly	24.0±16.5	12.7±13.8	-47.1	22.0±18.3	21.7±17.4	-1.4	0.0
				Blocking behaviours:							
				Blocking, repetition and repetition as blocking	5.2±4.6	3.8±4.5	-26.9	83.5±10.7	85.2±9.6	+2.0	0.1 NS
(Razavi et al., 2003)	Level III-1: Quasi-RCT Quality: Average	Physician specialists in medical or surgical oncology, radiotherapy, haematology, gynaecology or other cancer-related speciality (n=63) Cancer patients >18 years old, France	Post-training consolidation workshops	**Communication skills [x], mean scores±SD**						
					Control - Training only n=30			**Training with consolidation workshop** n=28			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change**
				Form of utterance [y]:							
				Open directive and screening questions	1.7±1.6	1.7±1.0	0	1.4±1.3	2.0±1.6	+42.9	NE
				Function of utterance [z]:							
				Eliciting information, clarification and checking	0.5±0.7	1.4±1.9	+180	0.8±1.2	2.4±2.9	+200	1.1 NS

				Emotional level [aa]*:*						
				Hints at feelings	1.9±2.8	2.8±3.5	+47.4	1.9±2.3	3.4±4.5	+78.9	1.7 NS
				Feelings stated explicitly	0.7±1.0	1.8±3.1	+157.1	1.0±1.5	1.9±2.5	+90.0	0.6 NS
(Young & Ward, 2002)	Level III-1: Quasi-RCT Quality: Average	Family physicians (n=53), Patients who smoke Australia	Distance learning module vs simple provision of prevention guidelines	**Physicians' knowledge and skills in providing smoking cessation advice to patients**							
					Mailed guideline n=27			**Distance learning module** n=26			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value**
				Knowledge scores, median [bb]	7.0	7.0	0	7.5	8.0	+6.7	0 p=0.5
				Skills [cc]*, %*							
				Negotiate a "quit date"	33.0	52.0	+19.0	38.0	42.0	+4.0	0.2 p=0.5
				Give advice about triggers for smoking	81.0	78.0	-3.0	65.0	54.0	-11.0	3.7 p=0.06
				Assess nicotine dependence	70.0	70.0	0.0	69.0	73.0	+4.0	0.0 p=0.8
				Arrange follow-up	56.0	52.0	-4.0	42.0	42.0	0.0	0.0 p=0.5
				Provide written materials with verbal advice	67.0	59.0	-8.0	50.0	50.0	0.0	0.0 p=0.5
				Provide written materials without verbal advice	0.0	11.0	+11.0	0.0	0.0	0.0	0.0 p=0.2
				Assess state of change	56.0	59.0	+3.0	62.0	70.0	+3.0	1.0 p=0.4
				Recommend NRT	74.0	74.0	0.0	77.0	62.0	-15.0	0.0 p=0.3

				Encourage patient to discuss concerns about quitting	67.0	74.0	+7.0	73.0	81.0	+8.0	1.1 p=0.6
				Advise patient to cut down ("nicotine fading") [dd]	63.0	48.0	-15.0	46.0	23.0	-23.0	1.5 p=0.06
				Advise patient to quit completely	93.0	93.0	0.0	96.0	88.0	-8.0	0.0 p=0.7
(Glazier et al., 2005)	Level III-3: CBA design Quality: Average	Community health centres (n=7) that employ family physicians, nurse practitioners, health promoters, occupational therapists, CHC clients - patients who have difficulty accessing primary healthcare services, Ontario, Canada	Interactive workshop enhanced with provider reinforcement (audit and feedback)	**Best practice for arthritis care [ee], % of clients receiving best practice**							
					Control n=105			**Workshop** n=318			**Effect measure [ff]**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value**
				Client given information on their type of arthritis	22.7	22.0	-0.7	22.4	42.1	+19.7	28.1 p=0.001
				Client given information about arthritis medications & side effects	55.8	52.6	-3.2	64.0	70.3	+6.3	2.0 p=0.004
				Client given phone number for Arthritis Society	4.0	8.8	+4.8	11.0	24.2	+13.2	3.1 p=0.003
				Client given information about available arthritis services	40.4	33.8	-6.6	39.4	51.1	+11.7	1.8 p=0.007
				Client given information about dealing with pain	53.7	48.7	-5.0	53.8	63.7	+9.9	2.0 p=0.018

				Clients received education about arthritis management	48.9	49.4	+0.5	54.4	62.5	+8.1	16.2 p=0.038
				Client's need for support and ability to cope with arthritis addressed	47.4	50.0	+2.6	51.4	61.3	+9.9	3.8 p=0.075
				Provider discussed how client is coping with arthritis and how to get additional support	48.5	46.8	-1.7	43.6	57.0	+13.4	7.9 p=0.11
				Provider discussed nutrition and healthy body weight relating to client's arthritis	48.0	50.6	+2.6	46.0	55.7	+9.7	3.7 p=0.43
				Provider recommended client do exercise program for treatment of arthritis	46.1	55.7	+9.6	46.9	54.8	+7.9	0.8 p=0.88
(Suggs et al., 1998)	Level III-3: CBA design Quality: Average	Registered nurses (n=63), Hickory, North Carolina and South Carolina	Multimedia, self-instruction educational package vs didactic conference	**Nurses' knowledge of geriatric pharmacology, mean test scores**							
					Traditional conference n=35			**Self-instruction learning package** n=28			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change**
				Nurses' knowledge	61.7	77.2	+25.1	63.4	71.8	+13.2	0.5 NS

[a] comparisons between control and intervention groups are based on hierarchical regression models (adjusted for patient covariates: age, sex, educational level, alcohol use, number of cigarettes smoked per day, self-reported health status, and presence of another smoker in household); [b] *any clinician* refers to intake clinicians or primary care clinicians including physicians, nurse practitioners and assistants; [c] *intake clinicians* refers to registered nurses, licensed practical nurses, and medical assistants; [d] baseline measures not provided, but reported as similar; [e] scores are post-intervention, baseline scores were adjusted for using linear regression; [f] Botega et al 1992 and Kerr et al 1995; [g] high score indicates a preference for biological theories and antidepressants; low score indicates an orientation to psychotherapy: ideal outcome = low score; [h] high score indicates that GP is uncomfortable in dealing with depression and sees it as unrewarding: ideal outcome = low score; [i] high score indicates pessimism about modifying the course of depression: ideal outcome = low score; [j] high score indicates difficulty in differentiating depression from unhappiness and little confidence in treatments beyond those usually provided: ideal outcome = low score; [k] questionnaire explored GPs' knowledge of CBT and the extent to which they feel confident in applying it to practice; [l] high score for confidence outcomes indicates a lack of confidence in treating depression or anxiety: ideal outcome = low score; [m] Baseline scores not provided, but reported as similar; [n] Kruskal-Wallis test for differences from baseline and Student's t-test for differences between groups; [o] Self-training control = waiting list group received manual and training videotapes; [p] Motivational Interviewing spirit = global measure of MI proficiency. Measures included overall MI spirit, % MI consistent responses, ratio of reflections to questions, % questions that were open, % reflections that were complex, % therapist's in-session talk time; [q] estimated relative rates were based on a conditional Poisson regression model with doctor-specific rate variables; [r] 2x2 factorial design - Groups A and B had been on a course; Groups C and D had not, Groups A and C received feedback; groups B and D did not. Follow-up was 3 months; [s] pre- and post-scores were not included due to space restrictions – available upon request; [t] antimicrobials included antibiotics, chemotherapeutics and antiamoebics; [u] Antidiarrhoels included spasmolytics, adsorbents and antidiarrhoeal fixed combinations; [v] knowledge score ranged from 0-29 (high); [w] Attitude/skills scores ranged from 25 (very comfortable dealing with breast cancer issues) to 125 (uncomfortable); [x] Communication skills based on rating system for each utterance by health care provider during interviews. Examples of categories are given here; [y] Form of utterance = statements and types of questions (8 categories); [z] Function of utterance = evaluative, supportive, informing, advising and interpretive functions (21 categories); [aa] Psychological depth of interviews = utterances about feelings rather than facts alone; [bb] Knowledge score = number of correct answers to 10 questions; [cc] Skills measure = % of physicians who indicated using cessation technique; [dd] Nicotine fading is an ineffective technique and decrease in recommendations is an improvement in practice; [ee] Best practice in arthritis care was assessed using Health Assessment Questionnaire and Medical Outcome Study Short Form-36; [ff] Chi-square tests were performed to assess differences; ASOs = AIDS service organisations; CBA = controlled before and after study; CBT = cognitive behaviour therapy; CI = confidence interval; CPGs = Clinical Practice Guidelines; GPs = General practitioners; MI = motivational interviewing; NE = not estimable; NRT = nicotine replacement therapy; ORS = oral dehydration solution; PHC = primary health care; RR = relative rate; SD = standard deviation.

Table 45. Effectiveness of educational meetings (CME) – Patient outcomes

Reference	Level and quality of evidence	Target population	Dissemination Strategy	Patient outcomes (health status)							
(Katz et al., 2004)	Level II: Cluster RCT Quality: Good	Adult patients who smoked at least one cigarette per day and presented for non-emergency care during the baseline period (n=2163) Southern Wisconsin, USA	Tutorial enhanced with individual performance feedback, use of a modified vital signs stamp (prompt), an offer of free nicotine replacement therapy, proactive telephone counselling	**Smoking cessation outcomes, % of patients**							
					Control			**Tutorial**			**Effect measure** [a]
					Before n=509	**After** n=499	**% change**	**Before** n=513	**After** n=642	**% change**	**Relative change p-value**
				Any quit attempt	41 [38, 45]	50 [46, 55]	+9.0	44 [40, 48]	57 [53, 61]	+13.0	1.4 p=0.06
				<10 cigarettes smoked/day	48 [38, 58]	63 [53, 73]	+15.0	51 [41, 61]	58 [49, 67]	+7.0	0.5 p=0.30
				≥10 cigarettes smoked/day	39 [35, 44]	47 [42, 52]	+8.0	42 [37, 47]	57 [52, 61]	+15.0	1.9 p=0.02
				2-month quit rate [b]	5 [3, 7]	6 [4, 8]	+1.0	5 [3, 7]	16 [13, 19]	+11.0	11.0 p<0.001
				<10 cigarettes smoked/day	9 [4, 15]	9 [3, 15]	0.0	9 [3, 15]	13 [7, 9]	+4.0	0 p=0.71
				≥10 cigarettes smoked/day	4 [2, 6]	5 [3, 7]	+1.0	4 [2, 6]	17 [14, 21]	+13.0	13.0 p<0.001
				6-month quit rate [b]	9 [6, 11]	10 [7, 12]	+1.0	8 [5, 10]	15 [13, 18]	+7.0	7.0 p=0.009
				<10 cigarettes smoked/day	15 [8, 22]	19 [11, 26]	+4.0	15 [8, 22]	20 [13, 27]	+5.0	1.3 p=0.93
				≥10 cigarettes smoked/day	7 [5, 10]	8 [5,10]	+1.0	6 [4, 8]	14 [11, 17]	+8.0	8.0 p<0.001
				Continuous abstinence [c]	4 [2, 5]	4 [2, 5]	0.0	3 [1. 4]	11 [8, 13]	+8.0	0 p<0.001
				<10 cigarettes smoked/day	6 [1, 11]	5 [1, 10]	-1.0	5 [1, 9]	10 [5, 16]	+5.0	5.0 p=0.22

				≥10 cigarettes smoked/day	3 [1, 5]	3 [2, 5]	0.0	2 [1, 4]	11 [8, 14]	+9.0	0 p<0.001
(Premaratne et al., 1999)	Level II: RCT Quality: Good	General practices with a practice nurse (n=41), All registered patients aged 15-50 years (n=24,000) Greenwich, London, UK	6 teaching sessions conducted by Nurse specialists in asthma and follow-up support, practice nurses in turn educated patients in the management of asthma according to the British Thoracic Society's guidelines	**Quality of life among patients with asthma, mean square root [95% CI]** [d]							
					Control n=903		**Teaching sessions + support** n=659		**Difference**		**Effect measure Odds ratio [95% CI]**
				Quality of life, mean square root	1.5 [1.46, 1.54]		1.5 [1.47, 1.56]		-0.01 [0.11, 0.09] p=0.85		1.07 [0.76, 1.52] p=0.68
(King et al., 2002)	Level II: Cluster RCT Quality: Average	Mental health patients who scored above the threshold for psychological distress on the hospital anxiety and depression scale (n=272) North London, UK	Training package: 4-half day cognitive behavioural therapy workshops at one-week intervals	**Patients emotional symptoms, mean score±SD**							
					Control doctors n=135			**Trained doctors** n=137			**Effect measure Mean difference [95% CI]**
				Beck depression inventory	16.6±11.5			17.5±9.6			-0.2 [-2.3, 1.9] p=0.84
				State anxiety	48.2±14.9			48.6±13.8			0.8 [-2.4, 4.0] p=0.62
				Trait anxiety	50.4±13.7			52.3±13.2			0.9 [-2.0, 3.8] p=0.53
				SF-36 dimensions, % of patients							
				% with role limitations (emotional) - all areas	33.0			47.0			2.7 [1.1, 6.4] p=0.03
				Social function	29.2			29.7			-3.1 [-9.4, 3.1] p=0.32
				Mental health	21.0			20.8			0.1 [-4.4, 4.6] p=0.96
				Energy and vitality	25.1			21.7			-1.0 [-5.7, 3.6] p=0.66

[a] comparisons between control and intervention groups are based on hierarchical regression models adjusted for patient covariates: age, sex, educational level, alcohol use, number of cigarettes smoked per day, self-reported health status, and presence of another smoker in household; [b] quit rates = the proportion of patients who report abstinence over the prior 7 days at 2- and 6-month follow-up;
[c] continuous abstinence = self-reported abstinence at both 2- and 6-month follow-up; [d] Mean square root quality of life high score of 2.5 corresponded to average answer of 'mildly' to 20 questions (none, mildly, moderately, severely, very severely); CI = confidence interval; RCT = randomised controlled trial; SD = standard deviation.

Table 46. Effectiveness of educational outreach visits – Process outcomes

Reference	Level and quality of evidence	Target population	Dissemination Strategy	Process outcomes (practitioners' behavioural change)							
(Cranney et al., 1999)	Level II: Cluster RCT Quality: good	PHC practices (n=18), general practitioners Elderly patients, aged 70-79 years, with hypertension (n=69) UK	Practice-based educational outreach visit: small-group, semi-structured, one-hour session led by trained educational facilitator	**GPs' management of hypertension in elderly patients, reported threshold [a] for treating systolic hypertension**							
					Control [b] n=9 practices; 35 GPs			**Educational outreach visit: [b]** n=9 practices; 34 GPs			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value**
				GPs' reported threshold for systolic BP (mmHg)	166.6	167.2	0.4	172.7	161.8	-6.3	15.8 p=0.007
(Watson et al., 2001)	Level II: Cluster RCT Quality: good	General Practices (n=20), Avon, England	*Intervention 1:* Mailed guidelines for the use of oral NSAIDs in the management of oral musculoskeletal disorders *Intervention 2:* Mailed guidelines plus 2 one-to-one educational outreach visit from community pharmacists	**Drug prescribing [c], mean ±SD**							
					Control n=7 practices; 36 GPs			**Mailed guidelines** n=6 practices; 36 GPs		**Mailed guidelines + Educational outreach visit** n=7 practices; 35 GPs	
					% change [d]			**% change [d]**	**Relative change**	**% change [d]**	**Relative change p-value**
				Recommended 3 NSAIDs, % of total NSAID	+2.8			+4.3	1.5	+5.9	2.1 p=0.29
				Top 5 NSAIDs, % of total NSAID	+0.3			+1.7	5.7	+3.0	10.0 p=0.009
				Ibuprofen, DDDs per 1000 STAR-PUs [e]	-4.9			+3.8	0.8	-5.6	1.1 p=0.44
				Ibuprofen, % total DDDs	-7.4			+3.2	0.4	+1.8	0.2 p=0.39
				Total volume, DDDs per 1000 STAR-PUs [e]	+1.4			+0.5	0.4	-8.8	6.2 p=0.10
				Total cost, NIC (£) per 1000 STAR-PUs [e]	+8.9			+4.5	0.5	-6.2	0.7 p=0.08

				Azapropazone, DDDs per 1000 STAR-PUs [a]	-34.7	-40.5	1.2	-75.6	2.2 p=0.06
(Weller et al., 2003)	Level II: RCT Quality: good	General Practices (n=145), Central and Southern Adelaide, South Australia	*Intervention 1:* Educational materials and feedback delivered by educational outreach visit *Intervention 2:* Evidence-based educational materials and feedback delivered by mail out	PSA test-ordering rates per 100 male consultations by age group of men tested, median of tests ordered [f]					
					Control [#] n=52	Mailout of evidence-based materials [#] n=47		Evidence-based materials + Educational outreach visit [#] n=46	
					% change [i]	% change [i]	Relative change p-value	% change [i]	Relative change p-value
				All age groups [j] 0-6 months	+27.2	+6.5	0.2 p<0.001	-17.5	0.5 p<0.001
				6-12 months	+6.2	+13.5	1.5 NS	-0.5	0.1 NS
(Dey et al., 2004)	Level II: RCT Quality: good	General Practices (n=54), Wallasey, West Wirral or Birkenhead primary care Groups, North-west England. Patients aged 18-64 years with acute lower back pain (n=2,187)	Educational strategy based on RCGP clinical practice guidelines for management of acute lower back pain: 'guideline team' visit in the form of a structured interactive discussion; poster reinforcing guidelines recommendations and a copy of a text recommended by the RCGP for patients	Acute lower back pain management, % of patients given appropriate care					
				CPG clinical action:	Control [i] n patients=1049		Educational strategy [i] n patients=1138		Chi-square [k] p-value
				Referred for X-ray	13.7		15.1		0.24 p=0.62
				Sickness certificates	19.2		17.7		0.11 p=0.74
				Prescribed opioids or muscle relaxants	18.7		18.7		0.00 p=0.99
				Referred to secondary care	2.3		3.4		2.36 p=0.12
				Referred to physiotherapy or educational programme	13.8		20.8		6.49 p=0.01
(Watson et al., 2002)	Level II: cluster RCT Quality: good	Community pharmacies (n=60). Patients with vulvovaginal candidiasis	Postal distribution of guidelines plus one of the following: 1. Educational outreach (EO)	Community Pharmacy adherence to OTC guideline recommendations, % of patient visits with appropriate outcome					
				Control n=15	Educational outreach n=15		Continuing education n=15		EO + CE n=15	
				% change	% change	Relative change	% change	Relative change	% change	Relative change

		(thrush), Grampian region, Scotland	delivered by a community pharmacist + follow-up phone call 2. Continuing education session (CE) 3. EO + CE	-2.0	+5.0	2.5 NS	-1.0	0.5	-2.0	1.0 NS
(Crotty et al., 2004)	Level II: RCT Quality: good / average	Physicians (n=120) working in residential aged care facilities (hostels n=10; nursing homes n=10), metropolitan Adelaide, South Australia Older adult patients in residential care (n=715)	Educational outreach visits (n=2x30 minute duration), delivered by a pharmacist, designed to improve the implementation of Evidence-based clinical practice in the area of falls reduction and stroke prevention	**Appropriate care for falls reduction and stroke prevention, % of resident patients**							
					Control n=334			**Educational outreach visits n=381**			**Effect measure [1]**
				Sample of outcomes [a]	**Before**	**After**	**% change**	**Before**	**After**	**% change**	**Relative risk [95% CI]**
				Use of any psychotropic medications [d]							
				Residents prescribed any psychotropics	63.8	68.1	+4.3	70.0	69.9	-0.1	0.89 [0.69, 1.15]
				Use of Benzodiazepines							
				Residents prescribed any benzodiazepines	43.7	43.7	0	45.4	39.1	-6.3	0.89 [0.69, 1.15]
				Use of Antipsychotics							
				Residents prescribed any antipsychotics	24.6	23.1	-1.5	23.6	24.9	+1.3	0.96 [0.69, 1.34]
				Blood pressure (BP) recording							
				BP recorded in prior 3 months	36.5	46.4	+9.9	31.9	46.8	+14.9	1.5 [0.80, 1.11]
(Hall et al., 2001)	Level II: RCT Quality: average	General practices (n=76) comprising Newcastle and North Tyneside health authority district, UK Patients with peptic ulcer	EOV conducted by a community pharmacist, to encourage implementation of clinical practice guidelines for management of helicobacter pylori [b] eradication, in addition	**Compliance with guidelines for management of helicobacter pylori eradication [b], mean prescribing for omeprazole dose units per quarter, per patient**							
					Mailed clinical practice guidelines % change [c] North Tyneside: n=18; Newcastle: n=22			**Educational outreach visit + mailed clinical practice guidelines % change [c] North Tyneside: n=18; Newcastle: n=22**			**Relative change**
				North Tyneside May-Jul '96	+1.3			+8.0			6.2 NS [e]
				Aug-Oct '96	+6.5			+10.3			1.6

		receiving ulcer-healing drugs who may be eligible for *helicobacter pylori* eradication	to postal distribution of educational materials based on the content of the guidelines	Nov '96-Jan '97	+15.0	+12.1	0.8
				Feb-Apr '97	+13.1	+5.7	0.4
				May-Jul '97	+24.2	+21.3	0.9
				Aug-Oct '97	+21.6	+19.0	0.9
				Nov '97-Jan '98	+23.5	+19.5	0.8
				Newcastle *May-Jul '96*	+13.0	+9.5	0.3 NS[q]
				Aug-Oct '96	+15.7	+15.5	1.0
				Nov '96-Jan '97	+21.7	+20.3	0.9
				Feb-Apr '97	+28.7	+32.4	1.1
				May-Jul '97	+36.5	+32.4	0.9
				Aug-Oct '97	+33.9	+29.0	0.8
				Nov '97-Jan '98	+42.6	+33.1	0.8
				Compliance with guidelines for management of helicobacter pylori eradication[o], mean prescribing for metronidazole dose units per quarter, per patient			
					Mailed clinical practice guidelines % change [p] North Tyneside: n=16; Newcastle: n=22	**Educational outreach visit + mailed clinical practice guidelines % change [p]** North Tyneside: n=16; Newcastle: n=22	**Relative change**
				North Tyneside *May-Jul '96*	0	0	0 NS[q]
				Aug-Oct '96	+23.1	+22.2	1.0
				Nov '96-Jan '97	+23.1	+44.4	1.9
				Feb-Apr '97	+30.8	+22.2	0.7
				May-Jul '97	+23.1	+22.2	1.0
				Aug-Oct '97	+46.2	+44.4	1.0
				Nov '97-Jan '98	+46.2	+66.7	1.4
				Newcastle *May-Jul '96*	+17.6	+30.8	1.8 NS[q]
				Aug-Oct '96	+5.9	+30.8	5.2

				Nov '96-Jan '97	-5.9		+38.5	6.5
				Feb-Apr '97	-11.8		+23.1	2.0
				May-Jul '97	+17.6		+38.5	2.2
				Aug-Oct '97	+23.5		+53.8	2.3
				Nov '97-Jan '98	+5.9		+38.5	6.5
(Finkelstein et al., 2001)	Level III-1: Quasi RCT Quality: average	Primary health care practices (n=12) affiliated with 2 MCOs, Eastern Massachusetts and North-west Washington State Children (n=8,815) enrolled in the health plans of the MCOs and parents	90-minute small group practice meeting led by a trained physician peer leader using CDC endorsed summaries of prescribing recommendations plus feedback; follow-up meeting held 4 months later	**Rate of antibiotic courses dispensed to children younger than 6 years of age, number of antibiotics per person per year [r]**				
					Control		**Practice meeting**	**Effect measure**
					Before [s]	**After**	**% change**	**Before [s]**	**After**	**% change**	**Relative change p-value**
				Antimicrobial courses dispensed (per person years) *Children 3 years to <36 months of age*	2.9	2.6	-10.3	2.2	1.8	-18.2	1.8 p<0.0001
				Antimicrobial courses dispensed (per person years) *Children 36 to <72 months of age*	1.7	1.6	-5.9	1.4	1.2	-14.3	2.4 p<0.0001
(Goldstein et al., 2003)	Level III-1: Quasi-experimental study Quality: average	Primary care physicians (n=259) community based PHC practices, Providence Bristol counties, Kent county and Newport Washington counties, Rhode Island, New England	4-5 physician-centred office educational outreach visits lead by 2 masters-level Office Practice Consultants re NCI counselling approach and other office-based strategies for smoking cessation, plus patient education resources, materials to identify and track smokers, referral information, pocket cards and desk prompts	**Physicians' counselling behaviour reported by patient, % of patients**						
					18 months follow-up [t]			**24 months follow-up [t]**		
					Control [u] % change [v]	**Educational outreach % change [v]**	**Relative change**	**Control [u] % change [v]**	**Educational outreach % change [v]**	**Relative change**
				Physicians talked about smoking	-0.7	+7.0	10.0 NS	-2.7	-1.0	0.4 NS
				Physicians advised patients to quit	-0.8	+6.9	8.6 NS	-4.5	-1.2	0.3 NS
				Physicians arranged follow-up to quit	+9.0	+18.1	2.0 NS	-8.9	-7.1	0.8 NS

<table>
<tr><td rowspan="11">(Solomon et al., 2001)</td><td rowspan="11">Level III-1: Quasi RCT
Quality: average/poor</td><td rowspan="11">Physicians, general medical, oncology and cardiology services (n=17) Bringham and Women's Hospital
Patients prescribed levofloxacin or ceftazidime (n=490)
Boston, Massachusetts, USA</td><td rowspan="11">Face-to-face or telephone practice meetings (approx. 10 minute duration) plus performance feedback
Dissemination of guidelines for first-line antibiotic therapy as pocket-sized laminated brochures developed by the hospital's Division of Infectious Diseases</td><td colspan="8">Average number of days with unnecessary[w] target antibiotics administered per service, mean ±SD</td></tr>
<tr><td></td><td colspan="3">Control
n=8 services</td><td colspan="3">Practice meetings
n=9 services</td><td>Effect measure</td></tr>
<tr><td></td><td>Before</td><td>After[x]</td><td>% change</td><td>Before</td><td>After[x]</td><td>% change</td><td>Relative change p-value</td></tr>
<tr><td>Unnecessary use of antibiotics</td><td>7.6±4.7</td><td>8.8±2.2</td><td>+15.8</td><td>8.5±7.8</td><td>5.5±2.1</td><td>-35.3</td><td>2.2
p<0.001</td></tr>
<tr><td colspan="8">Discontinuation of unnecessary orders, %</td></tr>
<tr><td>Discontinued orders:</td><td></td><td>30.0</td><td></td><td></td><td>70.0</td><td></td><td>p=0.001</td></tr>
<tr><td>Target antibiotics</td><td></td><td>16.0</td><td></td><td></td><td>55.0</td><td></td><td>p=0.001</td></tr>
<tr><td>All antibiotics</td><td></td><td>14.0</td><td></td><td></td><td>14.0</td><td></td><td>NS</td></tr>
<tr><td>Route changes (intravenous to oral)</td><td></td><td>14.0</td><td></td><td></td><td>14.0</td><td></td><td>NS</td></tr>
<tr><td rowspan="6">(Majumdar et al., 2003)</td><td rowspan="6">Level III-3: CBA design
Quality: good</td><td rowspan="6">Rural health regions (n=2), Northern Alberta
Patients with Type II diabetes (n=393), Canada</td><td rowspan="6">Visits by a Travelling Diabetes Resource Program plus multi-disciplinary diabetes outreach service (group and one-on-one academic detailing) vs bimonthly visits only</td><td colspan="4">New target medication for diabetes management, % patients prescribed new medication</td></tr>
<tr><td rowspan="2">Target medication</td><td colspan="2">Visits only[y]</td><td colspan="2">Visits plus outreach service[y]</td><td>Effect measure</td></tr>
<tr><td colspan="2">After</td><td colspan="2">After</td><td>p-value</td></tr>
<tr><td>Any target medication</td><td colspan="2">23.5</td><td colspan="2">25.0</td><td>0.73</td></tr>
<tr><td>Blood pressure lowering</td><td colspan="2">14.8</td><td colspan="2">17.2</td><td>0.60</td></tr>
<tr><td>Cholesterol lowering</td><td colspan="2">3.8</td><td colspan="2">6.8</td><td>0.21</td></tr>
<tr><td>Glucose lowering</td><td colspan="2">8.2</td><td colspan="2">13.4</td><td>0.22</td></tr>
</table>

[a] GPs' reported threshold is the level above which the doctor typically commences treatment for hypertension; [b] Mann-Whitney test was used to determine significant differences between intervention and control groups; [c] Desired practice was reduction in the volume and cost of total NSAID prescribing and azapropazone prescribing and increase in the volume of prescribing of three recommended NSAIDS; [d] analysis of covariance was used to adjust for baseline differences; [e] STAR-PUs = standard units for eight major therapeutic classes, including NSAIDs; [f] "correct" test ordering = decrease in "unnecessary" tests; [g] Kruskall-Wallis test was used to compare PSA testing rates between study groups; [h] baseline PSA testing rates were equivalent between the study groups; [i] Mean data for groups are available on request; [j] baseline data not provided, yet reported as similar; [k] comparisons were made using Chi-square statistics adjusting for the cluster randomised design; [l] analyses adjusted for age, gender, level of care, dementia and baseline values; [m] Additional similar outcomes available on request; [n] includes benzodiazepines, anti-psychotics or antidepressants; [o] H pylori bacterium/infection found to be a major cause of peptic ulcers (a sore in the lining of the stomach); [p] percentage change from baseline (Feb-Apr'96 – 3 quarters before the first educational outreach visit), due to space restrictions, pre- and post-intervention scores are not provided - available on request; [q] all outcomes are NS; [r] ideal outcome is a decrease in the rate of antibiotic dispensing; [s] generalised estimating equations (GEE) were used to adjust for baseline differences in antibiotic use; age and MCO; [t] 18 or 24-month follow-up after 6-month intervention; [u] Control group physicians were aware of their role as controls in the study and had higher rates of talking, advising and following up on patients compared to an additional control group of non-participating physicians; [v] Due to space restrictions, pre- and post-intervention data are not provided – available on request; [w] unnecessary use refers to orders that fell outside the CPGs; [x] Baseline scores for prescribing not provided, but multilevel modelling used to adjust for differences in baseline scores duration of the intervention; [y] Baseline data not provided, but adjusted for using multivariate regression analysis; BP = blood pressure; CDC = Centers for Disease Control and Prevention; CPGs = Clinical Practice guidelines; DDD = defined daily dose; EOV = educational outreach visits; GPs = General practitioners; MCO = managed care organisations; NCI = National Cancer Institute NIC = net ingredient cost; NSAID = Non-steroidal anti-inflammatory drugs; OTC = over the counter PHC = primary health care; PSA = prostrate specific antigen; RCGP = Royal College of General Practitioners.

Table 47. Effectiveness of educational outreach visits – Patient outcomes

Reference	Level and quality of evidence	Target population	Dissemination Strategy	Patient outcomes (health status)							
(Crotty et al., 2004)	Level II: RCT Quality: good / average	Physicians (n=120) working in residential aged care facilities (hostels n=10; nursing homes n=10), metropolitan Adelaide, South Australia Older adult patients in residential care (n=715)	Educational outreach visits (2x30 minutes), delivered by a pharmacist, designed to improve the implementation of Evidence-based clinical practice in the area of falls reduction and stroke prevention	**Proportion of patients who fell or were at risk of stroke, % of resident patients**							
					Control n=334			**Educational outreach visits** n=381			**Effect measure** [a]
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative risk [95% CI]**
				Fall rates							
				Residents who fell in prior 3 months	19.8	21.9	+3.1	22.0	25.5	+3.5	1.1 [0.86, 1.58] NS
				Risk of stroke							
				At risk of stroke	59.0	65.0	+6.0	54.9	57.7	+2.8	0.5 [0.39, 1.08] NS
				On aspirin	38.9	41.0	+2.1	33.4	35.4	+2.0	0.9 [0.89, 1.06] NS
				Residents at risk of stroke on aspirin	50.3	52.5	+2.2	41.6	44.1	+2.5	1.1 [0.29, 1.00] NS
				Residents with atrial fibrillation on warfarin	22.6	17.1	-5.5	8.6	16.7	+8.1	-1.5 [0.23, 3.59] NS
(Goldstein et al., 2003)	Level III-1: Quasi-experimental study Quality: average	Primary care physicians (n=259) community based PHC practices, Rhode Island, New England	4-5 educational outreach visits for smoking cessation, plus patient education resources, materials to identify and track smokers, referral information, pocket cards; desk prompts	**Patient quit rates by assessment point per intervention group, %**							
					Control	**PCS**		**PCS + home intervention** [b]		**Home intervention** [b]	
					% change	**% change**	**Relative change**	**% change**	**Relative change**	**% change**	**Relative change**
				6 months	+7.1	+8.4	1.2	+8.9	1.3	+7.6	1.1
				12 months	+16.4	+17.0	1.0	+16.9	1.0	+16.5	1.0
				18 months	+20.0	+25.2	1.3	+19.2	1.0	+24.8	1.2
				24 months	+22.6	+33.3	1.5 p=0.006	+25.7	1.1	+26.3	1.2

(Majumdar et al., 2003)	Level III-3: CBA design Quality: good	Rural health regions (n=2), Northern Alberta, Patients with type II diabetes (n=393), Canada	Visits by a Travelling Diabetes Resource Program plus multi-disciplinary diabetes outreach service (group and one-on-one academic detailing) vs bimonthly visits only	**Proportion of patients achieving 10% improvement in quality of diabetes care, %**			
				Clinical area	**Visits only n=183**	**Visits plus outreach service n=210**	**Effect measure**
					After [c]	**After [c]**	**p-value**
				Blood pressure	25.0	42.0	p=0.004
				Total cholesterol	17.0	13.0	p=0.33
				HbA (1c)	14.0	18.0	p=0.44
				Patient satisfaction with care provided, adjusted mean change from baseline [c]			
				Satisfaction with general medical care	-11.9	+4.1	p<0.001
				Satisfaction with diabetes care	-3.7	+4.1	p=0.008

[a] Analyses adjusted for age, gender, level of care, dementia and baseline values; [b] home-based smoking intervention developed by a group of collaborating investigators was implemented simultaneously with the Physicians Counselling Smokers (PCS) Project; [c] Baseline measures not provided, but differences adjusted for using multivariate logistic regression (blood pressure, cholesterol, HbA1c) and ANCOVA (patient satisfaction). No adjustment for potential clustering effects; BP = blood pressure; HbA1c = blood glucose measure.

Table 48. Effectiveness of local opinion leaders – Process outcomes

Reference	Level and quality of evidence	Target population	Dissemination Strategy	Process outcomes (practitioners' behavioural change)					
(Finkelstein et al., 2005)	Level II: cluster RCT Quality: good	Primary care practices (n=40); Patients: children 5-17 years old with asthma (n=638) Chicago or Massachusetts, USA	Physician peer leader education (PLE) Peer leader education enhanced with planned asthma care (PAC)	**Medication controller [a] dispensing, mean absolute change from baseline, 95% CI**					
					Distribution of guidelines	**Physician peer leader**		**Planned asthma care**	
					Mean change [b]	**Mean change [b]**	**Adjusted intervention effect [95% CI]**	**Mean change [b]**	**Adjusted intervention effect [95% CI]**
				Among persistent asthmatics					
				≥1 controller dispensed	0.04 [-0.04, 0.12]	0.01 [-0.07, 0.08]	0.01 [-0.07, 0.08]	0.04 [-0.02, 0.1]	-0.03 [-0.09, 0.02]
				≥3 controllers dispensed	0.01 [-0.09, 0.11]	0.02 [-0.06, 0.10]	0.02 [-0.01, 0.10]	0.11 [0.05, 0.17]	0.03 [-0.04, 0.10]
				≥1 inhaled corticosteroid	0.12 [-0.01, 0.25]	0.02 [-0.11, 0.16]	0.02 [-0.11, 0.16]	0.17 [0.08, 0.26]	-0.02 [-0.13, 0.09]
				≥3 inhaled corticosteroid	0.04 [-0.07, 0.15]	0.07 [0.02, 0.15]	0.07 [-0.02, 0.15]	0.13 [0.08, 0.18]	0.03 [-0.04, 0.10]
				Among all patients with asthma					
				≥1 controller dispensed	0.07 [-0.01, 0.15]	0.03 [-0.08, 0.15]	0.03 [-0.08, 0.15]	0.13 [0.07,0.19]	0.04 [-0.06, 0.14]
				≥3 controllers dispensed	0.04 [-0.02, 0.10]	0.02 [-0.05, 0.09]	0.02 [-0.05, 0.09]	0.11 [0.05, 0.17]	0.04 [-0.02, 0.09]
				≥1 inhaled corticosteroid	0.10 [0.00, 0.20]	0.05 [-0.08, 0.17]	0.05 [-0.08, 0.17]	0.17 [0.11, 0.23]	0.04 [-0.06, 0.14]
				≥3 inhaled corticosteroid	0.03 [-0.03, 0.09]	0.04 [-0.02, 0.10]	0.04 [-0.02, 0.10]	0.09 [0.07, 0.11]	0.03 [-0.02, 0.07]
				≥1 oral steroid dispensed	0.02 [-0.01, 0.05]	0.06 [0.00, 0.12]	0.06 [0, 0.12]	0.04 [0.00, 0.08]	0.07 [-0.02, 0.15]
(Gifford et al., 1999; Holloway et al., 1999)	Level II: RCT Quality: good	Urban neurologists (n=417) Dementia patients New York State, USA	Educational package: mailed CME course; practice-based tools; interactive evidence-based seminar led by opinion leaders; follow-up mailings.	**Neurologists' adherence to practice guidelines for the evaluation and management of dementia, % of neurologists**						
					Control n=139			**Educational package** n=139			**Effect measure**
				6 guideline recommendations [c]:	**Before [d]**	**After**	**% Change**	**Before [d]**	**After**	**% Change**	**Relative change p-value**
				Order neuroimaging only if clinical criteria present							

				Scenario 1	5.6	5.9	+0.3	5.6	20.2	+14.6	48.7 p<0.01
				Scenario 3	47.6	42.3	-5.3	47.6	60.7	+13.1	2.5 p<0.01
				Order electroencephalography if clinical criteria present Scenario 1 & 3	64.4	67.0	+2.6	64.4	72.3	+7.9	3.0 p>0.2
				Screen for and treat depression Scenario 2	80.6	84.3	+43.7	80.6	86.2	+5.6	0.1 p>0.2
				Do not order apolipoprotein E genotype testing to predict or diagnose Alzheimer disease At least 1 of 3 scenarios	87.9	95.0	+7.1	87.9	94.6	+6.7	0.9 p>0.2
				Refer all patients and families to the Alzheimer's Association At least 1 of 3 scenarios	20.4	23.2	+2.8	20.4	44.1	+23.7	8.5 p≤0.01
				Encourage all patients and families to enrol in Safe Return Program At least 1 of 3 scenarios	1.0	3.2	+2.2	1.0	18.3	+17.3	7.9 p≤0.01

[a] Controller medications included inhaled corticosteroids, cromolyn/nedocromil, long-acting ß-agonists and theophylline. ≥3 dispensings indicated chronic controller use; [b] Mean absolute change was calculated from baseline proportion in each practice. Baseline scores were reported as similar. Clustering by practice was adjusted for using generalised estimating equations (GEE) method. Possible imbalances among treatment arms were identified by logistic regression (accounting for over-dispersion) for dichotomous outcomes and analysis of variance (ANOVA) for ordinal variables; [c] Adherence to guideline recommendations was based on Neurologists' written responses to three clinical scenarios depicting a typical patient with dementia presenting for an initial evaluation. Scenario 1 and 3 depicted patients with characteristics typical of Alzheimer's disease who did not meet any of the recommended criteria for ordering either a neuro-imaging study or electroencephalography, scenario 2 depicted a patient with established Alzheimer's disease and symptoms of major depression; [d] External baseline group (n=139) used for both intervention and control group comparisons; selection and characteristics of the baseline group was equivalent to the intervention and control groups; CI = confidence interval; RCT = randomised controlled trial.

Table 49. Effectiveness of local opinion leaders – Patient outcomes

Reference	Level and quality of evidence	Target population	Dissemination Strategy	Patient outcomes (health status)					
(Finkelstein et al., 2005)	Level II: cluster RCT Quality: good	Primary care practices (n=40); Patients: children 5-17 years old with asthma (n=638) Chicago or Massachusetts, USA	*Intervention 1:* Physician peer leader education (PLE) *Intervention 2:* Peer leader education enhanced with planned asthma care (PAC)	**Health care utilisation, 95% CI**					
					Distribution of guidelines	**Physician peer leader**		**Planned asthma care**	
					Mean change [a]	**Mean change [a]**	**Adjusted intervention effect [95% CI]**	**Mean change [a]**	**Adjusted intervention effect [95% CI]**
				≥1 ED/hospitalisation	-0.01[0-0.04, 0.02]	-0.01 [-0.05, 0.03]	0 [-0.06, 0.06]	0 [-0.01, 0.01]	0.03 [-0.003, 0.06]
				Ambulatory visits	-0.01 [-0.23, 0.21]	0.17 [-0.01, 0.35]	0.06 [-0.002, 0.14]	0.21 [0.03, 0.39]	0.08 [-0.01, 0.18]

[a] Mean change was calculated from baseline proportion in each practice. Baseline scores were reported as similar. Clustering by practice was adjusted for using generalised estimating equations (GEE) method. Possible imbalances among treatment arms were identified by logistic regression (accounting for over-dispersion) for dichotomous outcomes and analysis of variance (ANOVA) for ordinal variables; CI = confidence interval; ED = emergency department.

Table 50. Effectiveness of patient-mediated interventions – Process outcomes

Reference	Level and quality of evidence	Target population	Dissemination Strategy	Patient outcomes (health status)							
(Thapar et al., 2002)	Level II: Cluster RCT Quality: good	Primary health care practices (n=82) treating adults with active epilepsy (n=1275), Manchester, UK	Prompts + GP-completed reminder card providing evidence-based information, used opportunistically	**Documentation of seizure frequency, % of patients**							
					Control [a] n=392			**Patient-held card [a]** n=368			
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-values [b]**
				Recorded seizure frequency	37.8	42.8	+5.0	36.5	44.6	+8.0	1.6 p=0.49
				Reported seizure frequency	48.3	51.5	+3.2	51.6	56.0	+4.4	1.4 p=0.238
				Documentation of phenytoin serum levels in previous year, % of patients							
				Phenytoin serum levels checked	31.2	31.5	+0.3	32.6	39.2	+6.6	22.0 p=0.447

[a] GEE method used to adjust for clustering. [b] Wald Chi-square test

Table 51. Effectiveness of patient-mediated interventions – Patient outcomes

Reference	Level and quality of evidence	Target population	Dissemination Strategy	Patient outcomes (health status)							
(Thapar et al., 2002)	Level II: Cluster RCT Quality: good	PHC practices Adults with active epilepsy, Manchester, UK	Prompts + GP-completed reminder card providing evidence-based information, used opportunistically	**Medication use and side effects, % of patients**							
					Control [a] n=392			**Patient-held card [a]** n=368			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value**
				Patient on more than one epilepsy drug	28.8	28.9	+0.1	32.1	29.9	-2.2	22.0 p=0.253
				Medication side effects reported by patient	52.8	43.6	-9.2	53.2	50.8	-2.4	0.3 p=0.016
				Satisfaction with care provided, % of patients							
				Satisfaction with information provided	67.7	76.1	+8.4	65.1	76.2	+11.1	1.3 p=0.943
				GP's care of epilepsy rated as high	77.2	79.0	+1.8	77.5	83.6	+6.1	3.4 p=0.27

[a] GEE method used to adjust for clustering. GP = general practitioner; PHC = primary health care; RCT = randomised controlled trial.

Table 52. Effectiveness of prompts and reminders (including decision support) – Process outcomes

Reference	Level and quality of evidence	Target population	Dissemination Strategy	Process outcomes (practitioners' behavioural change)
(Shaw et al., 2000)	Level II: RCT Quality: good	Paediatric resident practitioners (n=52) Children <5 years old attending clinic for a well-child care visit (n=495), Boston, USA	Encounter-based immunisation prompting system	**Proportion of well child care visits with missed opportunities for immunisation, % (number/number eligible)**

	Control 328 visits; n=30 residents			**Encounter-based prompts** 298 visits; n=22 residents			**Effect measure**
Performance	**Before**	**After %**	**% change**	**Before**	**After %**	**% change**	**Relative change p-value**
≥1 missed opportunity/vaccine administration error [b]	Not provided [a]	21.6 (71/328)	NE	Not provided [a]	11.4 (34/298)	NE	P<0.001
Knowledge	**Before** n=30	**After** n=22	**% change**	**Before** n=22	**After** n=16	**% change**	**Relative change [c]**
Immunisation lecture exam score	76.5	81.3	+4.8	75.5	80.7	+5.2	1.1 NS

(Ramsay et al., 2003)	Level II: Cluster RCT Quality: good	GPs 6 radiology departments in North-East England and Scotland	Educational reminder messages for knee and lumber spine radiographs	**Referrals for knee and lumbar spine radiographs per GP practice [d], number of referrals and practice per month, mean±SD**

	Control knee n=40 practices lumbar spine n=39 practices	**Educational reminders** knee n=41 practices lumbar spine n=40 practices	Effect measure
	After	**After**	**Absolute mean reduction [e] p-value**
Knee radiographs	1424±2.97	920±1.87	1.10 p=0.001
Lumbar spine radiographs	1349±2.88	847±1.76	1.12 p=0.001

(Eccles et al., 2001) (Thapar et al., 2002)	Level II: Cluster RCT Quality: good	Primary health care practices (n=82) treating adults with active epilepsy (n=1275), Manchester, UK	Prompts + GP-completed reminder card providing evidence-based information, used opportunistically	**Documentation of seizure frequency, % of patients**

	Control [f] n=392			**Doctor-held card [f]** n=515			**Effect measure**
	Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value**
Recording seizure frequency	37.8	42.8	+5.0	36.6	57.4	+20.8	4.2 p=0.003

				Reported seizure frequency	48.3	51.5	+3.2	51.6	56.0	+4.4	1.4 p=0.238
				Documentation of phenytoin serum levels in previous year, % of patients							
				Phenytoin serum levels checked	31.2	31.5	+0.3	28.1	28.7	+0.6	2.0 p=0.851
(Bahrami et al., 2004)	Level II: Cluster RCT Quality: good	Dental practices across Scotland selected from the Scottish Dental Practice Board list (n=51) 16-24-year old patients	Guidelines and post-graduate education course plus: audit and feedback (A&F) computer aided learning (CAL) package A&F plus CAL package	**Dentists' compliance with guidelines, mean %**							
				Control n=11	**Audit and Feedback** n=12		**Computer Aided Learning** n=11		**A&F + CAL** n=13		
				% change	**% change**	**Relative change**	**% change**	**Relative change**	**% change**	**Relative change**	
				+4.0	+1.0	0.3 NS	+3.0	0.8 NS	+7.0	1.8 NS	
(Sanders & Satyvavolu, 2002)	Level II: RCT Quality: average	Physicians (n=22) Primary health care group practices (n=2) Veterans with a variety of chronic diseases including hypertension, diabetes & with high blood pressure levels=320; 160 per practice) Virginia, USA	Chart reminder attached to outpatient medical records	**Patients with hypertensive medication adjusted according to BP level [g], % patients with medication adjusted**							
					Control n=135 % (n)		**Reminders n=126 % (n)**				**Effect measure Odds ratio [95% CI]**
				High normal (systolic 130-139mm Hg; diastolic 85-89 mm Hg)	1.8 (1/21)		14.3 (3/21)				0.32 [0.01,3.79]
				Stage 1 (systolic 140-159mm Hg; diastolic 90-99 mm Hg)	28.1 (20/71)		33.3 28/84)				1.19 [0.54, 2.61]
				Stage 2 (systolic 160-179mm Hg; diastolic 100-109 mm Hg)	75.0 (12/16)		57.7 (15/26)				2.2 [0.47, 10.93]
				Stage 3 (systolic 180-209mm Hg; diastolic 110-119 mm Hg)	100.0 (3/3)		100.0 (1/1)				
				Stage 4 (systolic >210, diastolic >120)	100.0 (3/3)		100.0 (1/1)				
(Goldberg	Level III-1:	Primary health	Alcohol screening	**Patient referred for counselling, %**							

et al., 1991)	Quasi RCT Quality: Average	care practices (n=3) English-speaking adults visiting practice (n=1,328) Washington, USA	instrument (decision support)		**Control group** n=402	**Nurse referral** n=418	**Physician referral** n=508	**Effect measure**
					After [h]	**After** [h]	**After** [h]	**Relative change p-value**
				Patients referred for counselling	2.3	12.8	9.1	p=0.006
(Murtaugh et al., 2005)	Level III-1: Quasi RCT Quality: Average	Home care nurses (n=354)	Email reminders: *Basic intervention*: one-time email reminder highlighting 6 clinical recommendations *Augmented intervention:* email reminder supplemented with provider prompts, patient education material, clinical nurse specialist outreach	**Proportion of nurses recording assessment items for heart failure patients, %**				
					Control	**Email reminder** [i]		**Email reminder + prompts** [i]
					After [j]	**After** [j]	**Difference p-value**	**After** [j]	**Difference p-value**
				Heart failure status	3.7	13.3	+10.1 p=0.006	23.9	+20.2 p<0.001
				Diet	27.6	38.2	+10.6 p=0.076	48.7	+21.1 p=0.001
				Medication knowledge	24.8	31.1	+6.3 p=0.285	34.4	+9.6 p=0.109
				Medication adherence	48.2	62.7	+14.5 p=0.024	59.6	+11.4 p=0.077
				Medication side-effects	12.7	15.3	+2.6 p=0.558	23.6	+10.9 p=0.030
				Nurses instruction to patient about signs and symptoms of heart failure, %					
				Shortness of breath	18.1	31.1	+13.0 p=0.021	28.9	+10.8 p=0.053
				Fluid weight gain	20.6	29.9	+9.3 p=0.097	39.7	+19.1 p=0.001
				Fatigue	11.8	10.5	-1.3 p=0.752	15.9	+4.1 p=0.353
				Global instructions about heart failure symptoms	42.1	53.9	+11.8 p=0.070	59.5	+17.4 p=0.007
				Nurses recording of other heart failure management instructions given to patients, %					
				Weighing self	16.0	37.2	+21.2 p<0.001	48.7	+32.7 p<0.001

				Managing fluid weight gain	5.7	8.0	+2.3 p=0.505	11.9	+6.2 p=0.116
				Low salt diet	22.7	40.4	+17.7 p=0.003	49.6	+26.9 p<0.001
				Medication management	51.2	57.0	+5.8 p=0.385	59.7	+8.5 p=0.195
				Improving adherence	15.0	26.5	+11.5 p=0.030	18.0	+3.0 p=0.532
				Contacting doctor	27.3	36.2	+8.9 p=0.147	42.8	+15.5 p=0.014
				Educational material	10.5	17.6	+7.1 p=0.113	46.2	+35.7 p<0.001
(Frances et al., 2001)]	Level III-1: Quasi-RCT Quality: average	Primary health care physicians Patients with coronary heart disease San Francisco, USA	Computer-generated and written reminder system provided during patient visits	**Proportion of patients prescribed appropriate medication, % eligible patients [k]**					
					Control [l] n=354		**Computer-generated + written Reminders [l]** n=376		**Effect measure [m] p-value**
					After		**After**		
				Receiving beta-blocker (% of patients)	19.8		16.0		p=0.168
				Receiving cholesterol-lowering agent (% of patients)	31.9		36.7		p=0.159
				LDL level 100mg/dL (% of patients)	73.2		71.0		p=0.512
(Toth-Pal et al., 2004)	Level III-1: CCT Quality: poor	Primary health care physicians caring for elderly patients Stockholm, Sweden	Computer-generated reminders integrated with an electronic patient record system for opportunistic screening in elderly patients	**Proportion of patients undergoing appropriate tests in 5 study areas, %**						
					Control n=1989			**Computer-generated reminders** n=602		**Effect Measure**
					Before [n]	**After**	**% change**	**Before [n]**	**After**	**% change**	**Relative change p-value**
				Hypertension	84.4	84.3	-0.1	80.1	97.6	+17.5	175.0 p<0.05
				Anaemia	78.4	82.3	+3.9	77.1	95.2	+18.1	4.6 p<0.05

				Diabetes	61.4	67.0	+5.6	35.3	93.2	+57.9	10.3 p<0.05
				B-12 deficiency	20.3	20.2	-0.1	11.1	94.7	+83.6	836.0 p<0.05
				Hypothyroidism	33.5	32.4	-1.1	21.8	92.9	+71.1	64.6 p<0.05
(Goldberg et al., 2000)	Level III-2: CTS Quality: average	PHC Physicians Washington	Computer-generated preventive reminders for mammography, colorectal cancer screening and cholesterol testing	**Proportion of eligible patients screened, % patients [o]**							
					Control			**Computer-generated reminders**			**Effect measure**
					Before [p]	**After**	**% change**	**Before [p]**	**After**	**% change**	**Relative change p-value**
				Mammogram: (annual - women aged 50-60; bi-annual - women aged 60-75)	31.0	21.0	-10 p=0.44	24.0	61.0	+37.0 p=0.03	3.7 p=0.02
				Colorectal cancer screening with faecal occult blood cards (men and women aged 50-75 every 2 years)	16.0	18.0	+2 p=0.73	20.0	25.0	+5 p=0.33	2.5 p=0.77
				Cholesterol determinations every 5 years (men and women aged 18-65)	13.0	7.0	-6 p=0.03	18.0	11.0	-7 p=0.02	1.2 p=0.75
(McMullin et al., 2004)	Level III-2: Cohort study Quality: average	Primary health care physicians, nurse practitioners, physicians' assistants in community-based, ambulatory setting at Affinity Health System network of 17 primary care clinic	CDSS that provided diagnosis-specific, evidence-based information about the relative efficacy, safety and cost of different therapeutic options during the electronic prescribing process	**Mean prescription costs, mean US$ ± SE**							
					Control group n=19			**Intervention group** n=19			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value**
				New prescriptions	38.5±1.60	41.4±1.61	+7.5	38.5±1.63	37.3±1.62	-3.2	0.4 p=0.02
				New and refilled prescriptions	44.1±1.59	45.9±1.59	+4.1	43.7±1.60	40.6±1.59	-7.3	1.7 p=0.01
				Prescription costs for 10 high-cost drug categories:							
				Antibiotics	29.92±2.18	28.88±2.26	-3.5	27.19±2.27	25.04±2.29	-7.9	2.2 p=0.69

		Wisconsin, USA		Antidepressants	62.05±2.85	60.22±2.93	-2.9	60.37±2.87	50.59±2.83	-16.2	5.5 p=0.06
				Rhinitis medications	62.27±2.85	64.48±2.10	3.5	69.11±2.21	66.58±2.07	-3.7	-1.0 p=0.24
				GERD medications	104.73±6.25	108.83±5.93	3.9	96.08±6.21	84.38±6.04	-12.2	-3.1 p=0.10
				Asthma medications	64.84±4.47	61.73±4.58	-4.8	62.65±4.54	49.92±4.55	-20.3	4.2 p=0.25
				Diabetes medication	59.95±4.55	48.22±4.83	-19.6	53.15±4.75	42.09±5.14	-20.8	1.0 p=0.94
				Antihypertension medications, diuretics	25.83±1.18	22.65±1.15	-12.3	23.52±1.19	18.36±1.16	-22.0	1.8 p=0.30
				Lipid lowering agents	74.85±3.76	62.98±3.85	-15.8	73.06±4.07	66.55±3.95	-28.2	1.8 p=0.49
				Triptans and headache medications	69.26±9.69	88.95±9.64	28.4	94.81±9.60	67.02±9.22	-29.3	-1.0 p=0.01
				COX-2 inhibitors and NSAIDS	33.00±4.63	40.53±4.54	22.8	25.51±4.69	29.53±4.64	15.7	0.6 p=0.59

[a] baseline data not provided, but reported as similar; [b] 'missed opportunity' refers to 1 or more failures to immunise at a visit; 'no variance' was defined as complete administration of the vaccines due, the comparison of missed opportunities between the intervention and control groups was calculated using the Chi-square test; [c] Chi-square test; [d] study was assessed in conjunction with (Eccles et al., 2001), which assessed whether audit and feedback and educational messages reduced GPs requests for radiological tests in accordance with Radiologists' Guidelines, (Ramsay et al., 2003) provided evidence of a statistically significant effect for educational reminder messages, (Eccles et al., 2001) investigated sustainability of the statistically significant effect over a 12-month follow-up period, baseline measures were reported in (Thapar et al., 2002); [e] absolute mean reduction in the number of monthly referrals and change in the number of monthly referrals over 12-month period was determined using poisson regression; [f] intervention and control groups were reported as comparable at baseline, using binary logistic regression; [g] Hypertension was categorised according to the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (USA), study population was stratified by stage of blood pressure; [h] Baseline data not provided, but adjusted for using logistic regression analysis; [i] 'Basic' intervention: one-time email reminder highlighting 6 clinical recommendations; 'augmented' intervention: email reminder enhanced with provider prompts, patient education material and clinical nurse specialist outreach; [j] Baseline differences reported as similar or adjusted for using multivariate analysis; [k] Eligible patients were those who did not have the diagnosis in question or corresponding medication recorded before the study and would have had screening test recommended; [l] Sample size adjusted to account for clustering. Baseline differences adjusted for; [m] Chi-square and *t*-tests; [n] baseline data not adjusted for; [o] Mean weekly conversion rates: an 'opportunity' to undertake a preventive screening procedure was 'converted' if the procedure was performed on a patient due for the procedure within 10 days of the index visit for cholesterol and faecal occult blood tests, and 60 days for mammogram; [p] Logistic regression analysis was used to adjust for baseline differences and to test for statistical significance. Opportunity conversion rates for each reminder are represented as the percentage of opportunities converted. BP = blood pressure; CDSS = clinical decision support software; CI = confidence interval; COX-2 inhibitors = selective cyclooxygenase 2 inhibitors; CTS = controlled time series study design; GERD = gatroesophageal reflux disease; GP = General practitioner; LDL = low density lipoprotein; NSAIDS = nonsteroidal anti-inflammatory drugs; NS = not significant; PHC = primary health care; RCT = randomised controlled trial; SD = standard deviation; SE = standard error.

Table 53. Effectiveness of prompts and reminders (including decision support) – Patient outcomes

Reference	Level and quality of evidence	Target population	Dissemination Strategy	Patient outcomes (health status)							
(Eccles et al., 2001)	Level II: Cluster RCT Quality: good	PHC practices Adults with active epilepsy, Manchester, UK	Prompts + GP-completed reminder card providing evidence-based information, used opportunistically	**Medication use and side effects, % of patients**							
					Control n=392			**Doctor-held card** n=515			**Effect measure**
					Before [a]	**After**	**% change**	**Before** [a]	**After**	**% change**	**Relative change p-value**
				Patient on more than one epilepsy drug	28.8	28.9	+0.1	28.1	30.3	+2.2	22.0 p=0.40
				Medication side effects reported by patient	52.8	43.6	-9.2	50.8	49.3	-1.5	0.2 p=0.013
				Satisfaction with care provided, % of patients							
				Satisfaction with information provided	67.7	76.1	+8.4	64.4	66.0	+1.6	0.2 p=0.006
				GPs' care of epilepsy rated as high	77.2	79.0	+1.8	76.7	73.6	+3.1	1.7 p=0.10
(Goldberg et al., 1991)	Level III-1: Quasi RCT Quality: Average	PHC practices (n=3) English-speaking adults visiting practice (n=1,328) Washington, USA	Alcohol screening instrument (decision support)	**Patients referred to counselling, % patients who show**							
					Control n=402		**Nurse Referral** n=418		**Physician Referral** n=508		**Effect measure**
					After [b]		**After** [b]		**After** [b]		**p-value**
				Referred patients showing for counselling	66.7		61.1		50.0		p=0.772
(Frances et al., 2001)	Level III-1: Quasi-RCT Quality: average	PHC Physicians Patients with coronary heart disease San Francisco, USA	Combination of a computer-generated and written reminder system provided during patient visits	**Proportion of patients prescribed appropriate medication, % of patients**							
					Control [c] n=354			**Reminders** [c] n=376			**Effect measure** [d] **p-values**
				Receiving aspirin	37.9			35.1			p=0.440
				Receiving beta-blocker	19.8			16.0			p=0.168
				Receiving cholesterol-lowering agent	31.9			36.7			p=0.159
				LDL level 100mg/dL	73.2			71.0			p=0.512

[a] intervention and control groups reported as being comparable at baseline, using binary logistic regression. [b] Baseline data not reported, but adjusted for using logistic regression analysis. [c] After the sample size was adjusted for clustering, Chi-square and *t*-tests were used to calculate differences between patients in the intervention and control groups. [d] Baseline differences reported as adjusted for, yet method of adjustment used and baseline scores not reported. GP = General practitioner; LDL = Low density lipoprotein (100mg/dL = level is the desired range); PHC = primary health care; RCT = randomised controlled trial.

Table 54. Effectiveness of audit and feedback – Process outcomes

Reference	Level and quality of evidence	Target population	Intervention	Process outcomes (practitioners' behavioural change)							
(Eccles et al., 2001)	Level: II Quality: Good	General practices (n=244) North-east England and Scotland	Practice feedback to reduce unnecessary radiograph referrals	**Radiograph requests per 1,000 patients, summed across practices, mean ± SD** [a]							
				Outcome measures Physicians' compliance with referral guidelines	**Guideline only** n=61			**Feedback** n=60			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change**
				Knee radiograph referrals	6.7±3.9	7.0±3.6	4.5	7.0±5.1	6.3±4.0	-10.0	2.2 NS
				Lumbar spine radiograph referrals	7.5±4.1	6.8±4.3	-9.3	7.2±4.8	6.0±4.2	-16.7	1.8 NS
(Kiefe et al., 2001)	Level: III-1 Quality: Average	Primary health care physicians participating in the ACQIP (n=97); fee-for-service Medicare patients with diabetes mellitus (n=2978) Alabama, USA	Audit and feedback enhanced with achievable benchmark feedback for management of diabetes [b]	**Physician performance of 5 quality of care measures, % of physicians achieving benchmark** [b]							
				5 quality measures for appropriate care of ambulatory diabetic patients:	**Control** [c] n=35			**Audit + feedback** [c] n=35			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value**
				Influenza vaccination (benchmark 82%)	40	46	6	40	58	18	3.0 p<0.001
				Foot examination (benchmark 86%)	32	45	13	46	61	15	1.2 p=0.02
				Long-term glucose control (benchmark 97%)	30	65	35	31	70	39	1.1 p=0.02
				Serum cholesterol (benchmark 99%)	66	69	3	66	72	6	2.0 0.13
				Serum triglycerides (benchmark 98%)	57	60	3	61	65	4	1.3 p=0.22
(McCartney et al., 2001)	Level: III-1 Quality: Average	General practices (n=28); patients (n=180,000) London, UK	Audit and feedback enhanced with educational material and audit support to increase appropriate HRT prescribing and decrease inappropriate prescribing in		**Aspirin feedback** [d] n=14			**HRT feedback** n=14			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change**
				Appropriate HRT prescribing for women with a hysterectomy, % on HRT							

			women with hysterectomy	Women aged 30-49 with a hysterectomy on HRT	34.5	36.2	1.7	35.2	43.0	7.8	4.6 p<0.05
				All women with a hysterectomy on HRT	33.3	33.5	0.2	31.0	36.7	5.7	28.5 p<0.01
				Inappropriate HRT prescribing, % on inappropriate HRT							
				Women with a hysterectomy on combined oestrogen/progesterone	4.6	3.7	-0.9	4.0	3.1	-0.9	0
				Inappropriate prescribing of HRT in women >30 (no hysterectomy)	11.3	8.9	-2.4	12.2	6.3	-5.9	2.5

[a] multi-level modelling – variation between practices and between years was analysed using a random effects model, treatment effects were analysed using a fixed effects model, and practice list size was weighted using the least-squares procedure; [b] the achievable benchmark represents the average performance for the top 10% of the physicians being assessed; [c] differences at baseline were reported as adjusted for and paired *t* tests were used to compare the mean baseline and follow-up performance of achievable benchmark intervention physicians - analysis was repeated for comparison physicians, generalised linear models were used to evaluate the statistical significance and magnitude of the intervention effect – these models contained baseline performance as a covariate to adjust for any pre-intervention performance differences; [d] Aspirin feedback group, which was the control group in this study, was the intervention group for management of heart disease in a study published previously and assessed in Jamtvedt et al. (2003); ACQIP = Ambulatory Care Quality Improvement Project; HRT = hormone replacement therapy; NS = not significant; SD = standard deviation.

Table 55. Effectiveness of financial incentives – Process outcomes

Reference	Level and quality of evidence	Target population	Intervention	Process outcomes (practitioners' behavioural change)			
(Hillman et al., 1998)	Level: III-1 Quasi-RCT Quality: Good	Primary health care practices (n=25 audit 1; 26 audit 2,3,4) Philadelphia, USA	Financial incentives - semi-annual feedback on physicians' compliance with cancer screening with financial bonuses for 'good' performers	**Physician compliance with guidelines, mean physician compliance scores per indicator [a]**			
					Control group % change [b]	**Intervention group % change [b]**	**Effect measure Relative change p-value [c]**
				Pap smear *Audit 2*	+100.6	+68.1	0.68
				Audit 3	+206.1	+113.4	0.55
				Audit 4	+172.1	+108.7	0.63
				Colorectal screening *Audit 2*	+246.3	+149.7	0.61
				Audit 3	+328.7	+260.4	0.79
				Audit 4	+246.3	+193.3	0.78
				Mammography *Audit 2*	+23.9	+12.5	0.52
				Audit 3	+72.4	+48.4	0.67
				Audit 4	+70.3	+55.5	0.79
				Breast exam *Audit 2*	+76.4	+43.0	0.56
				Audit 3	+205.4	+131.3	0.64
				Audit 4	+128.4	+104.8	0.82
				Total compliance score *Audit 2*	+87.4	+60.0	0.69
				Audit 3	+152.4	+107.4	0.70
				Audit 4	+128.2	+97.0	0.76

[a] Aggregate compliance scores were the number of indicators in compliance divided by the number of applicable charts. [b] Percent change from baseline (Audit 1). Due to space restrictions, pre and post scores are not provided, but are available on request; [c] Differences between control and intervention groups are not significant for all outcomes; RCT = randomised controlled trial.

Table 56. Effectiveness of electronic educational sources – Process outcomes

Reference	Level and quality of evidence	Target population	Intervention	Process outcomes (practitioners' behavioural change)					
(Di Noia et al., 2003)	Level III-1: Quasi-RCT Quality: average	Professionals employed in schools, community agencies and policy-making bodies providing youth services (n=188), New York, USA	Substance use prevention program materials disseminated via CD-ROM and the Internet		**Pamphlet** n=55	**CD-ROM** n=64		**Internet** n=69	
					% change	**% change**	**Relative change p-value**	**% change**	**Relative change p-value**
				Accessibility: Frequency of searching for information, mean ±SD					
				6 months	-3.8	+3.3	0.6	-6.8	1.8
				12 months	+2.6	-3.3	1.3	-6.8	2.6
				Accessibility: Relevance of materials to population, mean ±SD					
				6 months	-10.6	+25.6	2.4	-17.6	1.7
				12 months	+6.4	+22.2	3.5	-14.1	2.2
				Accessibility: Accessibility of information, mean ±SD					
				6 months	-0.8	-3.1	3.9 p<0.05	0.0	0.0
				12 months	+1.1	-21.9	-19.9 p<0.05	-13.7	12.5 p<0.05
				Perceived self efficacy: Confidence in ability to identify programs, mean ±SD					
				6 months	-15.2	-0.9	0.1	-4.5	0.3
				12 months	-29.6	-3.6	0.1	-26.4	0.9 NS
				Perceived self efficacy: Confidence in ability to obtain programs, mean ±SD					
				6 months	-3.5	-12.0	3.4 p<0.05	-1.0	0.3
				12 months	-14.7	-19.7	1.3 p<0.05	-14.7	1.0 p<0.05
				Perceived self efficacy: Confidence in ability to recommend programs, mean ±SD					
				6 months	+5.5	+9.2	1.7	-2.6	0.5
				12 months	+6.4	+1.7	0.3	-21.9	-3.4 p<0.05
				Behavioural intentions: Likelihood of requesting program, mean ±SD					

				6 months	+8.0	+1.1	0.1	-6.0	0.8
				12 months	+11.0	+9.8	0.9	-8.0	0.7
				Behavioural intentions: Likelihood of implementing program, mean ±SD					
				6 months	-6.3	-7.4	1.2	-7.5	1.2
				12 months	+20.5	+25.9	1.3	+2.2	0.1
				Behavioural intentions: Likelihood of recommending program, mean ±SD					
				6 months	-13.7	-4.0	0.3	-15.9	1.2
				12 months	+6.2	-18.5	3.0	-29.8	4.8 p<0.05

RCT = randomised controlled trial; SD = standard deviation

Table 57. Effectiveness of record and/or office systems – Process outcomes

Reference	Level and quality of evidence	Target population	Intervention	Process outcomes (change in organisational structure or efficiency)					
(Boekeloo et al., 2003; Boekeloo et al., 2004)	Level II: RCT Quality: Good	Primary health care providers (n=26); Washington DC and Maryland, USA. Patients aged 12 to 17 years (n=444)	*Intervention 1:* Adolescent priming[a] on alcohol risk behaviours with adolescent self-assessment *Intervention 2:* Adolescent priming on alcohol risk behaviours with adolescent self-assessment and educational brochure + provider prompting	**Type of patient-provider communication, OR [95% CI]**					
				Type of communication	Control vs patient-priming only [a] OR [95% CI]			Control vs patient-priming + provider prompts [a] OR [95% CI]	
				Provider talked about alcohol-related topics	0.96 [0.89-1.04] NS			1.10 [1.04-1.17] p<0.005	
				Provider asked about patient's alcohol use	0.93 [0.85-1.02] NS			1.09 [0.99-1.19] NS	
				Patient asked provider about alcohol	1.03 [0.97-1.10] NS			1.08 [1.00-1.16] p<0.05	
				Patient asked provider any questions	1.13 [1.02-1.24] p<0.05			1.23 [1.14-1.32] p<0.005	
				Patient responded to questions and initiated discussion	1.15 [1.03-1.27] p<0.05			1.15 [1.03-1.30] p<0.05	
				Length of patient-provider communication, minutes, mean±SD					
					Control n=150	Audio only n=147	Effect measure [c] p-value	Audio + Prompt n=147	Effect measure [c] p-value
				Minutes teenager and provider spent face-to-face without parent	8.8±8.0	8.3±7.5	-0.2 p=0.75	10.8±7.6	1.7 p=0.03
				Total minutes teenager and provider spent face-to-face	19.2±7.1	21.0±7.3	1.8 p=0.04	21.7±7.8	2.5 p=0.004
(McBride et al., 2000)	Level II: RCT Quality: Good	Community primary care practices (n=45); Madison and Eau Claire, Wisconsin;	*Intervention 1:* Conference + QI consultations (n=11) *Intervention 2:* Conference + prevention coordinator (n=11)	**Proportion of medical records with cardiovascular disease screening and management information a documented, % patient medical records**					
					Conference only n=12	Conference + quality improvement consultations n=11	Conference + prevention coordinator n=11	Conference + quality improvement consultations + prevention coordinator n=11	

		Minneapolis; Minnesota; Iowa City, USA Adult patients (n=20 medical records audited)	*Intervention 3:* Conference + QI consultations + prevention coordinator (n=11) For prevention of cardiovascular disease	*Screening [d] in recommended location, all patients*					
					% change [be]	**% change [e]**	**Relative change**	**% change [e]**	**Relative change**	**% change [e]**	**Relative change**
				12 months	+5.0	+11.0	2.2	+33.0	6.6	+50.0	10.0
				18 months	+5.0	+16.0	3.2	+25.0	5.0	+44.0	8.8
				Screening in recommended location, at risk patients [f]							
				12 months	+1.0	+10.0	10.0	+30.0	30.0	+53.0	53.0
				18 months	+2.0	+16.0	8.0	+23.0	11.5	+47.0	23.5
				Risk management [g] information on medical record, at risk patients [f]							
				12 months	-1.0	+3.0	3.0	+4.0	4.0	+7.0	7.0
				18 months	+6.0	+29.0	4.8	+29.0	4.8	+23.0	3.8
				Presence of cardiovascular disease information on recommended tools in the medical record of each physician, % per location							
				Patient questionnaire							
				12 months	+13.0	+15.0	1.2	+22.0	1.7	+24.0	1.8
				18 months	+21.0	+20.0	1.0	+25.0	1.2	+21.0	1.0
				Problem list							
				12 months	-8.0	+4.0	0.5	+13.0	1.6	+35.0	4.4
				18 months	-6.0	0.0	0.0	+10.0	1.7	+31.0	5.2
				Flow chart							
				12 months	+3.0	+14.0	4.7	+22.0	7.3	+20.0	6.7
				18 months	+3.0	+27.0	9.0	+22.0	7.3	+20.0	6.7
(Kinsinger et al., 1998)	Level II: RCT Quality: Good	Family physicians and general internists, community primary care practices (n=62) Female	Office system (tailored to practice) + attendance at end-of-intervention conference	**Performance of breast cancer screening for women age 50 years and older, % practices**							
					Control			**Office-system intervention**			**Effect measure [h]**
					Before n=30	**After** n=27	**% change**	**Before** n=32	**After** n=31	**% change**	**OR [95% CI] p-value**
				Mammogram mention [i]	40.5	44.0	+3.5	38.7	51.4	+12.7	1.5 [1.1, 2.0] p=0.01

		Female patients ≥50 years with no previous diagnosis of cancer (n=2,887), (n=40-200 charts audited per practice) Rural North Carolina, USA		Mammogram report	30.6	34.0	+3.4	28.0	32.7	+4.7	1.1. [0.8, 1.4] p=0.56
				Clinical breast examination	44.6	43.9	-0.7	41.1	46.4	+5.3	1.3 [1.0, 1.6] p=0.06
				Mammogram mention + clinical breast examination	30.3	32.6	+2.3	28.2	38.7	+10.5	1.4 [1.1, 1.9] p=0.01
(Dietrich et al., 1992)	Level III-1: Quasi RCT Quality: Good	Family physicians and general internists within ambulatory care practices (n=98), Patients aged 42+ years New Hampshire & Vermont, USA	*Intervention 1*: Office system (tailored to practice) *Intervention 2:* Educational intervention *Intervention 3:* Office system (tailored to practice) + educational intervention	**Proportion of eligible female patients who received cancer prevention and early detection services, practice mean** [j]							
				Service	**Control** n=26	**Educational intervention** n=26		**Office system** n=24		**Office system + Educational intervention** n=26	
					% change	**% change**	**Relative change p-values**	**% change**	**Relative change p-values**	**% change**	**Relative change p-values**
				Mammogram (age >50 years)	-1.7	+34.0	20.0 p<0.01	+30.5	17.9 p<0.01	+36.8	21.6 p<0.01
				Clinical breast examination	-5.8	+6.0	1.0	+12.9	2.2 p<0.05	+15.9	2.7 p<0.05
				Recommendation for breast self examination	-5.3	+7.7	1.5	+16.7	3.2	+19.6	3.7 p<0.05
				Cervical cytology	-3.2	+3.3	1.0	+22.4	7.0 p<0.05	+6.6	2.1
				Proportion of eligible patients who received cancer prevention and early detection services, practice mean							
				Faecal occult blood test (age >50 years)	+2.2	+12.5	0.6	+29.2	13.3 p<0.01	+41.9	19.0 p<0.01
				Rectal examination	+5.6	0.0	0.0	+11.9	2.1	+8.6	1.5

				Sigmoidoscopy (age >50 years)	+20.0	+7.1	0.4	+24.0	1.2	+12.5	0.6
				Recommendation to decrease dietary fat	-4.1	+11.6	2.8	+14.3	3.5 p<0.05	+8.5	-2.0
				Recommendation to increase fibre intake	+11.8	+18.8	1.6	+20.0	1.7	-17.1	-1.4
				Recommendation for smokers to quit	-8.2	+8.2	1.0	+1.2	0.1 p<0.05	+2.6	0.3

[a] Priming involved 15-minute audio-taped "patient-priming" program on alcohol risk behaviours; [b] baseline scores not provided, but adjusted for using generalized estimating equations (GEE) method; [c] General linear mixed model regression; [d] Screening information included cholesterol level, diagnosis of hypertension or smoking status information; [e] Baseline scores not included due to space restrictions and were reported as adjusted for using GEE method; [f] At risk patients have at least one of the following characteristics: self-identified smoker, a medical record diagnosis of hypertension, a cholesterol level of >200; [g] Risk management includes counselling or pharmaceutical treatment for at least one risk factor, [h] Logistic regression models used in analysis; [i] 'Mention' includes all cases of 'reported' mammography or where mammography was considered even if the patient didn't follow though; [j] Two-way ANCOVA arcsin transformed proportions with baseline as covariates; CBE = clinical breast examination; CI = confidence intervals; NS = not significant; OR = odds ratio; QI = quality improvement RCT = randomised controlled trial.

Table 58. Effectiveness of record and/or office systems – Patient outcomes

<table>
<tr><th>Reference</th><th>Level and quality of evidence</th><th>Target population</th><th>Intervention</th><th colspan="6">Patient outcomes (health status)</th></tr>
<tr><td rowspan="6">(Boekeloo et al., 2003; Boekeloo et al., 2004)</td><td rowspan="6">Level II: RCT
Quality: Good</td><td rowspan="6">Primary health care providers (n=26), Washington DC and Maryland, USA
Patients aged 12 to 17 years (n=444)</td><td rowspan="6">Intervention 1:
Adolescent priming [a] on alcohol risk behaviours with adolescent self-assessment
Intervention 2:
Adolescent priming [a] on alcohol risk behaviours with adolescent self-assessment and educational brochure + provider prompting</td><td colspan="6">Alcohol use outcomes reported, % of adolescents</td></tr>
<tr><td rowspan="2">Alcohol use outcome</td><td colspan="2">Control vs patient-priming [ab] only OR [95% CI]</td><td colspan="2">Control vs patient-priming [ab] + provider prompts OR [95% CI]</td></tr>
<tr><td>After 6 months</td><td>After 12 months</td><td>After 6 months</td><td>After 12 months</td></tr>
<tr><td>Hung around with friends while they drank</td><td>1.17 [0.57, 2.40]</td><td>1.03 [0.63, 1.69]</td><td>1.74 [0.90, 3.35]</td><td>1.04 [0.60, 1.81]</td></tr>
<tr><td>Refused to drink when asked by others</td><td>1.27 [0.76, 2.13]</td><td>1.19 [0.74, 1.92]</td><td>2.08 [1.29, 3.35] p<0.01</td><td>1.50 [0.91, 2.46]</td></tr>
<tr><td>Drank last 30 days</td><td>1.29 [0.67, 2.49]</td><td>2.31 [1.31, 4.07] p<0.01</td><td>1.49 [0.80, 2.80]</td><td>1.25 [0.76, 2.06]</td></tr>
<tr><td>Drank last 3 months</td><td>1.87 [0.81, 4.30]</td><td>1.76 [1.12, 2.77] p<0.05</td><td>1.65 [0.98, 2.79]</td><td>1.22 [0.79, 1.89]</td></tr>
<tr><td>Binged last 3 months</td><td>3.44 [1.07, 11.01] p<0.01</td><td>3.00 [1.44, 6.24] p<0.05</td><td>4.71 [1.55, 14.30] p<0.01</td><td>2.86 [1.13, 7.26] p<0.05</td></tr>
<tr><td rowspan="9">(Ockene et al., 1999)</td><td rowspan="9">Level III-1: quasi-RCT
Quality: average</td><td rowspan="9">Primary care internists (n=45) Massachusetts, USA</td><td rowspan="9">Intervention 1:
Training program for physician-delivered nutrition counselling
Intervention 2:
Training program + office - support program (including office prompts, algorithms, simple dietary assessment tools)</td><td colspan="6">Change in patient outcomes from baseline to 12 months follow-up, least squares means [c]</td></tr>
<tr><td>Patient outcome</td><td>Control</td><td>1 - Counselling training</td><td>2 - Counselling training + office-support</td><td>Mean difference between 1 and 2 [d]</td><td>p-value [e]</td></tr>
<tr><td>SFA, % energy</td><td>0.0</td><td>-0.4</td><td>-1.1</td><td>-1.1</td><td>0.01</td></tr>
<tr><td>Weight, kg</td><td>0.0</td><td>-1.0</td><td>-2.3</td><td>-2.3</td><td><0.001</td></tr>
<tr><td>LDL cholesterol,</td><td>-0.01</td><td>0.02</td><td>-0.11</td><td>-0.10</td><td>0.10</td></tr>
<tr><td>Total fat, % energy</td><td>-0.7</td><td>-1.0</td><td>-2.3</td><td>1.6</td><td>0.11</td></tr>
<tr><td>Total cholesterol, mmol/L (mg/dL)</td><td>0.03</td><td>0.05</td><td>-0.10</td><td>-0.12</td><td>0.07</td></tr>
<tr><td>HDL cholesterol, mmol/L (mg/dL)</td><td>-0.02</td><td>0.01</td><td>0.01</td><td>0.03</td><td>0.09</td></tr>
<tr><td>Triglycerides, mmol/L (mg/dL)</td><td>0.12</td><td>-0.06</td><td>-0.01</td><td>-0.13</td><td>0.03</td></tr>
</table>

				Total-cholesterol - HDL ratio	0.1	0.1	-0.1	-0.2	0.004

[a] Priming involved 15-minute audio-taped "patient-priming" program on alcohol risk behaviours; [b] Controlling for cohort, physician sex, office location, adolescent age, sex, ethnicity etc; [c] Mixed effects model ANOVA adjusted for age, gender and education; [d] Post-intervention (after scores) data not reported, only baseline and change scores reported; [e] T-test compared least squares means for intervention group 1 and 2; CI = confidence intervals; HDL = high-density lipoprotein; LDL = low-density lipoprotein; NS = not significant; OR = odds ratio; SFA = saturated fatty acids; RCT = randomised controlled trial.

Table 59. Effectiveness of multi-disciplinary (integrated care) interventions – Patient outcomes

Reference	Level and quality of evidence	Target population	Intervention	Patient outcomes (health status)							
(Diabetes Integrated Care Evaluation Team, 1994)	Level III-1: quasi-RCT Quality: average	Hospital diabetic clinic, general practice groups (n=3), Adult diabetic patients (n=274) attending a hospital clinic and registered w one of 3 general practices Grampian, Scotland	Computer-coordinated integrated care (general practice plus hospital diabetes clinic)	**Patients' metabolic control, mean ± SD**							
				Metabolic control indicators	**Conventional care**			**Integrated care**			**Effect measure**
					Before n≥103	**After** n≥106	**% change**	**Before** n≥117	**After** n≥120	**% change**	**Relative change**
				Glycated haemoglobin [a] (%)	5.3±1.4	5.3±1.7	0	5.3±1.4	5.3±1.7	0	0
				Body mass index	28.3±5.6	27.9±4.5	-1.4	27.6±8.5	28.7±7.6	+4.0	2.9
				Creatinine (mol/l)	90.4±26.3	100.6±29.8	+11.3	88.9±19.1	102.2±28.8	+15.0	1.3
				Systolic blood pressure (mm Hg)	153.9±24.8	156.4±25.7	+1.6	155.9±27.1	161.5±25.1	+3.6	2.2
				Diastolic blood pressure (mm Hg)	84.8±11.5	83.5±9.9	-1.5	85.6±15.6	84.3±11.1	+0.6	0.4

[a] The comparison between the study groups on glycated haemoglobin for which we had baseline information on a different scale from that collected at final review, was performed by analysis of covariance, the means reported were adjusted at the mean level of the baseline scale; RCT = randomised controlled trial; SD = standard deviation.

Table 60. Effectiveness of alternative care approach – Process outcomes

Reference	Level and quality of evidence	Target population	Intervention	Process outcomes (practitioners' behavioural change)							
(Sikka et al., 1999)	Level II: RCT Quality: average	Primary care physicians Adult diabetic patients (n=133) Jacksonville Health Care Group, Florida, USA	Nurse case management conducted by a registered nurse / certified diabetes educator trained to follow diabetes management algorithms	**Renal assessment rates, % of patients**							
					Usual care n=50			**Nurse Case Management** n=51			**Effect measure p-value**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change**
				Quantitative protein/microalbumin	18.0	32.0	+14.0	25.6	52.9	+27.3	1.95 p<0.05
				Dipstick test	70.0	58.0	-12.0	68.6	51.0	-17.6	1.6
				Follow-up test in eligible patients [a]	28.1	51.9	+23.8	33.3	80.7	+47.4	2.0 p<0.05
(Campbell et al., 1998; Raftery, Yao, Murchie, Campbell, & Ritchie, 2005)	Level II: RCT Quality: average	General practices (n=19) Patients <80 years diagnosed with coronary heart disease, (n=1,265) Grampian, Northeast Scotland	Nurse-run clinics implemented in general practice that promote medical and lifestyle secondary prevention for coronary heart disease	**Effect of nurse-run clinics compared to control, OR [95% CI]**							
				Appropriate [b] secondary prevention	**Nurse-run clinic OR [95% CI]**						**p-value [c]**
				Aspirin management	3.22 [2.15, 4.80]						<0.001
				Blood pressure management	5.32 [3.02, 9.41]						<0.001
				Lipids management	3.19 [2.39, 4.26]						<0.001
				Moderate physical activity	1.67 [1.23, 2.26]						0.001
				Low fat diet	1.47 [1.10, 1.96]						0.009
				Non-smoking	0.78 [0.47, 1.28]						0.322
				Cumulative score of secondary prevention for nurse-run clinic							
				Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value**	
				3.23	3.29	1.9	3.31	3.89	17.5	9.2 p<0.001	

[a] Eligible patients for follow-up quantitative protein/microalbumin tests were those with negative dipstick or without baseline dipstick test; [b] Appropriate treatment according to relevant clinical practice guidelines; [c] Controlling for baseline, age, sex, practice; CI = confidence intervals; OR = odds ratio; RCT = randomised controlled trial.

Table 61. Effectiveness of continuous quality improvement – Process outcomes

Reference	Level and quality of evidence	Target population	Intervention	Process outcomes (practitioners' behavioural change)					
(Rantz et al., 2001)	Level: III-1: quasi-RCT Quality: Average	Nursing facilities (n=113), nursing home residents, Missouri, USA	Assessed 2 quality improvement (QI) interventions: *Intervention 1:* workshop to teach staff about QI and how to use QI report (feedback) that receive quarterly throughout study *Intervention 2:* workshop and QI feedback reports plus additional consultation support by clinical nurse specialist to assist facilities in interpreting QI report	**Quality indicator scores, mean**					
				Quality indicator outcome measures	**Control** n=33	**QI workshop + feedback** n=37		**QI workshop + feedback plus Clinical Consultation** n=36	
					% change [a]	**% change** [a]	**Relative change**	**% change** [a]	**Relative change p-value**
				Incidence of new fracture	-35.5	-43.3	1.2	-35.3	1.0
				Prevalence of falls	-2.6	+1.5	0.6	-10.0	3.8 p≤0.1
				Prevalence of behavioural symptoms affecting others	+9.0	-9.4	1.0	-3.6	0.4 p≤0.1
				Use of 9 or more different medications	+20.0	-20.9	1.1	+14.4	0.7
				Prevalence of occasional or frequent bladder or bowl incontinence without a toileting plan	-3.0	-16.6	5.5	-15.2	5.1
				Prevalence of indwelling catheters	+41.2	-33.3	0.8	+13.0	0.3
				Prevalence of fecal impaction	+22.6	-10.0	0.4	-43.5	1.9
				Prevalence of weight loss	-9.5	-23.1	2.4	+9.3	1.0
				Prevalence of bedfast residents	+23.9	-39.1	1.6	-5.1	0.2
				Prevalence of daily physical restraints	-1.9	-22.2	11.7	-9.5	5.0
				Prevalence of little or no activity	-8.0	-27.3	3.4	-17.4	2.2 p≤0.1
				Prevalence of stage 1-4 pressure ulcers	-1.1	-28.6	26.0	+4.1	3.7 p≤0.1

				Prevalence of stage 1-4 pressure ulcers (low risk)	-6.9	-6.1	0.9	+8.0	1.2 p≤0.1
(Irvine Doran et al., 2002)	Level III-1: quasi-RCT Quality: poor	Health care professionals (n=149) in 25 CQI health care teams, Ontario, Canada	*CQI intervention*: CQI education, patient care training, conflict management, application of CQI in clinical practice	**Change in behaviour and CQI knowledge, mean±SD**					
				Control (delayed intervention) n=10 teams			**CQI intervention** n=15 teams			**Effect measure [c]**
				Before	**After [b]**	**% change**	**Before**	**After [b]**	**% change**	**Relative change**
				CQI knowledge scores [d]						
				49.6±7.2	62.3±6.0	+25.6	52.6±9.3	64.1±7.6	+21.9	0.9
				Functional group interaction scores [e]						
				3.3±0.2	3.3±0.2	0	3.2±0.4	3.4±0.3	+6.3	NE
				Dysfunctional group interactions scores						
				3.9±0.2	4.0±0.2	+2.6	3.9±0.2	3.9±0.2	0	0
				Team success at improving patient outcomes and processes of care [f]						
						Success rating				
						Improved outcome mean±SD		**No improved outcome mean±SD**		**p-value [g]**
				Change in CQI knowledge		10.6±6.3		13.0±7.7		NS
				Change in functional group interaction [h]		0.1±0.1		0.1±0.2		NS
				Change in dysfunctional group interaction		0.0±0.2		0.1±0.2		NS

[a] before and after scores not provided due to space restrictions; analysis by logistic regression and adjustments using GEE method; [b] 3 months after intervention, before delayed intervention (control); [c] Repeated measures ANOVA – differences compared to baseline for CQI knowledge and MANOVA for group interactions; [d] CQI knowledge measured using newly-developed 36-item instrument; [e] measured using scale of effective group interactions (Watson and Michaelsen); [f] Effect of changes in CQI knowledge, functional group interactions and team problem-solving effectiveness on improvement in patient outcomes and processes of care – rated by independent reviewers; [g] independent samples t-test between successful and unsuccessful teams; [h] groups differed significantly at baseline, therefore statistical analysis of between-group differences in 'change from baseline' are not provided (potentially misleading); CQI = continuous quality improvement; NE = not estimable; NS = not statistically significant (p>0.05); RCT = randomised controlled trial; SD = standard deviation.

Table 62. Effectiveness of mail outs – Process outcomes

Reference	Level and quality of evidence	Target population	Intervention	Process outcomes (change in organisational structure or efficiency)	
(Matowe et al., 2002)	Level III-3: Interrupted time series with no control Quality: Good	376 general practitioners, 87 practices, Grampian, Scotland	Postal dissemination of Royal College of Radiologists (RCR) Guidelines on general practitioner referrals for radiography	**Change in radiography referrals per month after guidelines, absolute change [95% CI]**	
				Radiology examinations	**Effect measure [a] Absolute change [95% CI]**
				Total examinations	-32.0 [-226.8, 291.5]
				Abdominal ultrasound	3.8 [-28.3, 58.9]
				Ankle x-rays	4.0[-5.8, 13.9]
				Barium meals	13.5 [23.1, 50.2]
				Chest x-rays	35.0 [-62.1, 132.1]
				Cervical spine x-ray	-5.1 [-31.8, 20.9]
				Foot and toe x-ray	1.2 [-10.8, 13.1]
				Hand and finger x-rays	1.7 [-10.7, 14.1]
				Hip x-rays	-9.3 [-25.8, 7.2]
				Kidney, ureters and bladder	27.0 [-70.9, 64.8]
				Knee x-rays	2.8 [-22.1, 27.8]
				Lumbar spine x-rays	-7.7 [-24.7, 40.2]
				Pelvic ultrasound	4.9 [-14.4, 24.3]
				Pelvis x-rays	30.6 [0,61.2]
				Shoulder x-rays	-4.6 [-15.9, 6.7]
				Sinus x-rays	-3.1 [-11.4, 5.2]
				Testicular ultrasound	-6.8 [-19.8, 6.1]
				Thoracic spine x-rays	-5.8 [-16.0, 4.4]

[a] time series regressions were used to estimate effects; CI = confidence intervals.

Table 63. Effectiveness of multi-faceted interventions – Process outcomes

Reference	Level and quality of evidence	Target population	Intervention	Process outcomes (practitioners' behavioural change)							
(Langham et al., 2002)	Level II: Cluster RCT Good quality	17 general practices London UK	*Information:* training and support for organisation of patient information *Evidence:* training and support for accessing and interpreting evidence *Information and evidence*	**Recorded risk factors, % of patients**							
					Control n=254	**Information only** n=257		**Evidence only** n=240		**Information & evidence** n=223	
					Mean % change [a] [95% CI]	**Mean % change [a] [95% CI]**	**Relative change**	**Mean % change [a] [95% CI]**	**Relative change**	**Mean % change [a] [95% CI]**	**Relative change**
				Smoking status	-5.4 [-25.7, 15.0]	-5.2 [-16.0, 5.6]	1.0	-1.2 [-14.1, 12.1]	0.2	+13.7 [-6.5, 34.0]	2.5
				Blood pressure	-16.2 [-30.7, -1.7]	-1.1 [-23.1, 20.8]	14.7	-14.1 [-48.7, 20.5]	0.9	+0.7 [-33.0, 34.3]	0.0
				Cholesterol	+12.3 [-9.1, 33.8]	+11.5 [5.3, 17.8]	1.1	+7.2 [-8.1, 22.4]	0.6	+22.5 [7.9, 37.2]	1.8
				All risk factors	+6.5 [-8.1, 21.3]	+6.6 [-14.5, 27.7]	1.0	+7.2 [-19.4, 33.9]	1.1	+19.9 [0.5, 39.3]	3.1
				Prescribing behaviour, % of patients receiving medication							
				Aspirin	+3.4 [-0.5, 7.3]	-8.7 [-23.8, 6.4]	2.6	-2.2 [-10.5, 6.1]	0.6	+2.0 [-11.3, 15.3]	0.6
				Anti-hypertensives	-16.7 [-61.0, 27.6]	-22.5 [-70.8, 25.8]	1.4	-9.3 [-24.6, 13.2]	0.6	-27.3 [-48.6, -5.9]	1.6
				Lipid-lowering agents	+3.0 [-1.7, 7.7]	+6.0 [-0.5, 12.5]	2.0	+4.0 [-30.4, 11.8]	1.3	+4.4 [1.3, 7.5]	1.5
(Young et al., 2002)	Level II: Cluster RCT Good quality	Family Physicians (n=60), in practices (n=39), Patients attending family practices (n=1,241) Australia	Academic detailing; audit and feedback; resources (patient and practice-based) 1. Educational outreach (core) 2. Audit and feedback 3. Patient education materials	**Changes in smoking cessation advice, posttest v baseline OR [95% CI] [b]**							
					Control n=982			**Multifaceted Intervention** n=745			
				Asked about smoking status (all patients) [c]	1.67 [1.60, 1.75]			1.74 [1.31, 2.31]			
				Advise smoker to quit	1.76 [0.78, 3.98]			1.92 [1.06, 3.49]			
				Discuss health risks of smoking	1.73 [0.80, 3.72]			2.60 [1.43, 4.74]			
				Discuss passive smoking	2.17 [0.94, 1.61]			2.49 [0.90, 6.88]			
				Provide practical advice	1.19 [0.55, 2.58]			2.81 [1.46, 5.41]			

				Set a "quit date"	2.28 [0.94, 5.52]	4.96 [1.85, 13.32]
				Provide written materials	1.72 [0.65, 2.58]	6.49 [2.51, 16.76]
				Recommend nicotine gum	0.52 [0.22, 1.24]	5.31 [2.68, 10.51] p<0.001
				Recommend nicotine patches	0.66 [0.32, 1.38]	2.70 [1.44, 4.40] p<0.01
				Arrange follow-up appointment	3.44 [0.74, 2.77]	4.85 [1.36, 17.3]
				Refer to a smoking clinic	1.23 [0.20, 7.48]	1.68 [0.33, 8.48]
				Document smoking status (all patients) [d]	2.88 [1.18, 7.04]	2.47 [1.75, 3.50]
				Document smoking cessation advice	1.40 [0.41, 4.79]	3.33 [1.39, 7.97]

				Proportion of patients for whom each and all recommendations of the CPGs were fulfilled, %			
(Bekkering et al., 2005)	Level II: Cluster RCT Average quality	Physiotherapists (n=113), patients referred for low back pain (n=500), private practices (n=68) Netherlands	CPGs; education; discussion; role playing; feedback; reminders 1. Local consensus processes 2. Educational meetings 3. Audit and feedback 4. Prompts and reminders	Recommendation	**CPGs only** n=253	**Multifaceted Intervention** n=247	**Effect measure [e] OR [95% CI]**
				Limit number of sessions in normal course	13.0	27.0	2.39 [1.12, 5.12]
				Set functional treatment goals	71.0	79.0	1.99 [1.06, 3.72]
				Use mainly active ingredients	60.0	77.0	2.79 [1.19, 6.55]
				Give adequate information	87.0	96.0	3.59 [1.35, 9.55]
				All four recommendations	30.0	42.0	2.05 [1.15, 3.65]
(Foy et al., 2004)	Level II: Cluster RCT Poor quality	Hospital gynaecology units providing induced abortion care (n=26), women patients undergoing induced abortion Scotland	Audit and feedback; educational meetings; dissemination of structured case records; promotion of patient information booklet *intervention based on Theory of Planned Behaviour 1. Audit and feedback 2. Educational meetings 3. Patient education materials	**Gynaecologists' compliance with CPG recommendations, % mean unit compliance ±SD**			
				Recommendation (total number eligible cases)	**Printed CPG summary**	**Multifaceted Intervention**	**Effect measure [e] OR [95% CI]**
				Appointment with gynaecologist within 5 days of referral (n=1430)	40.5±18.3	35.5 ±17.1	0.89 [0.50, 1.58]
				Ascertainment of cervical cytology history (n=1074)	60.2 ±32.1	58.5 ±29.2	0.93 [0.36, 2.40]
				Offer of contraceptive supplies if required prior to discharge (n=1474)	73.0 ±24.9	72.1 ±17.7	1.11 [0.48, 2.53]
				Antibiotic prophylaxis or screening for lower genital tract organisms (n=1474)	96.5 (90.1-98.6) [j]	100 (95.2-100) [j]	1.70 [0.71, 5.99]

				Misoprostol cost effective alternative to gemeprost (n=1472)	100 (97.3-100) [f]	100 (86.5-100) [f]	1.00 [0.27, 1.77]
(Forsetlund et al., 2003)	Level II: RCT Good quality	Public health physicians working municipalities with more than 3000 inhabitants Norway	Workshop + newsletter + access to information service, databases and electronic discussion list Multifaceted intervention: 1. Educational materials 2. Educational meetings 3 Behavioural training 4 Discussion list 5 Tailored services *Control group:* Access to library services only	**Physicians' use of research information in practice, mean score±SD [g]**			
					Access to library services [h] n=75	**Multifaceted intervention [h]** n=73	**p-value [i]**
				Hypothetical assignment n=50	1.8±1.2	2.1±1.3	0.154
				Additional questions n=46	1.7±1.0	2.2±1.4	0.063
				Self-reported searching of Cochrane and Medline, % of physicians			
					Access to library services [h] n=60	**Multifaceted intervention [h]** n=55	**Effect Measure Chi-square**
				Searched Cochrane	38.3	61.8	6.3 p=0.01
				Searched Medline	53.3	56.4	0.1 p=0.74
				Change in knowledge, mean ±SD			
					Access to library services [h] n=61	**Multifaceted intervention [h]** n=58	**Mean difference [95% CI]**
				Source knowledge	0.7±0.5	1.1±0.6	0.4 [0.2, 0.6]
				Concept knowledge	1.1±0.4	1.3±0.4	0.2 [0.0, 0.3]
(Frijling et al., 2002)	Level II: RCT Good quality	General practitioners Netherlands	Education Feedback Feedback and support, including education and guidance from a facilitator	**GPs' compliance with recommendations, compliance rate % based on number of decisions**			
					Control n=62		**Multi-faceted intervention** n=61			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change OR [95% CI] [j]**
				Foot exam	39.0	48.0	+8.0	43.0	62.0	+19.0	2.4 1.7 [1.2, 2.4] p=0.004
				Eye exam	67.0	65.0	-2.0	70.0	79.0	+9.0	4.5 1.5 [1.1, 2.2] p=0.02

				Medication review	61.0	66.0	+5.0	65.0	73.0	+8.0	1.6 1.5 [1.0, 2.3] p<0.05
				BP measurement	92.0	95.0	+3.0	94.0	97.0	+3.0	1.0 1.3 [0.7, -2.5] p=37
				Medication change	37.0	47.0	+10.0	33.0	44.0	+11.0	1.1 1.1 [0.7, 1.9] p=0.61
				Schedule follow-up	70.0	65.0	-5.0	70.0	66.0	-4.0	0.8 1.0 [0.7, 1.5] p=0.81
				BMI review	59.0	64.0	+5.0	62.0	66.0	+4.0	0.8 1.0 [0.7, 1.5] p=0.96
(Frijling et al., 2003)	Level II: RCT Good quality	124 general practices Netherlands	Educational outreach Feedback	**Change in compliance rates [k], %**							
					Control Mean % change [95% CI] [l]		**Intervention Mean % change [95% CI] [l]**		**Effect measure Relative change OR [95% CI] [m]**		
				Newly diagnosed hypertension							
				Assess risk factors	0.0 [-6.0, 6.0]		-2.0 [-9.0, 5.0]		NE 1.1 [0.8, 1.5]		
				Provide information/advice	-1.0 [-10.0, 8.0]		5.0 [-6.0, 16.0]		5.0 1.3 [0.9, 1.9]		
				Treated hypertension							
				Provide information/advice	-3.0 [-8.0, 2.0]		5.0 [-1.0, 10.0]		1.7 1.6 [1.4, 1.8]		
				Increase anti-hypertensive medication	4.0 [-3.0, 11.0]		8.0 [-1.0, 16.0]		2.0 0.9 [0.6, 1.2]		
				Schedule follow-up	0 [-5.0, 5.0]		1.0 [-4.0, 6.0]		NE 1.0 [0.8, 1.2]		
				Hypercholesterolemia							
				Assess risk factors	2.0 [-2.0, 5.0]		5.0 [2.0, 8.0]		2.5 2.0 [1.4, 2.9]		

				Provide information/advice	0.0 [-6.0, 6.0]	7.0 [1.0, 13.0]	NE 1.6 [1.2, 2.1]
				Angina pectoris			
				Assess risk factors	0.0 [-7.0, 6.0]	8.0 [2.0, 15.0]	NE 3.1 [1.1, 8.8]
				Provide information/advice	-9.0 [-23.0, 4.0]	-7.0 [-18.0, 4.0]	0.8 1.0 [0.6, 1.7]
				Prescribe aspirin and sublingual nitrate	1.0 [-14.0, 17.0]	10.0 [-1.0, 21.0]	10.0 1.4 [0.9, 2.4]
				Heart failure			
				Monitor clinical signs of deterioration	-7.0 [-17.0, 2.0]	12.0 [0.0, 25.0]	1.7 4.1 [2.2, 7.8]
				Provide information/advice	6.0 [-2.0, 15.0]	0.0 [-8.0, 8.0]	0.0 [0.9 [0.4, 1.7]

(Margolis et al., 2004)	Level II: RCT Good quality	Private paediatric and family practices in 2 regions North Carolina	Continuing education (academic detailing; mini-lectures) + process improvement (PSDA cycle) methods to implement office systems including audit & feedback, tools including flow sheets 1. Educational meetings (interactive CME) (core) 2. Educational outreach 3. Audit and feedback	**Proportion of patients receiving all age appropriate preventive services [n], %**					
					Control practices n=22		**Multifaceted intervention practices** n=22		**Effect measure**
				Time from baseline	**% children with all services**	**Ratio of change from baseline**	**% children with all services**	**Ratio of change from baseline**	**Ratio of intervention v control [o] [95% CI]**
				12 months	9		7		
				18 months	10	1.0	17	2.5	2.4 [0.9, 6.5]
				24 months	10	1.1	28	4.2	4.1 [1.4, 10.7]
				30 months	10	1.1	34	5.1	4.6 [1.6, 13.2]

(Schectman et al., 2003)	Level II: RCT Good quality	14 group practices 106 clinicians Washington	Educational session with local opinion leader Audit and feedback	**Use of clinical services, % patients based on episode of care**							
					Control n=20 clinicians			**Multifaceted intervention** n=20 clinicians			**Effect measure**
				Total use of services							
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change**
				Lumbosacral spine x-ray	21.0	18.0	-3.0	31.0	19.0	-12.0	4.0
				Physical therapy referral	13.0	13.0	0.0	12.0	10.0	-2.0	NE
				Lumbosacral CT or MRI	5.6	7.1	+1.5	7.6	5.6	-2.0	1.3

				Specialty referral	5.9	7.1	+1.2	12.0	8.6	-3.4	2.8
				1 or more of above	33.0	32.0	-1.0	41.0	31.0	-10.0	10.0
				Overall change in use							p=0.042
				Use inconsistent with guidelines							
				Lumbosacral spine x-ray	8.2	8.6	+0.4	14.5	8.1	-6.4	16.0
				Physical therapy referral	10.9	12.0	+1.1	10.0	9.2	-0.8	0.7
				Lumbosacral CT or MRI	3.5	5.4	+1.9	5.7	3.5	-2.2	1.2
				Specialty referral	4.0	5.6	+1.6	9.5	7.1	-2.4	1.5
				1 or more of above	21.5	24.3	+2.8	29.9	21.2	-8.7	3.1
				Overall change in consistency with guidelines							p=0.046

(Searle et al., 2002)	Level II: RCT Average quality	Specialists and trainees providing services in 6 public teaching hospital gynaecology units with 12,000-13,000 relevant procedures per year, and women patients <40 years of age Adelaide, Australia	CPGs; problem-based interactive workshop; opinion leader; printed educational materials (laminated algorithm and guidelines) *Multi-faceted intervention:* 1. Educational meetings (core) 2. Educational materials 3. Opinion Leaders 4. Local consensus processes Control: Educational materials alone	**Number of hysteroscopies and D&Cs performed, number across 6-month period**							
				Educational material n=28 specialists			**Multifaceted intervention n=16 specialists**			**Effect measure**	
				Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change**	
				395	277	-29.9	304	288	-5.3	0.2 NS	
				Performance with clinical scenarios, awareness scores median (range) [P]							
				Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change**	
				1 (0-3)	1 (0-3)	0	1 (0-3)	1 (0-2)	0	0 NS	
				Perceived referral/booking rates for hysteroscopies and D&Cs per doctor, median (range) [P]							
				Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change**	
				25 (8-100)	25 (10-85)	0	30 (10-75)	25 (7-75)	-83.3	0 NS	
(Heller et al., 2001)	Level III-1: quasi-RCT	36 hospitals Patients	Local opinion leader Feedback	**Management of unstable angina, % of patients**							
					Control		**Opinion leader & feedback**				

	Good quality	admitted with unstable angina			**Before**	**After**	**% change OR [95% CI]**	**Before**	**After**	**% change OR [95% CI]**	**Relative change OR [95% CI] [q]**
				Aspirin	84.0	83.0	-1.0 0.9 [0.6, 1.3]	82.0	85.0	+3.0 [1.2 [0.9, 1.5]	3.0 1.1 [0.7, 1.8]
				Heparin	69.0	77.0	+8.0 1.6 [1.1, 2.4]	72.0	64.0	-8.0 0.7 [0.2, 2.0]	1.0 0.5 [0.3, 1.2]
				Aspirin + heparin	62.0	68.0	+6.0 1.3 [1.0, 1.8]	63.0	57.0	-6.0 0.8 [0.4, 1.6]	1.0 0.6 [0.3, 1.3]
				Beta-blockers	49.0	51.0	+2.0 1.1 [0.9, 1.4]	46.0	57.0	+11.0 1.6 [1.1, 2.2]	5.5 1.3 [0.9, 2.0]
				Calcium channel blockers	53.0	47.0	-6.0 0.7 [0.7, 0.9]	54.0	41.0	-13.0 0.6 [0.4, 0.8]	2.2 0.8 [0.6, 1.0]
				Nitrates	NA	NA	0.8 [0.6, 1.1]	NA	NA	0.6 [0.4, 0.9]	0.9 [0.6, 1.4]
				Coronary angiography	NA	NA	1.5 [0.8, 2.6]	NA	NA	1.2 [0.9, 1.6]	0.8 [0.3, 2.3
				Echo-cardiography	NA	NA	1.0 [0.5, 1.9]	NA	NA	1.0 [0.7, 1.4]	0.7 [0.3, 1.5]
				Rehabilitation	NA	NA	0.8 [0.4, 1.4]	NA	NA	0.9 [0.5, 1.8]	1.3 [0.6, 2.6]
(Lemelin et al., 2001)	Level III-1: quasi-RCT Good quality	46 primary care practices Ontario Canada	*Facilitated intervention* Facilitators visited practices, using 7 interventions (audit and feedback; consensus processes; opinion leaders; educational outreach; educational materials; reminders; patient-mediated interventions) to improve preventive care	**Reported preventive care abstracted from patient chart, mean % eligible patients**							
					Control			**Facilitated intervention**			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value [r]**
				Recommended practice [s]							
				Folic acid supplementation	9.3	12.9	+3.6	6.9	21.6	+14.7	4.1 p<0.05
				Smoking cessation counselling	40.5	38.7	-1.8	37.6	41.2	+3.6	2.0 NS
				Hypertension management	65.9	81.7	+15.8	82.2	79.7	-2.5	0.2 p<0.01

				Mammography (women 50-69 years)	53.4	58.7	+5.3	53.6	67.5	+13.9	2.6 NS
				STD screening	21.7	20.6	-1.1	14.2	21.6	+7.4	6.7 NS
				Pap smear	57.9	59.1	+1.2	60.8	66.2	+5.4	4.5 NS
				Influenza vaccination	49.4	53.4	+4.0	46.1	64.8	+18.7	4.7 p<0.05
				Blood pressure measurement	69.9	72.4	+2.5	68.6	75.1	+6.5	2.6 NS
				Overall up-to-datedness	54.6	57.4	+2.8	52.3	62.3	+10.0	3.6 p<0.01
				Inappropriate practices [t]							
				Proteinurea screening	24.8	24.7	-0.1	21.4	13.5	-7.9	79.0 p<0.01
				Blood glucose screening	26.1	33.7	+7.6	25.4	27.9	+2.5	0.3 p<0.05
				Prostate-specific antigen testing	20.5	24.6	+4.1	16.7	28.4	+11.7	2.9 NS
				Chest radiography	5.2	5.0	-0.2	2.4	3.9	+1.5	7.5 NS
				Mammography (women 40-49 years)	5.5	9.9	+4.4	12.3	12.0	-0.3	0.1 NS
				Overall inappropriateness	22.5	25.5	+3.0	20.5	19.1	-1.4	0.5 p<0.05
				Overall preventive performance	32.1	31.9	-0.2	31.9	43.2	+11.3	56.5 p<0.001
(Philbin et al., 2000)	Level III-1: quasi-RCT Good quality	10 hospitals Patients diagnosed with heart failure New York	Interdisciplinary team approach CME Patient educational material Feedback	**Compliance with care pathway – documentation of actions, % of patients**							
					Control			**Multifaceted intervention**			**Effect measure**
					Before n=640	**After** n=664	**% change**	**Before** n=762	**After** n=840	**% change**	**Relative change Intervention effect [95% CI]** [u]
				Primary aetiology of heart failure	75.0	73.0	-2.0	69.0	76.0	+7.0	3.5 10.0 [-7.0, 26.0]

				Left ventricular systolic function	67.0	77.0	+10.0	65.0	63.0	-2.0	0.2 -12.0 [-27.0, 2.0]
				Dietary counselling	74.0	78.0	+4.0	68.0	73.0	+5.0	1.3 1.0 [-22.0, 23.0]
				ACE inhibitor prescribed (all patients)	64.0	66.0	+2.0	57.0	63.0	+6.0	3.0 4.0 [-14.0, 23.0]
				ACE inhibitor prescribed (ideal patients)	79.0	83.0	+4.0	79.0	78.0	-1.0	0.3 -7.0 [-20.0, 5.0]
(Sanci et al., 2000)	Level III-1: quasi-RCT Good quality	105 general practitioners Melbourne	Educational strategies (workshop, materials, feedback, opinion leaders, office systems)	**Change in skills, competency and knowledge, mean [95% CI]**							
					Control n=51			**Multifaceted intervention n=54**			**Effect measure**
					Before	**Difference after 7 months**		**Before**	**Difference after 7 months**		**p-value [a]**
				Observer competence	51.8 [45.9, 57.6]	2.6 [-3.0, 8.1]		48.8 [46.2, 51.4]	15.3 [11.1, 19.5]		p<0.01
				Observer risk assessment	53.3 [49.4, 57.2]	0.5 [-3.0, 4.1]		50.7 [44.2, 57.2]	9.9 [5.8, 14.0]		p<0.03
				Self-perceived competency – comfort (process)	71.1 [66.4, 75.8]	0.2 [-3.5, 4.0]		71.8 [69.7, 73.9]	7.1 [4.7, 9.4]		p<0.03
				Self-perceived competency – comfort (substantive)	58.1 [52.3, 63.9]	0.3 [-5.1, 5.6]		60.5 [56.1, 64.8]	15.8 [13.8, 17.8]		p<0.01
				Knowledge and skill (process)	55.9 [50.4, 71.5]	0.7 [-4.0, 5.3]		66.3 [63.6, 69.1]	15.6 [12.1, 19.2]		p<0.01
				Knowledge and skill (substantive)	52.1 [44.5, 59.7]	2.8 [-2.0, 7.6]		57.5 [53.8, 61.2]	20.6 [18.2, 22.9]		p<0.01
				Self-rating on taped consultation	56.6 [52.7, 60.5]	3.1 [0.6, 5.6]		56.9 [55.7, 58.1]	17.8 [15.9, 19.7]		p<0.01
				Knowledge test	33.1 [31.6, 35.0]	3.1 [0.6, 5.6]		32.8 [31.6, 34.0]	14.6 [13.0, 16.2]		p<0.01
(Nilsson et al., 2001)	Level III-1: quasi-RCT Average quality	3 established CME groups (n of GPs=23); 6 health care centres (n of GPs=27), Northwest Health Care	Feedback; problem-oriented educational outreach visits; educational material; local opinion leaders 1. Feedback (core) 2. Outreach visits 3. Educational materials	**GPs' prescribing rates, mean % of prescribed defined daily doses (DDDs) [95% CI]**							
					Control			**Multifaceted intervention**			**Effect measure [b]**
				Pharmaco-therapeutic field and drug group	**Before [95% CI]**	**After [95% CI]**	**% change**	**Before [95% CI]**	**After [95% CI]**	**% change**	**Relative change [95% CI]**
				Hypertension [c]							

		District, Stockholm County Sweden	4. Opinion leaders	Diuretics	48.7 [44.6, 52.8]	45.5 [41.0, 50.0]	-3.2	43.5 [40.4, 46.6]	43.2 [39.8, 46.6]	-0.3	0.1 [-2.2, 8]
				Beta-blocking agents	27.2 [23.2, 31.2]	26.5 [23.5, 29.6]	-0.6	24.2 [20.8, 27.5]	25.8 [21.0, 30.6]	1.6	2.7 [-1.3, 5.9]
				Calcium channel blockers	12.6 [9.4, 15.9]	13.5 [10.8, 16.3]	+0.9	16.9 [13.8, 20.0]	15.4 [13.0, 17.9]	-1.5	1.7 [-6.3, 1.6]
				Agents acting on rennin-angiotensin system	10.9 [8.2,13.6]	14.1 [10.5, 17.8]	+3.1	15.0 [11.4, 18.6]	14.8 [11.3, 18.3]	-0.2	0.1 [-6.8, 0] p=0.047
				Peptic ulcer/dyspepsia [x]							
				Proton-pump inhibitors	68.1 [62.2, 74.0]	76.0 [70.5,81.6}	+7.9	61.0 [24.3, 79.8]	52.6 [28.6, 76.6]	-8.4	1.1 [-36.3, 3.7]
				H2-receptor antagonists	30.2 [23.7, 36.7]	23.3 [17.8, 28.9]	-6.8	37.8 [19.6, 55.9]	44.9 [20.2, 69.6]	7.1	1.0 [-7.8, 35.3]
				Depression [y]							
				Tricyclic antidepressants	15.8 [12.6, 18.9]	18.1 [12.8, 23.4]	+2.3	15.3 [5.7, 24.9]	15.4 [8.4, 22.4]	+0.1	0 [-13.7, 9.2]
				Selective serotonin reuptake inhibitors	81.7 [78.1, 85.3]	78.8 [72.3, 85.3]	-2.9	82.1 [71.5, 92.7]	82.6 [76.2, 89.1]	+0.5	0.2 [-8.8, 15.7]
(Flottorp et al., 2003)	Level III-1: quasi-RCT Poor quality	142 general practices Norway	Electronic and printed educational materials Decision support system reminders Interactive course Financial incentive	**Physicians' practices, % of practices**							
				Sore throat							
					Control (Urinary Tract Infection)			**Multifaceted intervention**			**Effect measure**
					Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value** [z]
				Use of antibiotics	50.8	49.5	-1.3	48.1	43.8	-4.3	3.3 p=0.03
				Use of lab tests	41.9	39.7	-2.2	44.6	42.0	-2.6	1.2 p=0.64
				Use of telephone consultations	12.5	14.1	+1.6	12.5	12.9	+0.4	0.3 p=0.13
				Urinary tract infection							
					Control (Sore throat)			**Multifaceted intervention**			

				Use of antibiotics	43.2	43.4	+0.2	46.5	46.3	-0.2	1.0 p=0.64
				Use of lab tests	53.5	55.0	+1.5	53.4	49.8	-3.6	2.4 p<0.05
				Use of telephone consultations	20.1	18.9	-1.2	20.1	19.8	-0.3	0.3 p=0.67
(Joseph et al., 2004)	Level III-1: Quasi RCT Poor quality	Veteran Affairs (VA) medical centres (n=20) and all patients presenting for care (n=5678) Minnesota, USA	Smoking cessation CPGs + organisational support – training meeting; study meetings; academic detailing *Multi-faceted intervention:* 1. Local consensus processes 2. Educational meetings 3. Educational outreach *Control:* Smoking cessation CPGs only	**Proportion of patients who received smoking cessation services, %**							
					Smoking cessation CPGs only n=2925			**Multifaceted intervention n=2753**			**Effect measure**
				Services	**Before**	**After**	**% change**	**Before**	**After**	**% change**	**Relative change OR [95% CI] p-value**
				Asked about smoking status (all patients)	70.8	74.3	+3.5	71.6	76.0	+4.4	1.3 1.1 [0.8, 1.4] p=0.71
				Counselled to quit at last visit	70.5	71.8	+1.3	69.7	73.9	+4.2	3.2 1.2 [0.7, 2.0] p=0.6
				Provided help at last visit	53.0	56.4	+3.4	51.7	61.2	+9.5	2.8 1.3[0.8, 2.1] p=0.32
				Behavioural	50.6	53.3	+2.7	49.2	59.2	+10.0	3.7 1.3 [0.8, 2.2] p=0.24
				Medication	12.9	18.0	+5.1	8.4	14.7	+6.3	1.2 1.3 [0.6, 2.6] p=0.57
				Documented smoking status	63.1	60.7	-2.4	55.7	67.0	+11.3	4.7 p<0.001
				Documented counselling (smokers)	67.8	68.8	+1.0	48.9	61.9	+13.0	13.0 p=0.11
(Waldorff et al., 2003)	Level III-3: CBA Average quality	PHC physicians and patients with	Mail out of CPGs for dementia; seminars, outreach visits; reminders;	**Physicians' diagnostic evaluations of dementia, % of diagnostic evaluations [95% CI]**							
					Control n practices=122			**Multifaceted intervention n practices=413**			**Effect measure**

		dementia (n=727) General Practices (n=535), Frederiksborg and Viborg Denmark	small group training 1. Local consensus processes 2. Educational meetings 3. Educational outreach 4. Reminders		**Before** n=62	**After** n=69	**% change**	**Before** n=225	**After** n=230	**% change**	**Relative change**
				Diagnostic evaluations relative to population aged 65 years	0.1 [0.1, 0.2]	0.1 [0.1, 0.2]	0	0.2 [0.2, 0.2]	0.2 [0.2, 0.2]	0	0 NS
				Diagnostic evaluations leading to specialist referral	40.0 [29.0,53.0]	49.0 [38.0,61.0]	9.0	44.0 [38.0,51.0]	47.0 [40.0,60.0]	3.0	0.3 NS
(Wright et al., 2003)	Level III-3: Non-randomised, latin square (cross-over) design Average quality	General practices (n=180) in 2 neighbouring health districts, Bradford & Airedale, and Huddersfield & Dewsbery, and patients with either asthma or angina United Kingdom	Mail out of CPGs for angina or asthma; educational meetings; educational outreach visit; audit; patient medicated interventions e.g., waiting room posters; reminders; marketing strategies (e.g., local media campaigns, patient advocate groups, electronic sources) 1. Local consensus processes 2. Educational meetings 3. Educational outreach 4. Patient medicated interventions 5. Reminders 6. Marketing strategies	**Compliance with CPGs recommendations, % of patients**							
					Control n practices=99			**Multifaceted Intervention** n practices=89			**Effect measure [aa]**
				CPG recommendations [o]	**Before**	**After**	**% change**	**Before**	**After**	**% change**	**Relative change [95% CI]**
				Asthma							
				Smoking status	74.0	86.0	+12.0	59.0	75.0	+16.0	1.3 [-14, 0]
				Inhaler technique	33.0	50.0	+17.0	27.0	47.0	+20.0	1.2 [-2, 6]
				Angina							
				Smoking status	71.0	83.0	+12.0	66.0	73.0	+7.0	0.6 [15, 27]
				Blood pressure	71.0	92.0	+21.0	73.0	95.0	+22.0	1.0 [-13, -1]
				Aspirin prescribed / contraindicated / self-medicating	69.0	76.0	+7.0	67.0	78.0	+11.0	1.6 [-16, -4]
				Beta-blocker prescribed / contraindicated	44.0	49.0	+5.0	48.0	54.0	+6.0	1.2 [-5, 1]

[a] Before/after scores not provided due to space restrictions. Available on request; [b] logistic regression analysis conducted using generalised estimating equations (GEE), differences between groups assessed by Chi-square and Wilcoxon's rank sum tests; McNemar's test used for paired proportions, Fisher's exact test used where expected frequencies were less than 5; [c] adjusted for patient's age and stage of change for smoking cessation; [d] adjusted for patient's smoking status; [e] Logistic multilevel analysis to adjust for clustering and baseline scores; [f] Median (interquartile range) and median difference for skewed data; [g] Scores on scales ranged from 1-5 (high); [h] values are post-test; baseline scores adjusted for using multiple regression (covariance) analysis; [i] tested by Mann-Whitney; [j] OR adjusted in multi-level analysis for baseline compliance, practice characteristics, patients' age and gender; [k] compliance rates = number of decisions concordant with guideline recommendations for an indicator/total number of decisions made for that indicator; [l] mean % change = mean percent change from baseline values; [m] multi-level logistic regression analysis adjusted for baseline compliance rates and practice type; [n] immunisations and screening for tuberculosis, anaemia and lead; [o] Ratio of intervention vs control using logistic random regression model and Taylor series approximations; [p] Two-sample t-tests with 95% confidence levels for mean differences to compare changes in study groups; [q] Chi-square test, corrected for cluster sampling using 2nd-order correction of Rao and Scott, was used to determine differences between intervention and control and between baseline and follow-up patients. Significance of changes was assessed using multivariate logistic regression to adjust for hospital type and patient characteristics; [r] general linear model – repeated measures; [s] guidelines recommend an increase in these activities; [t] guidelines recommend a decrease in these activities; [u] linear regression model used to adjust for baseline differences; [v] Goal was for GPs to prescribe beta-blocking agents and diuretics rather than calcium channel blockers and agents acting on the rennin-angiotensin system; [w] Goal was to decrease prescribing in general and per prescription and to increase prescribing of H2-receptor antagonists; [x] Goal was for GPs to focus more on depression and to increase prescribing overall rather than to influence choice of drugs; [y] Study groups allocated geographically - Bradford and Airedale were allocated asthma guideline for active implementation; Huddersfield and Dewsbury were allocated the stable angina guideline; [z] hierarchical logistic regression. Authors reported equivalent baseline measures between groups; [aa] Analysed using ANOVA and regression models; ACE = angiotensin-converting enzyme; BMI = body mass index; BP = blood pressure; CI = confidence intervals; CME = continuing medical education; CPG = clinical practice guideline; CME = continuing medical education; CT = computer tomography; D & C = Dilatation and Curettage; GP = general practitioner; MRI = magnetic resonance imaging; NE = not estimable; NS = not significant; OR = odds ratios; PHC = primary health care; PSDA = Plan, Study, Do, Act; RCT = randomised controlled trial; SD = standard deviation; STD = sexually transmitted disease.

Table 64. Effectiveness of multi-faceted interventions – Patient outcomes

Reference	Level and quality of evidence	Target population	Intervention	Patient outcomes (health status)
(Langham et al., 2002)	Level II: cluster RCT Good quality	17 general practices London UK	*Information:* training and support for organisation of patient information *Evidence:* training and support for accessing and interpreting evidence *Information and evidence*	**Control of risk, % of patients**

	Control	Information only		Evidence only		Information & evidence	
	Mean % change [95% CI] [a]	**Mean % change [95% CI] [a]**	**Relative change**	**Mean % change [95% CI] [a]**	**Relative change**	**Mean % change [95% CI] [a]**	**Relative change**
Current smokers	+0.4 [-11.7, 12.6]	-1.0 [-9.3, 7.3]	2.5	+0.5 [-6.6, 7.6]	1.3	+6.5 [0.8, 12.2]	16.3
BP: mean systolic (mmHg)	-1.7 [-3.1, -0.4]	-2.5 [-8.3, 3.3]	1.5	-0.1 [-13.6, 13.3]	0.1	+1.5 [-6.8, 9.7]	0.9
BP: mean diastolic (mmHg)	-2.7 [-7.3, 1.8]	-2.0 [-5.6, 0.0]	0.7	+1.5 [-3.9, 6.9]	0.6	-0.3 [-3.5, 2.8]	0.1
BP < 160/95	-10.2 [-19.0, 1.4]	-6.8 [-21.9, 8.3]	0.7	-6.5 [-19.7, 6.7]	0.6	-3.2 [-19.6, 13.2]	0.3
Total cholesterol (mmol/l), mean	-0.1 [-0.8, 0.6]	-0.2 [-0.5, 0.0]	2.0	-0.2 [-0.2, 0.0]	2.0	-0.7 [-1.3, 0.0]	7.0
Total cholesterol <5.5	+6.6 [-2.3, 15.4]	+1.2 [-6.2, 8.6]	0.2	-0.3 [-9.9, 9.4]	0.0	+0.9 [-7.9, 9.7]	0.1

Reference	Level and quality of evidence	Target population	Intervention	Patient outcomes (health status)
(Frijling et al., 2002)	Level II: RCT Good quality	General practitioners Netherlands	Education Feedback Feedback and support, including education and guidance from a facilitator	**Uncontrolled blood glucose, % patients**

Control			Multifaceted intervention			Effect measure
Before	**After**	**% change**	**Before**	**After**	**% change**	**Relative change p-value**
37.1	33.8	-3.3	39.0	35.6	-3.4	1.1 p>0.3

Reference	Level and quality of evidence	Target population	Intervention	Patient outcomes (health status)
(Philbin et al., 2000)	Level III-1: quasi-RCT Good quality	10 hospitals Patients with diagnosed heart failure New York	Interdisciplinary team CME Patient educational material Feedback	**Length of hospital stay, mean days**

Control			Multifaceted intervention			Effect measure
Before n=640	**After n=664**	**% change**	**Before n=762**	**After n=840**	**% change**	**Relative change intervention effect [96% CI] [b]**

				7.7	7.0	-9.1	8.0	6.2	-22.5	2.5 -1.1 [-2.9, 0.7]
				Mortality, % of patients						
				5.4	3.7	-1.7	5.9	5.2	-0.7	0.4 1.0 [-3.0, 5.0]
				Patient quality of life, mean Ladder of Life score						
				6.3	6.5	+3.2	6.6	6.5	-1.5	0.5 -0.3 [-1.6, 1.0]
(Sanci et al., 2000)	Level III-1: quasi-RCT Good quality	105 general practitioners Melbourne	Educational strategies (workshop, materials, feedback, opinion leaders, office systems)	**Change in rapport, satisfaction and confidentiality, mean [95% CI]**						
					Control n=51		**Multifaceted intervention** n=54			
					Before	**Difference after 7 months**	**Before**	**Difference after 7 months**		**p-value** [b]
				Standardised patients' rapport and satisfaction	57.9 [61.4, 74.5]	-0.5 [-6.1, 5.0]	57.9 [64.9, 70.9]	6.0 [2.6, 9.5]		p=0.12
				Standardised patients' confidentiality	35.2 [29.3, 41.1]	4.0 [-10.3, 18.3]	42.2 [31.0, 53.4]	53.5 [49.3, 57.8]		p<0.01
(Joseph et al., 2004)	Level III-1: Quasi RCT Poor quality	Veteran Affairs (VA) medical centres (n=20) and all patients presenting for care (n=5678), Minnesota USA	Smoking cessation CPGs + organisational support – training meeting; study meetings; academic detailing 1. Local consensus processes 2. Educational meetings 3. Educational outreach	**Smoking cessation services received, %**						
					Smoking cessation CPGs only n=2925			**Multifaceted intervention** n=2753			**Effect measure**
				Services	**Before**	**After**	**% change**	**Before**	**After**	**% change**	**Relative change OR [95% CI]**
				Used medications in last year	33.8	41.1	+7.3	31.2	26.1	-5.1	0.7 0.6 [0.3, 1.0]
				Plan to quit in next 30 days	40.1	44.1	+4.0	40.2	41.4	+1.2	0.3 0.9 [0.5, 1.5]

[a] Before/after scores not provided due to space restrictions. Available on request; [b] linear regression model used to adjust for baseline differences; BP = blood pressure; CI = confidence intervals; CME = Continuing Medical Education; CPG = clinical practice guideline; OR = odds ratios; RCT = randomised controlled trial.