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# Effective Dissemination and Implementation of Canadian Task Force Guidelines on Preventive Health Care: Literature Review and Model Development

Canada

CANADIAN  
TASK FORCE ON  
PREVENTIVE HEALTH CARE



GROUPE  
D'ÉTUDE CANADIEN SUR  
LES SOINS DE SANTÉ PRÉVENTIFS

**Effective Dissemination and Implementation of Canadian Task Force Guidelines on  
Preventive Health Care: Literature Review and Model Development**

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## EXECUTIVE SUMMARY

**Background:** The Canadian Task Force on Preventive Health Care (CTFPHC) is a publicly funded, independent scientific panel that develops evidence-based clinical practice guidelines (CPGs) on preventive health care. A recent criticism leveled at CPGs in general is that many are not implemented in clinical practice, and thus do not reach their goal of improving quality of health care to patients. The reasons for this apparent failure are many and diverse, and strategies have been developed and tested to address the gap between the production of CPGs and their application in practice. The current report reviews the effectiveness of strategies to facilitate dissemination, uptake and implementation of CPGs, as well as the theoretical approaches that have been applied to the implementation issue.

**Purpose of the Report:** The Task Force sees as an important goal the promotion of its guidelines to primary care physicians at the local level to encourage and facilitate uptake and implementation of recommended clinical actions for the ultimate benefit of patients. Briefly:

- There is a need for a stronger, more focused dissemination initiative to link national guidelines on clinical prevention to family physicians throughout the country.
- Conceptual models exist which help guide the development of a dissemination plan and a dissemination infrastructure.
- There is evidence to support the more detailed development of a focused and targeted dissemination initiative (e.g., literature on opinion leaders, etc.).
- The literature also indicates the critical importance of “local buy in” by health care providers (in this case family physicians in particular).
- Unlike the Ontario Cancer Care Initiative (the guidelines implementation cycle developed by Browman et al. 1995 and reviewed in Section 5) or guidelines applied through institutions (e.g., hospitals, nursing homes) there is currently no infrastructure to link a national organization (Canadian Task Force) to the local family physicians who provide care within the provincial systems.
- The current dissemination strategies using published journals and the CTF WWW site are necessary, but not sufficient components to an effective dissemination and linkage plan.
- There is the need to identify a feasible linkage and dissemination process that creates a “virtual infrastructure” which links the Canadian Task Force to practising family physicians via an identified group of family physician opinion leaders within each province.
- These opinion leaders would have an established and defined relationship with the CTF (input as the guidelines develop and promotion of recommendations and guidelines to local family physicians).

Although focused on prevention, the development of such a model would have benefit to the dissemination of other national guidelines.

**Methods:** A comprehensive literature search was conducted, and relevant studies reviewed and synthesized. The focus was on studies of adequate methodological design that evaluated the effectiveness of various approaches to overcoming barriers to the dissemination, uptake and implementation of practice guidelines. In addition, theoretical approaches to the problem were reviewed, as were models that had attempted to examine the issues in related contexts. A potential dissemination-implementation model for the Canadian Task Force was developed.

**Main Findings & Conclusions:** Participative, or socially influenced approaches to disseminating new information to physicians have proven to be the most effective, but ultimate behaviour change will depend not only on physicians' personal characteristics and motivations, but also on attributes

of the practice context. The primary care setting is somewhat unique, and principles developed within a hospital or other large organizational context may not apply as well as those needed specifically for this type of care setting. The interaction of system-level and personal factors, combined with the unique characteristics of the strategy chosen, make for a very complex decision-making process. When considering the development of a generic model to facilitate implementation of CPGs, ensuring adequate flexibility and adaptiveness within each model phase or component must accommodate this complexity. Any model designed to facilitate diffusion, dissemination and implementation must address the issues surrounding the four components of a basic diffusion model: sender, message, channel and receiver. The model for a potential CTFPHC dissemination-implementation infrastructure is presented in Section 6, taking into account the results of the review of the evidence, and the role of the four identified components.

**Next Steps:** These fall into two categories: 1) ongoing research, development and refinement of the model, and 2) dissemination of report results. **1) Research and Development:** 1. Identify linkage mechanisms and partners at every level of the model, including national, provincial and local organizations, and individual opinion leaders. 2. Further develop the model in conjunction with identified partners, using "lessons learned" from the literature. 3. Test the model at a) an exploratory or pilot level, b) refine it, and c) test it on a larger scale. 4. Obtain resources for #2&3, above. **2) Dissemination Plan:** The current report, and/or background information therein, will be disseminated as follows: 1. the literature review will be refined and developed into an academic manuscript suitable for publication in a peer-reviewed journal; 2. the evolved model will be presented at appropriate health care meetings or conferences, including discussion at an upcoming Canadian Task Force meeting, and possibly to other evidence-based medicine groups; 3. the model could be shared with the United States Preventive Services Task Force to explore their interest in collaboration; 4. relevant background information will be posted to the Canadian Task Force world wide website.

## 1. BACKGROUND

### a. Context of the Report

#### ***Clinical Practice Guidelines:***

Clinical practice guidelines (CPGs) are defined as "systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances" (Institute of Medicine, 1990). In the sense that they are developed to provide rules for individuals on how, when and why to perform (or ask for) certain medical procedures, these guidelines can be described as policy instruments. CPGs are said to express what has been termed "clinical policy" (Lomas, 1993a). Clinical policies have, until recently, been largely implicit; that is they are developed relatively informally, with little debate (particularly public debate); they are not documented, nor are there any instruments for their implementation or evaluation. This is in contrast to legislative (or public) policy development, which, Lomas argues, can provide some lessons and structure to inform clinical policy makers. The legislative policy model is designed to express the "democratic wish" of society, and as such it has evolved with an explicit process characterized by public debate, written documentation, and official instruments for the enforcement and implementation of the resultant policies (Lomas, 1993a, p. 12).

Within the health care field, there has been a recent move toward a more standardized approach to clinical practice guideline development, adopting some of these 'lessons learned' from the legislative arena. As mentioned in the definition provided above, CPGs are "systematically developed statements", however, "systems" have varied widely, historically relying on expert opinion and established practice patterns (Hayward et al., 1997; Cook et al., 1997; Browman et al., 1995). Furthermore, numerous groups that have different perspectives and different, more or less rigorous, standards for formulating their positions produce guidelines, consensus statements, and recommendations. Evidence-based medicine, which emphasizes practice decisions based on thorough and systematic evaluation of the available research evidence, has been a reaction to the confusion caused by the mixed messages in the system, as well as to the explosion of available research evidence (Sackett et al., 1997).

The basic protocol for developing evidence-based clinical practice guidelines involves: clearly defining the clinical problem; undertaking a comprehensive review of the available research literature (evidence); summarizing the extracted data (often in the form of an "evidence table"); presenting the data as outcome contingencies for the possible alternative decisions; and creating clinical recommendations for practice that may or may not also include financial cost implications and patient preferences (Wall et al., 1994). Thus, the evidence-based approach establishes a method for the production of a vehicle, the systematic review (Cook et al., 1997) that can then be synthesized into a (relatively) brief and usable statement. The end user of these policies is usually

the physician, but increasingly the patient as well (Bero & Jadad, 1997). This protocol varies somewhat from group to group, with differences in what is considered acceptable evidence, and the role of consensus development/debate in the formulation of the final recommendation.

To summarize, clinical practice guidelines have, broadly speaking, many purposes (Berger & Rosner, 1996). They can be used to:

- Improve the quality of health care
- Improve efficiency in health care delivery
- Decrease costs
- Reduce the risk of liability
- Provide medical education
- Assist in utilization reviews
- Evaluate physician job performance, suitability for employment, etc.
- Determine legal standards of care.

For the purposes of this report, the focus will primarily be on the first goal: improving the quality of health care by providing clinicians with the best available evidence when making clinical decisions.

In addition to these stated purposes, many authors have identified barriers to the effective dissemination, uptake and implementation of CPGs (Berger & Rosner, 1996). These include:

- organizational/implementation problems
- clinical irrelevancy
- conflict among guidelines
- guideline complexity
- malpractice and disciplinary concerns
- concern about professional autonomy
- resource issues
- time constraints
- lack of consensus among stakeholder groups re: goals/objectives

These too will be addressed, and strategies discussed to overcome these barriers to ensure broad dissemination, uptake and implementation of Canadian Task Force on Preventive Health Care guidelines.

### **The Canadian Task Force on Preventive Health Care**

The Canadian Task Force on Preventive Health Care (CTFPHC) is an independent scientific panel comprising university-based clinician-methodologists from diverse clinical backgrounds. It was established in September 1976 by the Conference of Deputy Ministers of Health of the ten Canadian provinces. Its mandate was and is "to determine how the periodic health examination might enhance or protect the health of Canadians and to recommend a plan for a lifetime program of periodic health assessments for all persons living in Canada".<sup>1</sup>

The Task Force spent the first several years of its existence evolving and refining a standardized methodology for conducting systematic reviews of the available research evidence. This included developing a "methodological hierarchy" by which different study designs could be evaluated, and a classification of recommendations to indicate whether there is evidence to include or not include given preventive actions in the periodic health examinations of asymptomatic people. When research does not provide clear guidance, this lack of evidence is articulated, leaving the decision to the clinician's professional judgment and assessment of the individual case.

The Task Force recognizes that in clinical practice, caregivers dealing with individual patients must make binary decisions – "**do it**" or "**don't do it**". It also recognizes, however, that for many preventive interventions, the scientific evidence does not lend itself to such simple two-dimensional alternatives. The particular characteristic that distinguishes the Task Force methodology from traditional approaches to decision-making on prevention issues is that evidence takes precedence over consensus (CTFPHE, 1994).

A primary Task Force goal is to provide a bridge between research findings and clinical preventive practice. A major objective is to help clinicians choose tests, counseling strategies or other preventive interventions of proven utility and avoid those that lack demonstrated value. Canadian Task Force recommendations inform clinicians, public citizens, health care policy-makers and planners.

To complement its more traditional dissemination activities, the CTFPHC has developed and recently "launched" its World Wide Web site (<http://www.ctfphc.org>). This is part of a larger electronic infrastructure designed to expedite internal information management processes as well as facilitate electronic dissemination of CTFPHC products. The Task Force is currently conducting research with physicians and consumers to ensure that we provide the types of information stakeholders seek, in convenient and usable forms. This research will help refine the current

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<sup>1</sup> The periodic health examination (PHE) is a group of activities, encompassing both primary and secondary prevention, designed either to determine a person's risk of developing disease or to identify early, asymptomatic disease. Primary prevention aims to prevent the occurrence of disease through immunization, and counseling for lifestyle change and risk reduction. Secondary prevention aims to identify asymptomatic individuals with early stage disease when such early

website (comprised of information for clinicians) and will allow development of a "Consumer Area", where guidelines and related materials will be presented in forms suitable for the general public.

### **b. Problem Statement and Report Objectives**

Recently, those who fund the development of evidence-based CPGs, and those who create them, have begun the process of evaluating their impact on clinician behaviour (Hayward et al., 1997), policy formation (Lomas, 1993a), and to a lesser extent, patient outcomes (Worrall et al., 1997).<sup>2</sup> In fact, at a 1997 meeting in Ottawa, representatives from CPG development groups and national professional organizations were invited by Health Canada to meet to discuss the state of the field and ways to refine evaluation of CPG implementation and impact. To date, the case for the effectiveness of CPGs (even those created using an evidence-based approach) in changing physician behaviour and improving patient outcomes has been variable (Hayward et al., 1997; and Worrall, et al. 1997).

Grimshaw and Russell (1993) conducted an overview of published evaluations of CPGs. Of the 59 studies examined, 55 detected significant improvements in care (process or outcome) after the guideline was introduced. The significance (both in size and in clinical benefit) of these improvements was variable, however (Grimshaw & Russell, 1993). On the other hand, some authors argue that any differences in care processes and outcomes do not justify the level of effort and resources devoted to producing CPGs (Davis & Taylor-Vaisey, 1997; Davis et al., 1995). In general, the literature has shown that simple diffusion of practice guidelines does not lead to changes in practice behaviour, or patient outcomes (Worrall et al., 1997).

One reason cited for the apparent failure of CPGs to have the impact initially envisioned is that they are often developed without attention to the situations in which they may be applied, and the values of those who they are intended to impact. Instead, some argue, guidelines have been developed to reflect the available evidence as strictly as possible. While this approach serves to produce scientifically based guidelines, it can overlook the fact that, in the practice context, the need for evidence competes with other factors, such as patient preferences, existing practice patterns and office systems, etc. Additionally, the number of practice guidelines produced, both evidence-based and not, has grown dramatically, leading some authors to call general practice

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identification promises significantly better response to treatment than in those who first present with symptoms. Canadian Task Force on the Periodic Health Examination, 1994, p. ix

<sup>2</sup> Evaluating patient outcomes in a systematic fashion is always a challenge, due primarily to ethical limitations in the types of study designs that can be employed. Thus, measuring the changes in physician behaviour (either via self-report or more objectively using chart audits, etc.), has been used as a surrogate outcome measure. Appropriately designed studies that have shown a direct impact on patient health outcomes are few in number and difficult to interpret as to the impact of the CPG itself versus the impact of inconsistent implementation of the guidelines(s) (practice variation) (Worrall et al., 1997).

guidelines the "new Tower of Babel" (Hibble et al., 1998). This explosion in information directed at the physician poses additional competition and another barrier to adoption of any single guideline.

Thus, it is critical that guideline producers include, as part of the production cycle, strategies and mechanisms that will ensure comprehensive dissemination of guidelines to all identified stakeholder groups. As part of this effort, the CTFPHC has prepared the current report, which will:

- a) review the relevant literature related to modeling the dissemination, uptake and implementation of CPGs, including discussion of diffusion theory, physician information needs, and strategies to change physician behaviour;
- b) discuss the prevailing models that have been developed regarding diffusion, dissemination, uptake and implementation of clinical practice guideline, specifically those of Browman et al. (1995), Lomas (1993c) and Orlandi (1991);
- c) propose the key components that will have to be considered for the CTF to develop a model to facilitate CPG uptake and implementation. The ultimate model will be adapted in part from those in b), that can guide the CTFPHC in its efforts to link to decision-makers and ensure update and implementation of its preventive health care guidelines.

## **2. METHODS**

A systematic search of the MEDLINE database was undertaken, using the MESH terms: "practice guidelines", "guidelines", "communication", "dissemination, information", "innovation diffusion", "diffusion of innovation" variously combined, and also run with the text words: "implementation" and "model\*". Additional MESH words included: "clinical competence", "computer communication networks", "information services", "education, medical, continuing", "organizational innovation", "physician's practice patterns", "preventive medicine /education/ organization & administration", and "quality of health care". The overall search yielded over 2000 citations. These were limited by focussing on physicians, especially primary care physicians, and where possible, preference was given the papers presenting models or research results about dissemination and/or implementation of evidence-based clinical practice guidelines, particularly those on preventive health care. Several papers reported efforts to disseminate CTFPHC recommendations, and these were given the highest priority. The final Reference Manager for Windows database contains 328 citations. Of these, 63 were fully reviewed and incorporated into this report. Key citations were annotated (see Appendix 1 - Annotation for Key Papers).

### 3. USER-CENTRED APPROACH

This report takes a user-centred approach to the challenge of disseminating preventive clinical practice guidelines to primary care physicians to maximize the potential that the guidelines will be implemented in practice. That is, consideration of the needs of physicians for timely, relevant and easy to use information guides the way we will discuss the existing literature, and the way in which the ultimate dissemination-implementation model will evolve. Strategies for dissemination will be assessed according to these criteria, and barriers and facilitators to dissemination and implementation will be identified from this perspective. For example, what the system might see as a facilitator to dissemination (e.g. broad-based diffusion of a guideline to ensure maximum coverage to the target population), might indeed be a barrier to the individual's ability to tailor the information to their practice situation.

The user-based approach requires an examination of the existing literature on the information needs and uses of physicians, including strategies that have been studied for changing physician behaviour. In addition, a brief description of Rogers' (1995) Diffusion of Innovations Theory will set the stage for later discussion of diffusion, dissemination and implementation models.

#### a. Information Needs and Uses of Physicians

To access this literature, the MEDLINE database was searched using the MeSH terms: "Physicians, Family"; "Information Services" and "Communication" and the text words "Family Physicians", "Information needs" and "Communications Media". Key hits were explored using the "Related Articles" feature in NLM's PubMed search engine. In addition, the library and information sciences literature was searched, focussed especially on the contents of the *Bulletin of Medical Library Association*. Further citations were obtained by hand searching and citation-tracking of key articles published in LIS journals, [e.g. Leckie et al. 1996; Marshall, 1993; and Detlefsen, 1998.]

#### *Physicians' Information Needs*

Physicians have various information needs according to the work role in which they find themselves:

**Clinical** = patient care - ranked as the most important information need; also usually time-sensitive

**Administrative** = office management and patient records management (charts, billing, etc.)

**Continuing Medical Education (CME)** = learning about new diagnostics, therapies, treatments, and other innovations

**Research** = many physicians, especially those with an academic affiliation, undertake research to answer broader questions about the practice and clinical environment.

**Teaching** = some physicians undertake university-based classroom teaching, or more commonly, train residents in clinics affiliated with medical schools; in addition, many physicians are involved in community outreach to teach their patients or the general public about disease prevention and health promotion.

The focus of this report is on clinical information needs, and the role of guidelines in addressing these through various means, including continuing medical education.

### *Research on Physicians' Information Needs and Uses*

As described by Leckie et al. (1996), and Marshall (1993), three major types of studies, employing various methodologies (mostly surveys), comprise the bulk of the research literature on physicians' information needs and uses. The first type of study, which is the most common, is the user study. Questions asked in user studies are related to the physicians' perceived needs, preferred channels or sources, and uses for patient care. Specifically, user studies have shown that, on average, 5 clinical questions are raised per patient. About a quarter (26%) of these require a synthesis of patient information and medical knowledge, making them more complex to answer. Only about 30% of information needs during a patient visit are met - these are usually met by another physician or health care professional (Covell et al., 1985).

Hayward et al. (1997) conducted a study of Canadian physicians to understand their information preferences, needs and uses (note: of the over 3000 Canadian physicians surveyed, about one third were primary care physicians). Table 1 shows physicians' self-reported sources of information. The authors also asked respondents to rate which sources had the greatest impact on their clinical decision-making. Again, informal discussions had the greatest impact. It is interesting to note that more formal training and reading were also influential. The sources reported by Hayward et al. (1997) as having the least impact on clinical decision-making were: pocket notes, **clinical practice guidelines**, brief updates, **original research articles**, position papers, computerized literature searches, and insurance plan policies. These results are consistent with the findings from similar studies of physicians' information source preferences.

To summarize, when making patient care decisions, physicians rely first and foremost on their own clinical training and judgement. Failing that, they consult expert-based systems, the favoured one being an informal consultation with a medical colleague. For a more cut-and-dried need, the physician will often rely on their personal collection, especially quick reference tools, such as the *Compendium of Pharmaceuticals and Services*. When in an education and research mode, physicians turn to more formal sources, including the medical literature and library-based information transactions. In terms of administrative information needs, less research has been

done. One could speculate that in these cases, physicians rely on their office staff and systems to manage patient data (charts), fee bill schedules, appointment scheduling, etc.

Education-focused studies examine physicians' information needs and uses while they are in a learning mode. This includes continuing medical education, research and teaching activities. A recent review of the evidence for the impact of traditional methods of continuing medical education has shown that these approaches are much less successful than they are thought to be, or should be (Davis et al., 1995).

### *Barriers to Information Seeking & Use*

In addition to the information needs and preferred sources outlined by the research findings, above, certain barriers to information seeking and use have been found in most, if not all, of these studies. These include physicians': lack of time; information overload; lack of training in use of formal sources; inadequate information management skills and systems; and lack of training to evaluate and apply research evidence. These types of barriers will be discussed in greater detail as they relate to dissemination and implementation of CPGs.

### *Overcoming Barriers*

Various new and not so new strategies have been developed to overcome these barriers to allow physicians to access and use the best information possible to inform their clinical and other practices. These include:

#### 1. Information Technology Applications:

Libraries (especially the National Library of Medicine) have made the medical literature more and more accessible by making use of new technologies. The most recent advance is allowing free internet-based access to the most current version of the MEDLINE database. Also, many medical journals have made themselves available online. A common feature of the better ones is an alerting service, which emails subscribers the table of contents of new issues. One of the best examples is the *British Medical Journal*, which provides this, plus many more useful services.

However, even with these new advances, the research evidence still shows that end-user searching is an activity more relevant to some roles than others. It remains a less valuable means of accessing patient care information (Marshall, 1993).

Information technology applications are also being used to provide evidence-based guidelines and information on the Internet. Individual CPG producers have developed websites to make their work available (e.g. Cochrane Collaboration, Canadian Coordinating Office for Health Technology Assessment, CTFPHC, etc.), and compendium sites have also begun to emerge as clearinghouses

for guidelines (e.g. the Canadian Medical Association's CPG Infobase, the UK National Health Service's Bandolier Evidence-Based Medicine Website, and the US Agency for Health Care Policy and Research's National Guideline Clearinghouse<sup>3</sup>).

## 2. Clinical Information Systems & Information Professionals

The clinical librarian is trained in clinical issues to be able to respond to clinicians' unrecognized information needs (Marshall 1993); they are often directly involved in patient care (Marshall 1993); they act as "quality filters" to the medical literature, in fact, studies have shown that librarians are equally as good at, or better than, physicians at retrieving relevant evidence (Kuller et al. 1993); finally, clinical librarians are an integral part of an overall "clinical information system", as described in Marshall, 1993 and Glanville et al. 1998. The potential of clinical information systems, mediated by trained information professionals, may require further consideration as part of a user-centred dissemination-implementation model for CPGs.

## 3. Evidence-Based Medicine

As described in the introduction, evidence-based medicine refers to making clinical decisions according to the best available evidence for the effectiveness of the procedure. Allowing clinicians to do this involves the larger process of extracting and rigorously evaluating the evidence. This means utilizing comprehensive literature search strategies and applying systematic epidemiologic techniques for analyzing and evaluating the effectiveness of the procedure, treatment or other intervention in terms of various patient outcomes (Sackett et al., 1997). These outcomes include the potential of the intervention to improve health outcomes, weighed against its potential harm (i.e. side effects, unnecessary treatments, etc.). A variety of factors are analyzed in this phase. Once the systematic evaluation is complete, the information is usually synthesized and distilled into practice recommendations or clinical practice guidelines (see Part 1 for a more thorough discussion of CPGs).

### *Getting Evidence from Research to Practice*

A model by Haynes and Haines (1998) shows the path from the research evidence, through a synthesis and repackaging process, into the practice situation, where the policies developed from the evaluation of the evidence are implemented, taking into account the patient's context and values (see Figure 1). Each of the stages in the process has been subjected to more or less

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<sup>3</sup> CMA Infobase: <http://www.cma.ca/cpgs/index.htm>; NHS Bandolier: <http://www.jr2.ox.ac.uk:80/Bandolier/>; AHCPR Guideline Clearinghouse: <http://www.guideline.gov>

extensive study. The last phase, describing the involvement of the patient, has been the least studied, but is starting to gain more attention (Jadad & Gagliardi, 1998).

Each component of the process chart is associated with attendant barriers. These barriers include: the huge amount of complex research evidence generated by medical research; the fact that guidelines are difficult, time consuming and costly to develop; and hard for the clinician to apply to practice due to such issues as accessibility, organizational barriers, poor continuing education and poor patient compliance with health advice and medical regimens (Haynes & Haines, 1998).

The solutions to these problems suggested by Haynes and Haines (1998) include: 1) increasing the use of services and groups that provide the synthesis and distillation of the evidence; 2) tailoring the guidelines to clinicians' practice situations and using information technologies to integrate appropriate maneuvers into patient care; 3) encouraging the use of evidence in other ways, such as through financial incentives; 4) improvement of CME programs; and, perhaps most important, 5) finding ways to educate and encourage patients to ask for and follow health care advice. These strategies will be further explored in sections 4 and 5 of the report.

## **b. Strategies for Changing Physician Behaviour**

Several authors have undertaken recent reviews of this topic, thus a full description of all relevant studies will not be included. Broadly speaking, changing physician behaviour has proven a challenging task (Davis et al., 1992).

In a recent report for Health Canada, Clarke and Associates (1998) undertook a comprehensive overview of this literature. They identify a series of principles, supported by varying types of evidence, underlying effective physician behavior change programs, as related to uptake and implementation of clinical practice guidelines:

- *Single Behaviour Focus* - target intervention at a single behavior or a group of related behaviors.
- *Modify the 'System'* - use multiple strategies directed at altering the system in which the physician practices.
- *Use Multiple Strategies* - rather than a single strategy
- *Develop and Coordinate Interventions to Influence Multiple Audiences* - direct dissemination efforts at physicians and patients simultaneously
- *Successful Single Strategies* - if using only a single strategy " reminder systems, opinion leaders and academic detailing approaches are usually the most effective" (Clarke, 1998, p.5)

- *Establish a 'Linkage System'* - between the developer and end-user. Selection of an intermediary credible to both sides can enhance the interaction.
- *A Credible Source is Necessary* - authority of the guideline developer - in the current instance, the CTFPHC is viewed as a credible and respected source by Canadian physicians.
- *Active Strategies are More Successful (than passive strategies)* - academic detailing and use of opinion leaders should be components of any plan, according to Clarke (1998). Use of passive strategies, such as publication of guidelines in academic journals, will require two or more years to show even a minor impact on practice.
- *Allow Sufficient Time for Successful Diffusion of an Innovation* - aspects of the diffusion process (see below), as well as local practice variations will impact the time to uptake of a guideline. Developers are cautioned to be patient.
- *Acceptance of Guidelines is Contingent Upon Local Contribution to their Development* - involving end users at the local level facilitates later uptake by that user group. This can include local input during priority-setting/topic selection, through to review and feedback of completed guidelines. No evidence exists to indicate the optimal strategy for local stakeholder involvement.
- *Guidelines Must Have a Specific Focus* - according to Clarke, guidelines with a clinical prevention focus are more likely to be than guidelines that focus on diagnosis or treatment, however, no direct evidence is cited for this statement.
- *Embed Guidelines Within a Clinical Pathway* - "roadmaps" to care rather than "recipes" for practice.
- *Guidelines will be Used if there is Reinforcement* - while the evidence indicates that providing reinforcement to guideline practitioners increases their use, it is not clear which strategies are most effective. Audit and feedback, financial reimbursement and continuing education models have been studied, to varying effect. Consideration of the use of reinforcement must necessarily include an analysis of the resources required to undertake these strategies.
- *Emphasis Should Shift to Diffusing and Implementing Existing Priority Guidelines and Away from Developing New Guidelines* - however, in the evidence-based context, new evidence drives the need for updates of existing reviews. This, coupled with the demand by clinicians to have the most current information available, may make this goal unrealistic (Clarke et al., 1998).

Several of these strategies, those supported by strong evidence, will be re-examined in upcoming sections when discussing dissemination-implementation models.

## 4. EVALUATION OF DISSEMINATION/IMPLEMENTATION STRATEGIES

### a. Diffusion of Innovations Theory

As indicated above, many of the strategies identified for transferring clinical information to clinicians, including guidelines, are based on Everett Rogers' Diffusion of Innovations Theory (1995). Briefly, diffusion is "the process by which an innovation is communicated through certain channels over time among members of a social system. It is a special type of communication, in that the messages are concerned with new ideas." (Rogers, 1995, p. 5).

This definition outlines the basic elements of the diffusion process: the message, the channel, and the receiver. Further, the notion of a specialized message, comprising a new idea, corresponds to the delivery of CPGs, which provide new clinical information. A fourth element in the process is time. Time is a key factor, in that different members of the receiver audience will hear about and adopt innovations at different times. Some because they are further (either geographically or socially) from the source of the message, and some because they are not psychologically ready to adopt an innovation until it has been in the system for a given period of time.

This raises the notion of adopter categories, and characteristics of the receiver. An individual's degree of innovativeness interacts with innovation characteristics to determine when or if that person will adopt the innovation. Rogers identifies 5 major categories of adopters, based on the relative time it takes each group to adopt a given innovation: 1) innovators, 2) early adopters, 3) early majority, 4) late majority, and 5) laggards. Most innovations have an S-shaped adoption curve, with relatively few innovators adopting very early, followed by the early adopters, which, when a critical mass is reached, will greatly accelerate adoption as the idea diffuses to more and more of the target audience. As the early majority adopts, the curve becomes steep, eventually leveling off in the latter stages of the innovation-decision process (generally once ~80% of the population has adopted). Some innovations will, of course, reach this point more quickly than others, and this will depend not only on receiver characteristics, but also on the qualities of the innovation itself.

In terms of characteristics of the innovation, Rogers addresses several key concepts. First, the innovation must provide a relative advantage over the idea that is superceded. This can be measured in economic or social terms or by convenience or satisfaction. In short, the advantage is not necessarily inherent to the innovation itself, but in how the receiver perceives it. Innovations that have greater compatibility or consistency with existing user values, experiences and needs will also be adopted more quickly. Idea incompatible with these values and norms are unlikely to ever be adopted. Ideas with less complexity, those that are simpler to understand, will also be adopted more quickly. Trialability and observability are the remaining two features that can facilitate

adoption of an idea. Innovations that are readily experimented with, and/or which can be visibly observed in action, are more likely to be adopted (Rogers, 1995). With regard to CPGs specifically, Grilli and Lomas (1994) found that less complicated, triable and observable CPGs are more effectively adopted.

The other main component of the basic diffusion model is the system, or receiver audience, at which the innovation is targeted, including such concepts as heterophily/homophily of members, social structure and system norms and values. All of these impact the rate of adoption of an innovation, and indeed whether it will be adopted at all. Understanding social system characteristics also provides some guidance on how to tailor innovations, and their diffusion, to have the greatest impact. Specifically, the use of influential members of the social system, also called opinion leaders, who are engaged in facilitating the transfer of innovations to other members of the system, is a standard approach to maximizing adoption rates. This will be discussed in further detail below.

Diffusion theory has been used by many authors as a model for dissemination of clinical practice guidelines. Indeed, Lomas (1993b) echoes Rogers by stating that “information must be part of a communication process before it is available as an input to decision making” (p. 226). However, in terms of effectiveness, the diffusion model has been criticized on several levels. First, diffusion of medical information is often passive, haphazard, not targeted, unplanned, uncontrolled (Lomas, 1993b). In effect, information is released “into the void” and those receivers that do come into contact with it were already open to receiving new information as generally active, highly motivated information-seekers. As an example, Lomas (1993b) uses the medical journal and the journal reader - new information is published in an academic journal; it is read by those who receive the journal via subscription, or by those who go to a library to specifically retrieve a given article (normally after having conducted, or had conducted on their behalf, a literature search). Lomas points out that end-user searching, and indeed active journal readers, are increasingly rare. Thus, he concludes, the true diffusion model is only effective when 1) receivers are highly motivated; 2) the rewards for finding the information are high; and 3) there is a relatively small pool of information. The problem, according to Lomas, is that none of these conditions exist for physicians today (1993b).

## **b. Dissemination & Implementation**

Several authors (e.g. Lomas, 1993b; Davis & Taylor-Vaisey, 1997) use the term dissemination to describe a process related to diffusion, but more active in nature. Dissemination strategies target the specific audience(s) and tailor the message to each audience. Additionally, aggressive follow-up measures are often employed to bolster the initial diffusion attempt. For example,

traditional journal publication would be supplemented with any or all of the following: media coverage, targeted mailings, orchestrated campaigns of oral presentations, and formal advertising (Lomas 1993b).

However, the goal of communication is more than just increasing awareness. The proximate goal, especially with regard to CPGs, is to change clinician behaviour to conform to the guideline. Ultimately, the practice change will lead to improved patient, or health care system, outcomes. This, says Lomas (1993b) is where dissemination must be effective in order to lead to implementation. In order for successful implementation to occur, those sending the messages must: identify barriers to use of the information; assist in overcoming these barriers; use local organizational and behavioural tools; and make it hard for the physician to ignore the information. Diffusion, dissemination and implementation are “phases in a process of increasingly active and more focused intents, with each subsequent phase dependent on the success of its predecessor phase” (Lomas, 1993b, p. 227). The decision making process leading to implementation has five stages: 1) gaining knowledge; 2) forming an attitude (persuasion); 3) making decision to adopt or reject; 4) actual implementation; and 5) receiving reinforcement (confirmation) (Lomas, 1993b).

Davis & Taylor-Vaisey (1997) reviewed the literature on the effectiveness of CPG dissemination strategies. Specifically, they examined whether CPG dissemination and/or implementation processes actually work. In general, they state that the literature presents mixed results with regard to awareness, compliance and impact of CPGs on patient outcomes. They further discuss the key characteristics of health care professionals (demographics - especially age and country of training), their practice settings (social norms, belief systems, customs, etc.), the role of incentives and regulations/practice standards (legal/financial), and finally the impact of patient factors. All of these factors combine uniquely for the individual clinician when making the decision to adopt a new idea.

In their review of specific strategies that facilitate CPG implementation, the authors identify several approaches that can facilitate dissemination and implementation: a) information dissemination designed to improve knowledge, skills, and attitudes (competence); b) strategies that enable or facilitate adoption of CPGs in practice setting (e.g. recall/reminder systems); and c) strategies that reinforce change (e.g. audit & feedback approaches). As a preliminary step, needs assessment is a key to determine the gap between ideal and actual performance and to target the intervention at that identified gap or need. Their results indicate that weak interventions include didactic, lecture-based CME approaches, such as seminars, conferences; and mailed, unsolicited materials. Moderately effective interventions include audit and feedback, especially if concurrent, specific and delivered by peers or opinion leaders. Relatively strong interventions include those that are patient based; those using reminder systems in the practice setting; and the use of-

academic detailing or opinion leaders (these are referred to as 'community-based'). Finally, multiple interventions (e.g. mailed educational materials and telephone follow up supplemented with presentation at meetings) are most effective. These authors conclude that CPG dissemination/implementation should be considered in a contextual, holistic manner, and employ both primary (broad dissemination) and secondary (facilitative) strategies. Finally, these initiatives should be undertaken in partnership with CME providers as part of "linkage system" (Davis & Taylor-Vaisey, 1997). A model, the "guideline cascade", developed by Fox et al. (1989), and adapted by these authors representing this process is reproduced as Figure 2.

### **c. Dissemination Strategies Identified as Effective**

#### ***Participative Approaches***

##### *Opinion Leaders (Educational Influentials)*

Opinion leadership is defined by Rogers as "the degree to which an individual is able informally to influence other individual's attitudes or overt behaviour in a desired way with relative frequencies" (Rogers 1995, p 281). The concept of opinion leadership is based on both diffusion theory and the social influences model of behaviour change.

Anderson and colleagues (1985, 1988) examined the role of informal communication networks in changing physicians' practice behaviour. Given the importance of informal communication within peer networks, the authors sought to understand how these could be used to facilitate the introduction of innovations into clinical practice. In a 1985 study (Anderson & Jay, 1985) the authors undertook a social network analysis of physicians' social structure and how this impacts the adoption and utilization of medical innovations (in this case a computerized hospital information system). They conclude that: "the center-periphery model of diffusion of new ideas among professionals may be too simplistic" (p. 977).

In a later study (Anderson et al., 1988) the goal was to design, implement and evaluate a program to increase physician use of a hospital information system, using "educational influentials". They identified these influential physicians by examining consultation patterns extracted from medical records to determine each physician's role in the consultation network. They also determined each physician's participation in hospital care program and medical staff committees. Using a quasi-experimental design, selected hospital programs were assigned to the experimental group, while others were controls. Physicians working within the experimental programs (N=109) were exposed to educational information (on use of order sets for the Hospital Information System) delivered by the identified influentials. The results of the study indicated that physicians in the experimental group increased their use of order sets on the Hospital Information System, while controls did not (Anderson et al., 1988).

Thomson et al. (1998) examined effectiveness of using local opinion leaders (LOLs) to improve professional practice and patient outcomes by conducting an overview analysis of 6 relevant trials (selected according to Cochrane Collaboration criteria). Their premise is say that “using local opinion leaders to transmit norms and model appropriate behaviour has the potential to change health care professional practice” (p.2). Five of the six trials showed some improvement in professional practice on at least one outcome measure (the target behaviour of interest was “general management” of patient problems by physicians). Three of the trials examined patient outcomes, and of these, only one showed a clinically important impact of LOL use. These authors conclude that while local opinion leaders can: “perform a ‘sanctioning function’ (ibid. p. 2); “enhance the ability of local providers to determine root causes of variation in practice” (ibid. p. 2); and “enhance the adaptation of general practice guidelines to suit the local environment” (ibid. p. 2), the use of LOLs has mixed effect on professional practice, and what function they perform requires further research (Thomson et al., 1998).

In a subsequent randomized controlled trial (RCT), Soumerai et al. (1998) evaluated a guideline implementation intervention of clinician education by local opinion leaders, including a performance feedback component. Using hospitals as the unit of analysis (20 experimental hospitals, 17 control), they tested an intervention consisting of clinician education by local opinion leaders (plus performance feedback) engaged to train their peers in use of a guideline for treatment of acute myocardial infarction (AMI). Outcome measures were changes in patient care regimens. Opinion leaders were identified by survey of peers using a method developed by Hiss et al. (1978). The authors concluded that, overall, the use of opinion leaders and performance feedback increased compliance with beneficial AMI therapies, as outlined in the guideline. Local changes in hospital protocols, facilitated by the influence of the new information in the system, may also have contributed to the decline in use of outdated practices. However, increasing the use of riskier treatments (e.g. thrombolysis), was more difficult to accomplish (Soumerai et al., 1998).

### Identification of Opinion Leaders

The literature provides some guidance as to how best to identify and recruit opinion leaders. Cosmas & Sheth (1980), writing in the business field, identify 9 dimensions of opinion leadership. Opinion leaders are: mature; authoritarian; self-centred; opinionated; accessible; general experts; practical; peer experts; and visible to their colleagues.

As described above, Anderson and Jay (1985) undertook a social network analysis of physicians’ social structure and how these impact the adoption and utilization of medical innovations. During the course of their investigation, they identified several central subgroups that exist within the physicians’ social world, and which perform different roles in the network. Other

subgroups are linked to these central groups, which are described as: 1) older, more professionally active physicians who initiate patient referrals and consultations; and 2) doctors more involved in private practice who initiate professional discussions with other groups (Anderson & Jay, 1985). Two further peripheral groups were identified: 3) intermediaries in patient referral who provide on-call coverage for doctors in Group 1; and 4) peripheral doctors who consult with and are consulted by doctors in Groups 1 and 2. In general, members of Groups 1 and 2 adopt innovations more quickly, and can serve as educational influentials to facilitate acceleration of the adoption curve among their colleagues. The authors note, however, that within this context at least, adoption is a separate process from implementation, in that acceptance of a new idea does not necessarily imply that the idea will be applied to practice (Anderson & Jay, 1985).

Hiss et al. (1978) developed a process for peer identification of educationally influential physicians. Briefly, educational influentials consistently and more frequently (than other physicians) display 9 characteristics, clustered around three general areas: communication, humanism, and knowledge (see Table 2a for a description of each characteristic). The authors then developed an "Educational Influential Identification Instrument" consisting of a brief introductory paragraph, followed by short descriptive paragraphs capturing features of the three areas. Peers are asked to name colleagues that best exemplify each cluster of characteristics (see Table 2b for a reproduction of the instrument). This method has been subsequently used by other researchers to identify opinion leaders in educational intervention studies (e.g. Soumerai et al., 1998).

### *Academic Detailing*

Davis & Taylor-Vaisey (1997) define academic detailing as "education of an individual physician by a pharmacist or other health professional, usually in the physician's office and most often in the area of prescribing" (p. 410). This approach is also called educational outreach, the principles of which are described by Soumerai and Avorn (1990) in the context of improving prescribing practice. The authors outline eight techniques to undertake effective educational outreach: 1) understanding the baseline behaviour by consulting with practitioners; 2) targeting programs to specific groups of physicians, and to their opinion leaders; 3) clearly defining objectives; 4) establishing credibility, particularly via endorsement of a respected organization and establishing unbiased processes for developing and delivering information; 5) finding ways to promote active physician participation; 6) using concise graphic materials; 7) highlighting and repetition; and 8) building-in reinforcement and follow-up strategies. The application of these techniques to changing other clinical practices is less well studied, but potentially promising.

### *Small Group Discussion*

Karuza et al. (1995) describe a consensus-based process for dissemination and implementation of a preventive health care guideline. Primary care practices were randomly allocated to participate (or not) in a 1-hour small group session to discuss and reach consensus on the implementation of a guideline on influenza vaccination for the elderly (control groups met to discuss an unrelated topic). Results indicated that those physicians who participated in the consensus process increased their vaccination rates by 34%, compared to controls. Knowledge about influenza and attitudes towards prevention did not change, and did not differ between the two groups (Karuza et al., 1995).

### *Other Strategies*

The use of interpersonal, participative approaches to facilitate learning has proven successful in a number of studies examining physician behaviour change. However, these strategies alone are not always effective, and can be enhanced by combining one or more of them with other strategies. These other approaches are often implemented at the system level to effect organizational change by creating an environment that supports behaviour change, and reinforces maintenance of desired new behaviours. Several of these approaches have been evaluated empirically, and these are reviewed below.

### ***Organizational Approaches***

Kaluzny et al. (1995) characterize guidelines as representing a "managerial innovation" whose aim is to "manage clinical practices, not to manage physicians" (James, 1993, as in Kaluzny et al., 1995). These authors highlight some of the features of the implementation process, apart from receiver, sender and message characteristics, which can influence successful implementation. The implementation phase itself is a multi-stage, interactive process consisting of several decision points. The following stages are required: recognition (that a gap exists between current and best practice); identification (by key decision-makers that there is a problem and something should/could be done), implementation (use of the guidelines), and institutionalization (integration of the guidelines into ongoing activities) (Kaluzny et al., 1995). However, guideline attributes and organizational characteristics will determine how a specific guideline moves through the implementation process. Given the potentially unlimited number of interactions this could entail, it is key to develop implementation strategies tailored to the users' organization/practice setting. Kaluzny et al. (1995) propose strategies aimed at recognizing the complexity of guidelines, organizations, and the interaction thereof. Two of these, continuous quality improvement (CQI) and reengineering are described below.

Continuous quality improvement (also called total quality management) is an organizational approach to change with the aim of improving overall system performance. This process is "incremental...[and] is more likely to succeed when the guideline is compatible with current practice and the relative advantage is clear...CQI is best suited to handling interactions within, not across, organizations" (Kaluzny et al., 1995, p. 349). Kaluzny et al. (1995) also report on an unpublished, ongoing study in which CQI is being used to encourage practice change based on an identified performance gap, followed by identification of patient needs for preventive care, and system prompts to remind providers to offer the required services. This implementation was followed-up by asking patients about their satisfaction with the care provided, and feedback to providers on how well the identified goals were being met (Kaluzny et al., 1995). Results of this study should prove interesting, when available.

Another organizational approach described by Kaluzny et al. (1995) is reengineering, or the "rethinking and redesign of work processes to achieve dramatic improvements in critical measures of performance such as cost, quality, service and speed" (p. 349). Again, an initial step to successful implementation of this approach is the identification by the organization of a gap in performance, and buy-in from members that the gap can and should be addressed. Guidelines will only facilitate change if they are identified as solutions to the identified problems (Kaluzny et al., 1995).

To the extent that these stages apply to the smaller organizational structure of the typical primary care practice, these can be useful guides to conceptualizing, and perhaps initiating, the implementation process.

### ***Audit and Feedback, Reminder Systems and Other Educational Interventions***

Wensing and colleagues (Wensing & Grol, 1994; Wensing et al., 1998) systematically reviewed the literature for single and combined strategies for implementing change in primary care. The 1998 review identified 61 studies that, according to the strength of their methodologies, were deemed "best evidence" (39 RCTs and 22 controlled before-after studies). The conclusions drawn by the authors were based on this "best evidence".

Their approach included the development of a taxonomy of strategies to organize and describe the data from these diverse studies. This taxonomy is worth considering as a method for conceptualizing all behaviour change strategies:

<b>Information Transfer</b>	<b>Information Linked to Performance</b>	<b>Learning Through Social Influences</b>	<b>Management Support</b>
Reading materials	Feedback	Individual instruction	Resources
Group education	Reminders	Peer review groups	Incentives
Patient education	Patient reminders	Patient reports	Rules, obligations Patient incentives

From Wensing et al., 1998 p. 992

Results of their reviews indicated that the most commonly evaluated single strategies were feedback, reminders, and group education. Group education combined with feedback was the most common multiple strategy. In terms of effectiveness<sup>4</sup>, feedback, reminders and individual instructions were the most effective single strategies, while effective multiple strategies were any combinations that included individual instruction (Wensing & Grol, 1994; Wensing et al., 1998). Provision of educational materials alone, a strategy often used for dissemination of CPGs, proved particularly ineffective as a single strategy. When combined with feedback (i.e. provision of data to support compliance with the recommendations), educational materials were somewhat more effective. Reminders, often used to promote provision of preventive services, were generally effective, though the effect disappeared as soon as the reminders stopped. In general, the authors conclude that strategies aimed solely at improving competence were less effective than those aimed at performance. Using social influences, such as individual instructors, feedback and peer review enhanced performance-oriented strategies.

Again, the only single approach shown effective or partly effective in a majority of "best evidence" studies were those strategies under "information linked to performance". For combined (dual) approaches, the most promising is "information transfer plus learning through social influence". "Information transfer plus information linked to performance" as a combined strategy was shown not effective in 12 of 20 studies. Finally, combining three or all four of the strategies proved effective in 5 of 6 studies (Wensing et al., 1998). These findings support the notion, found elsewhere in the literature, that combining strategies tends to have the greatest impact on effecting practice change.

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<sup>4</sup> Since so many different outcome measures were used in the various trials, the authors defined "effectiveness" according to how much positive change in outcome measures, attributable to the intervention, was achieved between the intervention and control groups. Those studies classified as "effective" showed improvement for all or most of the outcome measures, those with better results for most outcome measures were deemed "partly effective", and those with no better results on most measures were deemed "ineffective".

Another important factor identified by Wensing and colleagues (1994, 1998) concerns the physician's motivation. Those who have already decided that they must address a gap in their current performance are in a sense pre-disposed to address that gap, and are much more likely to adopt and implement an innovation that addresses that gap. If the physician (or any end-user) is not at that stage, physical and social supports to provide external motivation are necessary, as are means to help them identify the gap, and see the innovation as the means of solving the problem (Wensing & Grol, 1994).

This concept of "readiness for change" has been extensively studied by Prochaska and colleagues in the context of addictive behaviours. Briefly, these authors developed and have subsequently tested a five-stage behaviour change model that identifies individuals according to how prepared they are to change their behaviour (e.g. smoking). The first two stages - precontemplation and contemplation - describe those who are as yet not ready to change. The final three stages - preparation, action and maintenance - are action-oriented stages of change, and are defined by those who have decided to or have already implemented behaviour change (Prochaska, 1991; Prochaska et al., 1992; Prochaska et al., 1988). While an exhaustive review is not appropriate at this time, it is important to understand that individuals' motivational states vary, and that these states will, perhaps ultimately, impact whether a guideline is adopted and implemented.

### ***Conclusions***

As the preceding review indicates, participative, or socially influenced, approaches to disseminating new information to physicians have proven to be the most effective, but ultimate behaviour change will depend not only on physicians' personal characteristics and motivations, but also on attributes of the practice context. The primary care setting is somewhat unique, and principles developed within a hospital or other large organizational context may not apply as well as those developed specifically for this type of care setting (Wensing and Grol, 1994). The interaction of system-level and personal factors, combined with the unique characteristics of the strategy chosen, make for a very complex decision-making process. When considering the development of a generic model to facilitate implementation of CPGs, ensuring adequate flexibility and adaptiveness within each model phase or component must accommodate this complexity.

## **5. GUIDELINE IMPLEMENTATION: ISSUES, PROCESSES & MODELS**

### **a. Barriers and Facilitators to Implementation**

In general, barriers to implementation of practice guidelines arise from attributes of either the developer (evidence-based versus non-evidence-based; national versus local, etc.); the guideline itself (complexity, controversial topic, etc.) or the intended receivers, including both the system in which they work (social and/or physical), and characteristics of individual users (motivation, perception of a need to change, attitudes towards guidelines, etc.).

#### *Guideline Developer Characteristics*

The Canadian Task Force on Preventive Health Care, described in a previous section, functions as a guidelines developer. The Canadian Task Force has several positive attributes for this role, but also faces challenges in facilitating the effective uptake of its guidelines. First, CTF guidelines are evidence-based, and attribute identified as very important (Grol et al., 1998). In addition, this group has a long-standing history and is well-respected, both for the quality of the guidelines, and the development and maintenance of cutting edge methodologies for conducting systematic reviews and weighing research evidence. The authority and credibility of the CTF as a source of high quality, trustworthy recommendations are well established.

On the other hand, the fact that the Task Force is a national body can also present a challenge. Part of the debate surrounding the development and implementation of CPGs is the tension between national developers, who can produce guidelines on a larger scale, and, presumably, ensure that excessive duplication of effort is avoided. On the other hand, several studies have indicated that the involvement of local end-users of guidelines can enhance local uptake and implementation (Onion et al., 1996; Conroy & Shannon, 1995; Gates, 1995). Of course, the cost of developing a new guideline on the same topic for every group of local users is prohibitive, and wasteful (e.g. in the United States, it was estimated that over \$100 million has been spent to produce over 100,000 guidelines on myocardial infarction; Conroy & Shannon, 1995).

Two other approaches to local involvement in CPG development are 1) for the national developer to solicit input from local physicians early in, and during, the development process, and/or 2) for the developer to facilitate later adaptation of the national guideline to serve local needs.

This is an important but complex issue. The fact that the processes that facilitate uptake on the one hand (authority, trustworthiness, national-level resources), present barriers on the other (lack of local input) poses a significant challenge. However, these processes are not well understood. Perhaps the issue at hand is not whether to promote a national versus local approach, but rather to find mechanisms that promote appropriate linkages between the two. In the case of the Task

Force, the solution might be to facilitate local adaptation of national guidelines to make it easier for local clinicians to apply the recommendations to their practice. Another approach is to involve local decision-makers in the national process as much as possible. This will be further discussed in section 6.

### *Guideline Characteristics*

As we know from diffusion theory, such innovation traits as complexity, compatibility and relative advantage are intrinsically linked to the adoptability of the innovation (Rogers, 1995; see also Kaluzny et al., 1995 for a discussion of these traits viz. guidelines). Exploring this aspect further, Grol et al. (1998) developed and examined a list of characteristics of guidelines that facilitate their uptake and implementation in clinical practice. In general, guideline attributes that influence uptake are categorized as those having to do with: scientific validity; relevance and applicability in practice; formulation and style; compatibility with existing values and practices; complexity, consequences for care providers, patients and practice management; risks associated with implementing the guideline; and how much attention is given to disseminating the guideline (Grol et al., 1998).<sup>5</sup> The authors developed 16 different attributes of guidelines grouped under these categories (see Grol et al., 1998, p. 859), then judged several primary care-targeted guidelines (about one-third related to prevention) for the presence of each attribute. These scores were then correlated with guideline compliance, as measured by chart audit in 61 primary care practices.

The attributes with the greatest influence on whether or not guidelines were used were: 1) "based on scientific evidence"; and 2) "described concretely and precisely". Inversely, the attributes most contributing to non-use were: 1) "vague and not specific"; 2) "controversial and not compatible with current values"; and 3) "demanded changing existing routines and impacts management" (Grol et al., 1998). These findings, while not entirely surprising, can assist in developing guidelines. While some attributes centred on the practice setting are difficult to influence, and some topics cannot avoid controversy, these results can also be useful when guideline developers set topic priorities.

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<sup>5</sup> the reader will note that many of these guideline characteristics overlap with both developer and user characteristics, thus providing a good summary of the interaction of all three.

### *Receiver Characteristics*

In the review, above, of the evidence for strategies to effect physician behaviour changes, many of the issues related to office system or individual barriers were discussed. In addition to these, another key barrier to guideline uptake is clinician perceptions about CPGs. One of the most well identified barriers to CPG use is the negative view held by many physicians. The basic objection is that guidelines are overly prescriptive and standardized, and therefore difficult to tailor to individual patient cases. Such phrases as "recipes" and "cookbook medicine" (Petrie et al., 1995) capture the belief held by many that focussing solely on evidence removes the "art" from the practice of medicine (Tunis et al., 1994; Hayward et al., 1997; Conroy & Shannon, 1995). Overcoming these perceived threats to physician autonomy and freedom poses a significant challenge. One potential approach is to instil a sense of ownership in the guidelines by adding end-user input and feedback phases to the development cycle (Conroy & Shannon, 1995). As discussed in the preceding section, however, this will involve a delicate balance between effective guideline development and efficient use of resources.

In addition to negative attitudes, a successful guideline must also overcome the equally powerful factors of habit, custom, and social norms. Current practice patterns and peer beliefs, especially if supportive of old behaviour patterns, will interfere with the adoption of a new guideline, even if it is cognitively accepted as better practice (Conroy & Shannon, 1995).

### **b. Barriers to Effective Prevention**

As previously discussed, the barriers to physician behaviour change (viz. implementation of CPGs) cover the spectrum of individual, systemic, and social factors, and all combinations thereof. Haines and Donald (1998) provide a useful taxonomy for thinking about these, reproduced below:

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#### **Potential barriers to change may include:**

##### **Practice environment**

- Limitations of time
- Practice organisation, e.g. lack of disease registers or mechanisms to monitor repeat prescribing

##### **Educational environment**

- Inappropriate continuing education and failure to link up with programmes to promote quality of care
- Lack of incentives to participate in effective educational activities

##### **Health care environment**

- Lack of financial resources
- Lack of defined practice populations
- Health policies which promote ineffective or unproven activities
- Failure to provide practitioners with access to appropriate information

**Social environment**

- Influence of media on patients in creating demands/beliefs
- Impact of disadvantage on patients' access to care

**Practitioner factors**

- Obsolete knowledge
- Influence of opinion leaders
- Beliefs and attitudes (for example, related to previous adverse experience of innovation)
- 

**Patient factors**

- Demands for care
- Perceptions/cultural beliefs about appropriate care

NB Factors which in some circumstances may be perceived as barriers to change can also be levers for change. For example, patients may influence practitioners' behaviour towards clinically effective practice by requesting interventions of proven effectiveness. Practitioners may be influenced positively by opinion leaders.

*From: Haines & Donald, 1998, p. 6.*

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A number of authors have discussed the barriers specific to provision of preventive services by primary care physicians (Frame, 1994; Woolf, 1995, McPhee et al., 1985). Belcher et al. (1988) identified factors specific to the primary care setting that can act as barriers to effective provision of preventive services. These include:

- Role perception - some physicians see their care role as including provision of prevention, while others do not
- Practice setting - there is some evidence that larger organizations (e.g. American HMOs) tend to fragment primary care, making co-ordinated provision of preventive services more difficult. In the smaller office setting, there is some indication that group practices provide preventive care more effectively than solo practices, but these results should be viewed with caution.
- Attitudes and personal characteristics - "physicians' clinical preventive behaviour is closely related to their own beliefs, rather than to current expert recommendations" (p. 29). Such factors as training emphasis, the greater frequency of negative test results in asymptomatic people and concerns over long-term risks of new technologies can impact negatively on provision of clinical preventive services.
- Physician-patient interaction - regular interactions increase the likelihood that preventive services will be offered. For patients with specific or multiple complaints, prevention is often overlooked in favour of spending the visit concentrating on identified problem(s).
- Knowledge - lack of current knowledge of which maneuvers are effective, and often conflicting recommendations for the same maneuver make it difficult for the clinician to provide preventive

services with confidence. The general ineffectiveness of traditional CME initiatives is an additional challenge (David et al. 1992, 1995).

- Skill in examination and counseling - lack of training in provision of clinical examinations and counseling make it difficult for clinicians to provide these with confidence. Lack of practice plans in the office setting further hamper these efforts.
- Institutional supports - these include support of like-minded colleagues, effective record-keeping and reminder systems, performance evaluation and feedback.
- Environmental factors - smaller caseloads, more vigorous public health promotion campaigns and pressure from payers can increase rates of preventive care (Belcher et al., 1988).

In a survey by Weingarten et al. (1995) physicians tended to over-emphasise their intentions to provide preventive services, as compared to their actual rates of practice. However, those with the most positive attitudes towards guidelines were most likely to provide more preventive services to patients, as measured by chart audit (Weingarten et al., 1995).

In a key recent study, Hutchison and colleagues (1996) examined the barriers to effective transfer of prevention guidelines, specifically Canadian Task Force recommendations, to Canadian primary care physicians. In the area of prevention, additional barriers to implementation were cited, including patients' lack of motivation, patient expectations regarding health promotion counseling, and a reimbursement system not conducive to increasing preventive practice.

Hutchinson et al (1996) surveyed family physicians (N = 480) in Southern Ontario regarding their use of Canadian Task Force guidelines (15 maneuvers). They compared what doctors reported as perceived satisfactory levels of performance in general to what the physicians reported actually achieving. They also asked physicians to identify the perceived barriers to performing the preventive maneuvers. For all 15 maneuvers, physicians reported that their performance was less than satisfactory (range 22.9 - 75.5%). The reasons cited for this (barriers) were identified as 1. Patient-related (patient healthy and doesn't visit (~85%); patient refuses, not interested, doesn't comply (~70%)); 2. Physician-related (physician forgets to offer (~25%); guidelines too complex (~18.5%)). 3. Patient and Physician related (priority given to presenting problem (74%)). 4. Systems related (lack of effective reminder systems for patients (67%); lack of effective reminder systems for doctors (~45%); lack of time during patient visit (~37%)). 5. Intervention related (maneuver not clearly effective (~48%); patient discomfort/inconvenience (~40%); too expensive (~30%); not reimbursed (~15%)). (Hutchison et al., 1996). Results of the study show a significant difference between how much preventive care physicians think should be given, and how much they actually provide. They conclude that: "this gap could provide motivation for change, creating a receptive climate for strategies to enhance preventive care performance...many [family physicians]

might support changes in practice organization, clinical records, and information systems to give greater prominence to preventive and anticipatory care; initiatives to inform the public about preventive care; and development and implementation of effective reminder systems...” (p. 1698).

### **c. Implementation Issues**

#### *Strategies for Implementing Guidelines in Primary Care Practice*

Several authors have provided overviews of the issues related to implementing CPGs in general or primary care practice (Conroy & Shannon, 1995; Gates, 1995; Onion et al., 1996). Conroy and Shannon (1995) state that guideline implementation strategies should accomplish the following:

1. increasing clinician awareness (knowledge) about the guideline
2. changing clinician attitudes so that the guideline is accepted as a better standard of care
3. changing clinician behaviour so that the guideline influences practice
4. improving patient outcomes and quality of care.

These authors further draw on communication theory to suggest ways to ensure the best possible communication strategy for any given point in the dissemination process. They particularly discuss the importance of message (guideline) format (see also Grol, 1993):

Other key components to successful communication include using personal contacts to deliver the message in, if possible, an informal environment (Winkler et al., 1985). Finally, to gauge the effectiveness of these facilitative strategies, an evaluation component, aimed at all four impact areas above, must be incorporated in the model (Conroy & Shannon, 1995).

Petrie et al. (1995) suggest a different approach to local implementation of national guidelines. Rather than developing guidelines locally, they state that: “the opportunity of modifying...guidelines to create local protocols offers individual local groups the opportunity to adapt the guidelines - but not the evidence! - to their own ‘style’ of practice. This local ownership step has been shown to increase the uptake of local protocols” (Petrie et al., 1995, p 347). The key components of their approach are 1) using a local priority setting process; 2) stressing that the process is not prescriptive or a “straight-jacket”; 3) having adequate resources available, including time and money; and 4) educating participants about the development process and the methodology employed (e.g. evidence-based). Proper planning and management, they claim, can overcome not only the global barriers to CPG use, but also more local barriers, such as lack of protected time, budget pressures/ cost improvement programmes, legal implications, waiting lists and accreditation requirements.

Wise and Billi (1995) also stress the importance of involving local physician leaders in designing implementation strategies, while highlighting the role of social learning theory and self-

efficacy in any successful implementation initiative. They identify the common failings of existing implementation initiatives, in particular the use of the 'simple dissemination', or diffusion approach and the lack of involvement of the target audience (local physicians). They also identify three aspects of national CPGs that can inhibit local uptake: (i) uncertainty and the inherent limits to specificity of national guidelines for local practice; (ii) too general, and not reflective of local constraints (e.g. resource limits); and (iii) barriers to acceptance, including, as mentioned above, threats to clinical autonomy and suspicion about standardization (the authors identify this latter as possibly the most difficult barrier to overcome).

In analysing past deficiencies and suggesting remedies for these, Wise and Billi (1995) incorporate principles from social psychology, in particular social learning theory and self-efficacy. Social learning theory posits that learning is achieved cognitively, but is enhanced by performance - in this case local physicians' active participation in adapting, disseminating and implementing CPGs. Self-efficacy refers to "people's beliefs about their capabilities to exercise control over events that affect their lives" (p. 468). In their view a key step often missing in an implementation initiative is to allow local leaders active participation in evaluating the application of the guideline in their local setting while also soliciting their input in developing the local dissemination/ implementation model. Those invited to participate can be physician leaders or selected local practitioner who can act as change agents with their colleagues, or, if feasible, all local practitioners can become involved (Wise & Billi, 1995). The key is to involve participants in every phase of the process. These authors conclude that:

"Guideline adaptation, dissemination, and implementation should not entail the development of clinical practice guidelines, but should instead emphasize the inclusion of local physician leaders in the process of translating nationally endorsed practice guidelines into useful tools to guide physician practice at the local level." (Wise & Billi, 1995, p. 467)

#### **d. Existing Models for CPG Adaptation and Implementation**

Several authors have proposed models for guideline development, dissemination and implementation that take into account a variety of barriers, facilitators and strategies. Four of these approaches will be briefly reviewed.

Wise & Billi (1995) developed an implementation model that combines 'predisposing elements' & 'enabling and reinforcing elements' to facilitate implementation of CPGs. Their model is quite complex, resource-intensive and being tested in a well-defined academic hospital setting. These factors make it difficult to envisage application of the model in the Canadian primary care practice setting. Nonetheless, the phases they identify can inform model development for the Canadian Task Force on Preventive Health Care. The main and components and tasks within each component are briefly outlined: Phase 1: Identify Practice Area - (i) select practice area; (ii) identify

and recruit clinical leaders<sup>6</sup>; and (iii) identify and recruit additional project team members. Phase 2: Define optimal clinical practice and system processes - (iv) collect nationally endorsed guidelines; (v) review and critically appraise to select best one(s); (vi) collaboratively develop critical pathways; (vii) identify important data elements for review of historical practice to compare actual to optimal practice in that setting. Phase 3: Design and implement project team intervention - (viii) evaluate and develop implementation methods including identification of best communication method, facilitators (e.g. incentives, feedback, CME, patient empowerment), and receiving endorsement from appropriate departments. Phase 4: Assess outcomes - (vix) conduct concurrent data review and give feedback to clinicians. Phase 5: Redesign process (if necessary) - (x) review implementation methods and conduct outcomes assessment, including comparing actual vs. optimal practice with measures identified in (vii), financial analysis, dissemination to external agencies, and maintenance (review and update when new evidence) (Wise & Billi, 1995). Again, while this model is idealized and best suited for a teaching hospital setting, the authors report that they are also developing a similar model for use with community physicians and hospitals (as yet unpublished).

The second model, from the health promotion literature, is a general approach developed by Orlandi (1986, 1996) incorporating approaches from health education and theories of health behaviour. This model provides a general framework for conceptualizing the main actors in the process, and how they are linked together. Orlandi (1991) draws heavily on diffusion theory in his conceptualization. However, he identifies some key reasons why classic diffusion efforts have failed to successfully transfer health innovations. First, requiring that the innovation is immutable, or be treated as an "intact package" means that the receiver/user is viewed as the model component that must adapt to the innovation, rather than the other way round. It also makes it difficult to evaluate the contribution of the user system to the diffusion process. Finally, as previously discussed, the classic diffusion approach treats the adoption decision as a final and discrete end point, rather than as the multi-step process it actually is (Orlandi, 1991). Given these inherent weaknesses, every step in the process should be viewed as a potential failure point, including: failure of the innovation (poor design, not needed, etc.); communication failure; adoption failure (due to lack of resources or incompatibility with existing beliefs). Even if an innovation is finally adopted, it can be improperly implemented, or not implemented at all (i.e. adopted by the organization, but not used by members). Finally, innovations that are implemented initially may not be maintained.

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<sup>6</sup> Clinical leaders should be well respected (though not necessarily in an authority position); supported by the chair/clinical director; committed to completing project; have a proven track record in leadership and practice

Having identified the potential for failure, Orlandi (1991) proposes the "linkage approach to innovation-development and diffusion planning (1991, p. 294). "The key to this approach lies in its reliance on increased target group participation in all aspects of the process." (ibid.). A recreation of this model is presented in Figure 3. The distinguishing feature of this approach, and the key one for our purposes, is the "Linkage System: (box 3), and the roles of the resource (CPG developer) and user (physician/patient) systems in creating and maintaining the linkage: "the role of the resource system is to collaborate with the user system in the innovation planning process by helping the user system determine its needs, expectations, and limitations" (Orlandi, 1991, p. 296). This simple model provides an important framework for conceptualizing participative strategies for dissemination and implementation of CPGs, and will be revisited during development of the CTF model in section 6.

A third model of interest, developed by Browman and colleagues (1995, 1998) refers specifically to the development of clinical practice guidelines. This model is interesting because it makes the key steps in the development process very explicit. While there are 8 main components to the cycle, starting with identifying the clinical problem, this section will focus primarily on the last three stages: 6. Negotiate practice policies; 7. Adopt guideline, and 8. Scheduled review. While the authors offer no practical strategies for effective dissemination and implementation, they do stress the importance of involving the end-users (clinicians) in the earlier stages of the development process. A method for mediating this participation is the use of formal consensus development processes. Indeed, in a follow-up paper (Browman et al., 1998) these authors report on a study to assess the process of involving end-user clinicians in the development cycle, and the success of this approach. They conclude that practitioner feedback is both feasible and useful, and the suggestions made by their respondents enriched the evidence-based guidelines. Of interest is that this study was carried out with Ontario physicians. However, these were primarily oncologists and other specialists, rather than primary care physicians, and the study was carried out in a closed, highly structured system (Browman et al., 1998).

Finally, Lomas (1993c) developed a complex model that he called the " Coordinated Implementation Model" (recreated in Figure 4). As the name implies, it focuses on the implementation of CPGs. As reviewed earlier (see pp. 14-15), the key components of this model are the integration, or at least the acknowledgement, that factors outside of the immediate practice environment impact the individual clinician's adoption decision and subsequent implementation behaviour. The clinician faces demands (often competing) from economic, administrative, personal and community sources, as well as from her patients. External factors, such as new information

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assessment; have good communication with medical staff; and have staff assistance. Input from medical

technologies and social influences also come into play (Lomas, 1993c). Lomas' point is that the clinician is not a "blank slate" waiting for information, and the complexity of their unique situations, experiences and needs will impact their adoption and implementation decisions. To aid us, Lomas identifies a series of conditions that must be in place if implementation in practice is to occur:

- Authority and credibility of the CPG developer, coupled with a user-friendly format for the guideline that outlines the need for change (i.e. compares new to existing approaches)
- The guideline is flexible so that an individual clinician can tailor it to fit their situation, and can implement it without the need for collaboration or consultation with colleagues
- The importance of the new approach is communicated via multiple channels (not just the guideline)
- The clinician is made aware of influential peers who plan to adopt the guideline (models)
- The clinician has the opportunity to personally discuss the new approach with a respected colleague or expert
- The guideline does not compete with existing administrative or economic incentives, nor does it conflict with patient expectations. (Lomas 1993c, p. 232)

In summary, Lomas states that "local implementation activities [predispose physicians to consider change in their practices]...by enabling and subsequently reinforcing the desired behaviour change. Different skills are needed for each activity." (p. 234). In terms of the roles of key players in the overall process, Lomas states that journals are best suited to the role of "diffusion agents", while academics and medical organizations can facilitate the dissemination process. Finally, local agents, with the proper resources, are best suited to facilitate implementation activities.

#### *Evidence for the Effectiveness of a Linkage Model*

A key component in any model hoping to integrate nationally produced guidelines at the local level is the presence of intermediaries in the model. As discussed previously, this can include such individual change agents as peer opinion leaders acting as champions within small local groups. At a macro level, national guideline developers can create opportunities for local linkages by collaborating with national medical organizations to develop networks. Epps and colleagues (1998) conducted a study of the effectiveness of transferring preventive health programs (in this case the US National Cancer Institute's smoking cessation program) to physicians via national medical organizations using a train-the-trainer educational approach. Phase I of the project involved 1) enlisting national professional organizations; 2) cosponsoring 50 train-the-trainer

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director, chair and peers should be sought when identifying leaders.

sessions; and 3) training 2000 professionals to then train their colleagues. In Phase II, each trainer trained 50 colleagues (total = 100,000 trained professionals).

The rationale for using national medical organizations was that they would: have an interest in the content (e.g. tobacco use policies); be able to reach a large number of physicians; would have incentive to participate (i.e. they could use this training as a member benefit to recruit/retrain members); they have pre-existing national, regional and local communications channels; and they afford the opportunity to piggy-back the new training onto existing CME activities at national and regional conferences.

In selecting the national organizations to participate, the following criteria were used: large numbers of primary care physicians; use of conferences for CME; existence of established position statements on smoking cessation; availability of administrative staff; existence of state/local affiliates; established communication system within organizations and to members; flexibility in future national and regional meetings. Participation was made appealing to the organizations by assuring that they would incur no additional costs (Epps et al., 1998).

The authors suggest 12 strategies for facilitating the collaboration with these groups:

1. Get an "in" with a local member
2. Get an organization already committed to topic (eg. with existing policy)
3. Get an organization with their own program and make it worth their while to accept your approach (ie. provide free training)
4. Get them to involve staff in early stages
5. Get them each to appoint a staff person as coordinator
6. Make the training materials persuasive, adaptable, attractive and easy to use
7. Select faculty members ("master" trainers) who are experts on the topic, experienced teachers and who know how to use the materials
8. Hold national training seminars tagged onto national conferences
9. Offer training seminars as a member benefit - no cost, CME credits
10. Get voluntary and non-profit agencies as co-sponsors
11. Design a simple data collection system esp. re: outcome evaluation
12. Monitor program to assess effectiveness and identify groups that still need to be reached

## 6. COMPONENTS OF A POTENTIAL CTFPHC MODEL

### a. Key Questions

1. What organizing framework(s) or model(s) can be used by the CTFPHC to most effectively draw upon and integrate the evidence available in the literature on diffusion, dissemination and implementation?
2. How does the framework/model address possible barriers and facilitators?

### b. Model Components

Any model designed to facilitate diffusion, dissemination and implementation must address the issues surrounding the four components of a basic diffusion model: sender, message, channel and receiver.

#### *Sender Issues*

1. Direct responsibility for the internal processes that ensure reviews meet the criteria of rigour, timeliness, comprehensiveness and "user-friendliness" required to facilitate uptake and implementation.
2. Indirect influence on implementation can be facilitated by linking to, advocating for and working with external initiatives specifically targeted at implementation, and by generally providing assistance wherever appropriate and possible to facilitate implementation of CTF recommendations.

#### *Message & Channel Issues*

1. Diffusion and Dissemination - current diffusion efforts characterized by publication in peer reviewed medical journals, by compiling and printing periodic monographs and via electronic technologies will continue. In addition, more focussed dissemination strategies to target specific user groups (e.g. family physicians, public health professionals, policy-makers and consumers) will continue to be evolved and refined. Resources to support these activities will be required.

#### 2. Communication

a. Message design: The literature provides guidance on how to produce guidelines that are more likely to be read, understood and adopted. Key features include clear, precise and specific presentation of the facts, and discussion of difficult issues to reduce complexity as much as possible. If the topic is controversial, the issues on both sides can be delineated and presented in a balanced, concise way. Risks and consequences can be presented, and the benefits of the new approach can be compared to current practice in a convincing manner. The layout and style should be appealing and facilitate understanding, not obscure it.

2b. Promoting awareness: a first step to facilitating adoption and then implementation of any innovation is to ensure that the target audience is aware of that innovation. Strategies including press releases (via journals, medical newspapers etc.); media coverage; notices sent via existing physician communication networks (e.g. professional organization newsletters and bulletins); electronic notices (email, website postings) should be used to promote initial awareness of newly released CPGs.

3. Linkages - following Orlandi (1991), a "linkage model" presents a promising approach that will be further explored. This is conceived on two levels:

a) Linkage with organizations - to facilitate large-scale dissemination efforts, it is important to link in to already established networks of communication. In the Canadian medical establishment, primary care physicians can be reached through their professional colleges or organizations. For example, family physicians are accredited by the College of Family Physicians of Canada, and they receive journals, bulletins, CME training, etc. via their provincial chapter. It will be imperative to link to the National college, and to provincial chapters and local initiatives both as a means of accessing their communication network, but more importantly to promote collaborative development of initiatives to promote implementation of CPGs. Past efforts, such as the development of the office wallchart of CTF-recommended preventive services (endorsed by the Canadian Medical Association and the College of Family Physicians of Canada) proved very successful. Preliminary discussions between Dr. Feightner, CTF Chair, and Dr. Handfield-Jones, CFPC Director of Continuing Medical Education, have been very positive.

b) Linkage with individuals - as we know from the literature, the most effective strategies for uptake of new knowledge by physicians involve participative, interpersonal approaches, including use of opinion leaders or educational influentials, academic detailing and audit and feedback. We propose to explore the feasibility of identifying opinion leaders and other partners at the local, provincial and national levels using a method adapted from the successful approaches described on pp. 16-18. These opinion leaders could be invited to participate in various aspects of the CPG development cycle, including priority setting. Content experts could become contributors or reviewers early in the development process, as well as acting as champions or change agents at the dissemination stage.

A key aspect of making this multiple linkage approach work would be establishing stable communication networks and ensuring adequate support to partners at all stages of the process. A network of key family physicians (opinion leaders) would create an enriched infrastructure for dissemination and for facilitating involvement and implementation at the local level. Again, resources will need to be secured to ensure this.

*Receiver Issues*

1. System - organizational approaches to behaviour change that have proven effective include reminder systems, audit and feedback systems and support for these activities at the practice management level (e.g. adequate monitoring and recording practices). While the CTF is not mandated or resourced to become directly involved in day-to-day practice activities, it can serve as an advocate to their implementation and support. In addition, the development of new office tools<sup>7</sup> (such as posters, brochures, chart stickers, etc.) can also be advocated by CTF, and partnerships with groups developed to find ways to fund these and promote further research and evaluation of their role in implementation.

2a. Individual - Physician - as we have seen, changing physician practices and attitudes presents a significant challenge. The use of peers to facilitate change is described in the linkage approach, above. In terms of influencing physician attitudes, the CTF can continue to promote prevention as part of the curriculum for medical schools and residency programs, so that new doctors are prepared to provide preventive services. The CTF can also advocate for effective methods of CME to help existing physicians upgrade their clinical examination and counseling skills. Finally, we can make it easier for busy physicians to access the CTF's information, such as via the CTF website<sup>8</sup>, and make sure this information meets the message criteria defined above.

2b. Individual - Patient - another way to ensure that patients receive preventive services is to make them aware of which preventive maneuvers are effective, and which are not. A patient request for prevention may be a powerful motivator to its provision by a clinician (Sander et al., 1996; Roter, 1984; Flocke et al., 1998). In addition, an understanding of healthy lifestyle approaches that prevent ill health will benefit patients generally. The CTF is currently evaluating how best to provide its evidence-based information directly to patients. One possibility is linking to national and local health promotion agencies, such as public health units.

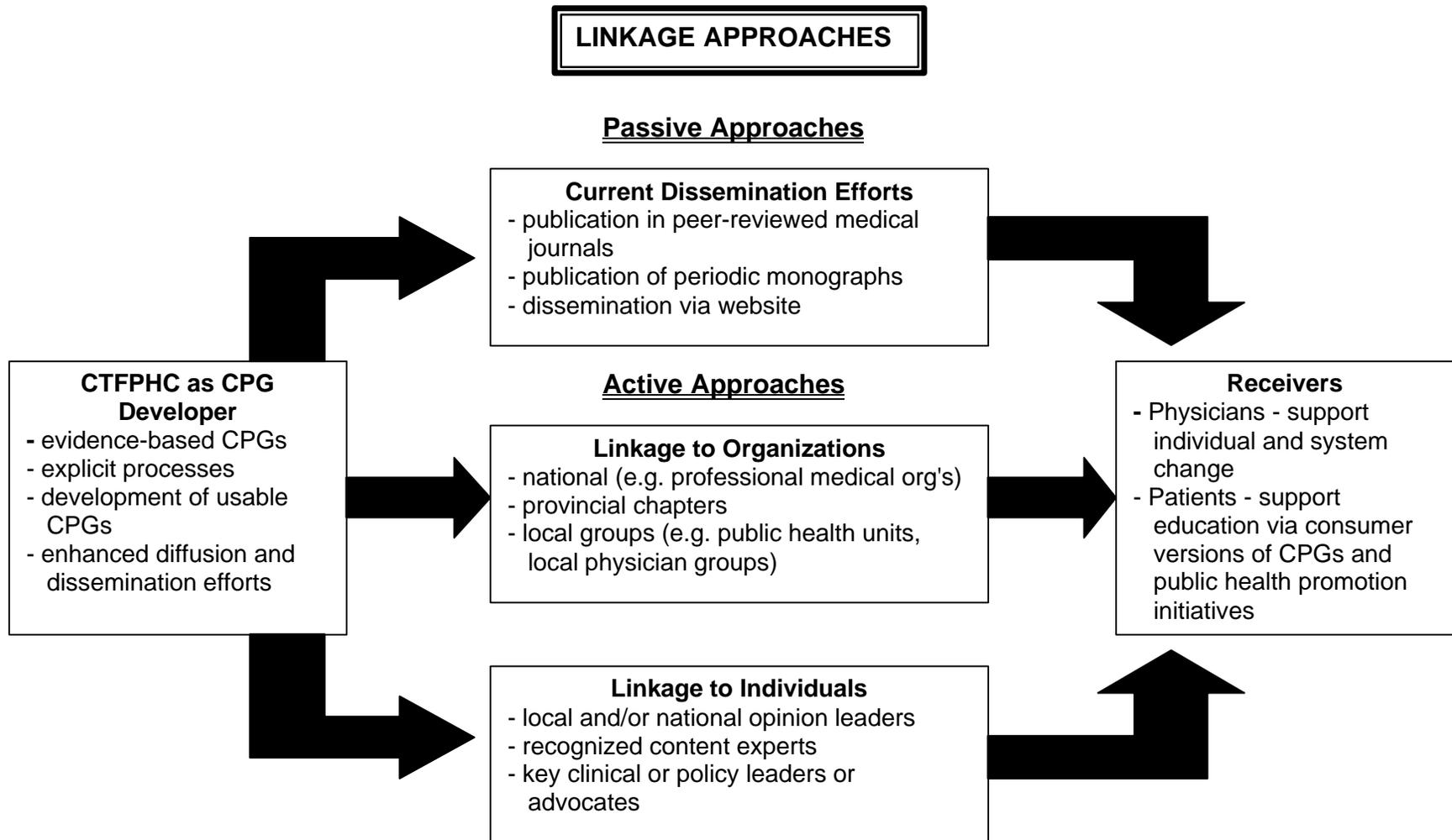
These key components of a potential CTF model are presented graphically on the following page.

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<sup>7</sup> The use of office tools to promote practice of preventive services has been proven largely ineffective. However, there has been little research on the use of these tools in a more broadly defined implementation system. Also, the use of these tools as a means of promoting awareness and "buy-in" is not known.

<sup>8</sup> A research project to obtain physician input onto the further development and evaluation of the website is currently underway.

## Components of a Potential CTF Dissemination- Implementation Infrastructure



## **7. NEXT STEPS, INCLUDING POSSIBLE DISSEMINATION MECHANISMS**

### **a. Research & Development Tasks:**

1. Identify linkage mechanisms and partners at every level of the model, including national, provincial and local organizations, and individual opinion leaders. Initial contacts to aid in opinion leader identification can include:

- Chairs of University departments of Family Medicine
- Chiefs of local hospital departments of Family Medicine
- Directors of Provincial chapters of professional organizations (e.g. College of Family Physicians)
- Local CME convenors
- Etc.

In addition to identifying opinion leaders, their role in the linkage system and in the guideline development process must be better understood (e.g. some may contribute by providing feedback on the clinical aspects of a guideline, while other might link to implementation initiatives).

2. Further develop the model in conjunction with identified partners, using "lessons learned" from the literature.

3. Test the model at a) an exploratory or pilot level, b) refine it, and c) test it on a larger scale.

4. Obtain resources for #2&3, above.

### **b. Dissemination Plan:**

The current report, and/or background information therein, will be disseminated as follows:

1. the literature review will be refined and developed into an academic manuscript suitable for publication in a peer-reviewed journal;

2. the evolved model will be presented at appropriate health care meetings or conferences, including discussion at an upcoming Canadian Task Force meeting, and possibly to such evidence-based medicine groups as HealNet, etc.

3. the model could be shared with the United States Preventive Services Task Force to explore their interest in collaboration.

4. relevant background information will be posted to the Canadian Task Force world wide website.

## 8. REFERENCES

- Anderson JG, Jay SJ, Perry J, Anderson MM, Schweer HM. Informal communication networks and change in physicians' practice behavior. *Proc Annu Conf Res Med Educ.* 1988;27:127-32.
- Anderson JG, Jay SJ. Computers and clinical judgment: the role of physician networks. *Soc Sci Med.* 1985;85;20:969-79.
- Belcher, DW, Berg, AO, Inui, TS. Practical approaches to providing better preventive care: Are physicians a problem or a solution. In RN Battista & RS Lawrence (eds.) *Implementing Preventive Services.* New York: American Journal of Preventive Medicine. 1988.
- Berger JT and Rosner F. The ethics of practice guidelines. *Arch Intern Med* 1996; 156:2051-6.
- Bero LA, Jadad AR. How consumers and policymakers can use systematic reviews for decision making . *Ann Intern Med.* 1997;97:37-42.
- Browman GP, Levine MN, Mohide EA, Hayward RS, Pritchard KI, Gafni A, Laupacis A. The practice guidelines development cycle: a conceptual tool for practice guidelines development and implementation. *J Clin Oncol* 1995 Feb;13(2):502-12.
- Browman GP, Newman TE, Mohide EA, Graham ID, Levine MN, Pritchard KI, Evans WK, Maroun JA, Hodson DI, Carey MS, Cowan DH. Progress of clinical oncology guidelines development using the Practice Guidelines Development Cycle: the role of practitioner feedback. *J Clin Oncol* 1998 Mar;16(3):1226-31.
- Canadian Task Force on the Periodic Health Examination. *The Canadian Guide to Clinical Preventive Health Care.* Ottawa:CCG. 1994 .
- Clarke, A & Associates. *A Literature Review to Identify Principles to Facilitate Physician Behaviour Change to Adopt and Implement Clinical Practice Guidelines.* Report commissioned for Adult Health Division, Health Canada, November 1998.
- Conroy M, Shannon W. *Clinical Guidelines: their implementation in general practice.* *British Journal of General Practice.* 1995;45:371-5.
- Cook DJ, Greengold NL, Ellrod AG, Weingarten SR. The relation between systematic reviews and practice guidelines. *Ann. Intern. Med.* 1997; 127(3):210, 216.
- Cosmas SC, Sheth JN. Identification of Opinion Leaders Across Cultures: an assessment for use in the diffusion of innovations and ideas. *Journal of International Business Studies.* 1980;7:66-73.
- Covell, DG, Uman GC, Manning PR. Information needs in office practice: are they being met? *Ann Intern Med* 1985; 85(4), 596-599.
- Davis DA & Taylor-Vaisey, A. 2. What the literature says: translating guidelines into practice. In: *Implementing Clinical Practice Guidelines: A Handbook for Practitioners.* Canadian Medical Association, 1997.
- Davis DA, Thomson MA, Oxman AD, Haynes RB. Evidence for the effectiveness of CME. *JAMA* 1992; 268:1111-7.
- Davis, DA, Thomson, MA, Oxman, AD, Haynes, RB. Changing physician performance: A systematic review of the effect of educational strategies. *JAMA,* 1995 274, 700-705.
- Epps RP, Manley MW, Husten CG, Houston TP, Martin LR, Glynn TJ. Transfer of preventive health programs to physicians' practices through medical organizations. *Am J Prev Med* 1998 Jan;14(1):25-30.

- Flocke SA, Stange KC, Zyzanski SJ. The association of attributes of primary care with the delivery of clinical preventive services. *Med Care* 1998 Aug;36(8 Suppl):AS21-30.
- Fox RD, Mazmanian, PE, Putnam, RW. *Change and Learning in the Lives of Physicians*. New York, NY: Praeger Publishers; 1989.
- Frame PS. Clinical prevention in primary care: everyone talks about it, why aren't we doing it? *J Am Board Fam Pract*. 1994;7(5):449-51.
- Gates PE. Think Globally, Act Locally: an approach to implementation of clinical practice guidelines. *Journal of Quality Improvement*. 1995;21:71-84.
- Glanville J, Haines M, Auston, I. Getting research findings into practice: Finding information on clinical effectiveness. *BMJ* 1998; 317:200-203.
- Greco PJ, Eisenberg JM. Changing physicians' practices. *N Engl J Med* 1993; 329:1271-4.
- Grilli R, Lomas J Evaluating the message: the relationship between compliance rate and the subject of a practice guideline. *Med Care* 1994;32(3):202-13
- Grimshaw JM, Russell IT. Effect of clinical guidelines on medical practice: a systematic review of rigorous evaluations [see comments]. *Lancet*. 1993;93:1317-22.
- Grol R, Dalhuijsen J, Thomas S, Veld C, Rutten G, Mokkink H. Attributes of clinical guidelines that influence use of guidelines in general practice: observational study. *BMJ* 1998 Sep 26;317(7162):858-61.
- Grol R. Development of guidelines for general practice care. *Br J Gen Pract* 1993; 43(369):146-51.
- Haynes B, Haines A. Getting research findings into practice: Barriers and bridges to evidence based clinical practice. *BMJ*, 1998; 317:273-276
- Hayward RSA, Guyatt GH, Moore K-A, McKibbon KA, Carter AO. Canadian physicians' attitudes about and preferences regarding clinical practice guidelines. *Can Med Assoc J* 1997; 156:1715-23.
- Hibble A, Kanka D, Pencheon D, Pooles F Guidelines in general practice: the new Tower of Babel? *BMJ* 1998 Sep 26;317(7162):862-3.
- Hiss RG, Macdonald, R, Davis WK. Identification of physician educational influentials (EI's) in small community hospitals. *Res Med Educ* 1978; 17:283-88.
- Hutchison BG, Abelson J, Woodward CA, Norman G Preventive care and barriers to effective prevention. How do family physicians see it? *Can Fam Physician* 1996 Sep;42:1693-700.
- Institute of Medicine. Field MJ, Lohr KN, Editors. *Clinical practice guidelines: Directions for a new program*. Washington, D.C. National Academy Press; 1990.
- Jadad AR, Gagliardi, A. Rating health information on the Internet: navigating to knowledge or to Babel? *JAMA* 1998; 279(8):611-614.
- Kaluzny AD, Konrad TR, McLaughlin CP. Organizational strategies for implementing clinical guidelines [see comments]. *Jt Comm J Qual Improv*. 1995;95:347-51.
- Karuza J, Calkins E, Feather J, Hershey CO, Katz L, Majeroni B. Enhancing Physician Adoption of Practice Guidelines. *Arch Intern Medicine*. 1995;155:625-32.
- Kuller AB, Wessel CB, Ginn DS, Martin TP. Quality filtering of the clinical literature by librarians and physicians. *Bull Med Libr Assoc* 1993; 81(1), 38-43.

- Leckie , G.J., Pettigrew, K. E. & Sylvain, C. (1996). Modeling the information seeking of professionals: A general model derived from research on engineers, health care professionals, and lawyers. *LQ*, 66(2); 161-193.
- Lomas J. Diffusion, dissemination & implementation: who should do what? *Ann NY Acad Sci* 1993b; 93:226-35.
- Lomas J. Making clinical policy explicit. Legislative policy making and lessons for developing practice guidelines, *Int. J. Technol. Assess. Health Care*1993a 9; 11-25.
- Lomas J. Retailing research: increasing the role of evidence in clinical services for childbirth. *Milbank Q.* 1993c;71(3):439-75.
- Marshall, J. Issues in clinical information delivery. *Lib Trends* 1993; 42(1); 83-107.
- Onion CW, Dutton CE, Walley T, Turnbull CJ, Dunne WT , Buchan IE. Local clinical guidelines: description and evaluation of a participative method for their development and implementation. *Fam Pract.* 1996;96:28-34.
- Orlandi MA, Landers C, Weston R, Haley N. Diffusion of Health Promotion Innovations. In: Glanz K, Lewis F, Rimer B, eds. *Health Behaviour and Health Education: Theory, Research and Practice*. San Francisco: Jossey-Bass Publishers; 1991:288-313.
- Orlandi MA. Health promotion technology transfer: organizational perspectives. *Can.J.Public Health.* 1996;87 Suppl 2:S28-33:S28-33.
- Orlandi MA. The diffusion and adoption of worksite health promotion innovations: an analysis of barriers. *Prev.Med.* 1986;15:522-36.
- Petrie JC, Grimshaw JM, Bryson A. The Scottish Intercollegiate Guidelines Network Initiative: getting validated guidelines into local practice. *Health Bull (Edinb).* 1995;53:345-8.
- Prochaska JO. Assessing how people change. *Cancer.* 1991 Feb 1;67(3 Suppl):805-7.
- Prochaska, JO, DiClemente, CC, Norcross, JC. In search of how people change: Applications to addictive behaviors. *American Psychologist.* 1992; 47(9):1102-1114.
- Prochaska, JO, Velicer, WF, DiClemente, CC, Fava, J. Measuring processes of change: Applications to the cessation of smoking. *J. Consulting & Clinical Psychology.* 1988; 56(4):520-528.
- Rogers, EM. *Diffusion of Innovations*, 4<sup>th</sup> Edition. New York: The Free Press. 1995.
- Roter DL. Patient question asking in physician-patient interaction. *Health Psychol* 1984;3(5):395-409
- Sackett, DL. et al. *Evidence-based medicine : how to practice and teach EBM*. New York ; Edinburgh : Churchill Livingstone, 1997.
- Sander RW, Holloway RL, Eliason BC, Marbella AM, Murphy B, Yuen S Patient-initiated prevention discussions. Two interventions to stimulate patients to initiate prevention discussions. *J Fam Pract* 1996 Nov;43(5):468-74.
- Soumerai SB, Avorn J Principles of educational outreach ('academic detailing') to improve clinical decision making. *JAMA* 1990 Jan 26;263(4):549-56.
- Soumerai SB, McLaughlin TJ, Gurwitz JH, et al. Effect of Local Medical Opinion Leaders on Quality of Care for Acute Myocardial Infarction. *JAMA.* 1998;279:1358-63.
- Thomson MA, Oxman AD, Haynes RB, Davis DA, Freemantle N, Harvey EL. Local Opinion Leaders to Improve Health Professional Practice and Health Care Outcomes. *The Cochrane Library.* 1998;1998:1-11.

- Tunis SR, Hayward R, Wilson M, et al. Internists' Attitudes about Clinical Practice Guidelines. *Ann Intern Med.* 1994;120:956-63.
- Wall EM, Susman J, Hagen MD, LeFevre M. An overview of clinical policies with implications for clinical practice, medical education, and research. *Fam. Med.* 1994; 26(5):314 -318.
- Weingarten S, Stone E, Hayward R, Tunis S, Pelter M, Huang H, Kristopaitis R The adoption of preventive care practice guidelines by primary care physicians: do actions match intentions?. *J Gen Intern Med* 1995 Mar;10(3):138-44.
- Wensing M, Grol R. Single and combined strategies for implementing changes in primary care: a literature review. *Int J Qual Health Care* 1994 Jun;6(2):115-32.
- Wensing M, Van Der Weijden T, Grol R. Implementing Guidelines and Innovations in General Practice: which interventions are effective? *British Journal of General Practice.* 1998;48:991-7.
- Winkler JD, Lohr KN, Brook RH. Persuasive communication and medical technology assessment. *Arch Intern Med* 1985 Feb;145(2):314-7
- Wise CG, Billi JE. A model for practice guideline adaptation and implementation: empowerment of the physician [see comments]. *Jt Comm J Qual Improv.* 1995;21:465-76.
- Woolf SH Practice guidelines: what the family physician should know. *Am Fam Physician* 1995 May 1;51(6):1455-63.
- Worrall G, Chaulk P, Freake D The effects of clinical practice guidelines on patient outcomes in primary care: a systematic review. *CMAJ* 1997 Jun 15;156(12):1705-12.

Table 1

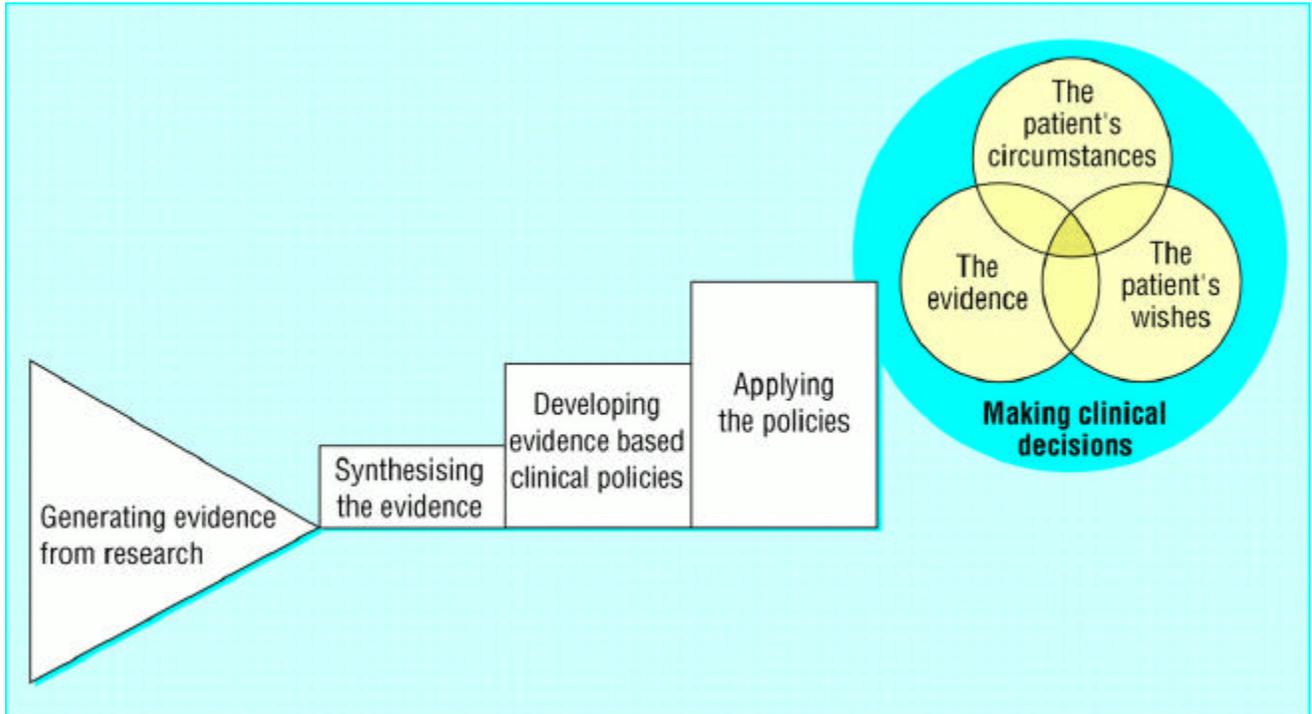
**Physicians' Reported Sources of Information**From: *Hayward et al (1997). CMAJ 156(12); 1715-23.*

<b>Sources of information used by respondents, by frequency of use</b>				
Source	Frequency of use; no. (and %*) of respondents			
	Never or yearly	Monthly	Daily or weekly	No response
Discussions with colleagues or consultants	40(3)	1000(16)	647(81)	191
Review articles in journals	129(9)	864(51)	685(40)	200
Medical textbooks	309(18)	701(42)	638(40)	230
Pocket notes	633(34)	480(31)	492(35)	273
Original research articles in journals	397(31)	709(41)	551(28)	221
Brief updates (e.g., the Medical Letter)	635(35)	717(48)	266(17)	260
CPGs	823(48)	581(38)	201(14)	273
Continuing medical education (CME) courses	1067(55)	450(34)	152(11)	209
Computer-aided literature searches (e.g., MEDLINE)	968(68)	482(22)	192(10)	236
Position papers by physician organizations	922(61)	585(33)	92(6)	279
Provincial or territorial insurance plan policies	1407(86)	146(12)	27(2)	298
*Percentages may not total 100 because of weighting by sample strata.				

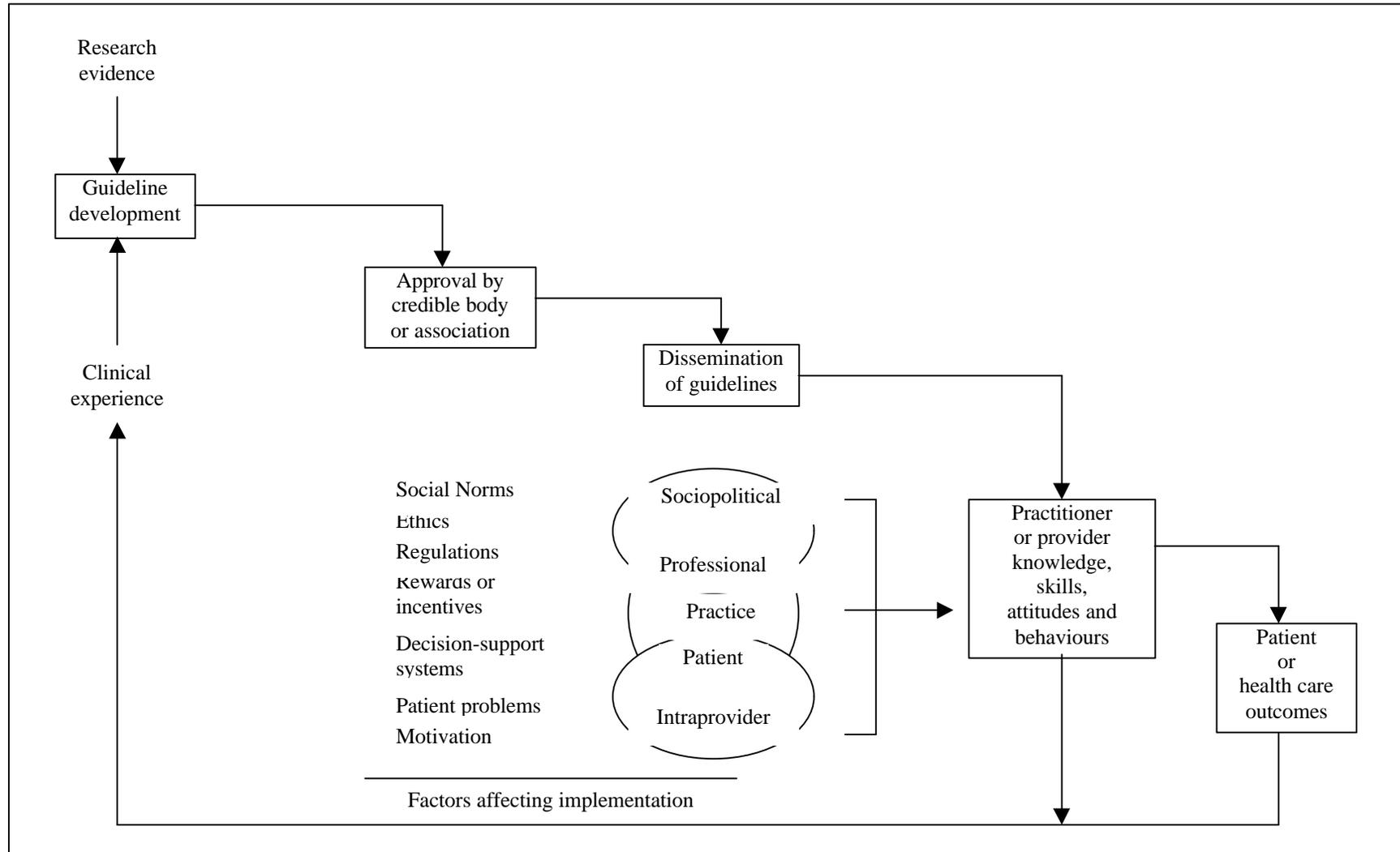
Figure 1

**Getting Evidence from Research to Practice**

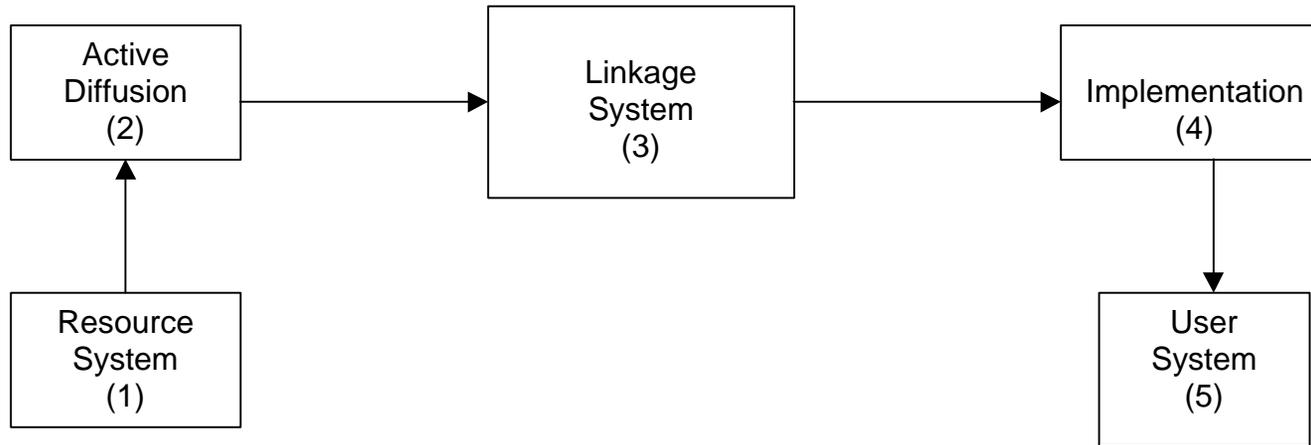
From: Haynes & Haines (1998). *BMJ*, 317, 273-276



**Figure 2**  
**The guideline cascade: steps in the development and implementation of clinical practice guidelines, and factors influencing the adoption of guidelines. Adapted from Fox, Mazmanian and Putnam as in David & Taylor-Vaisey, 1997.**

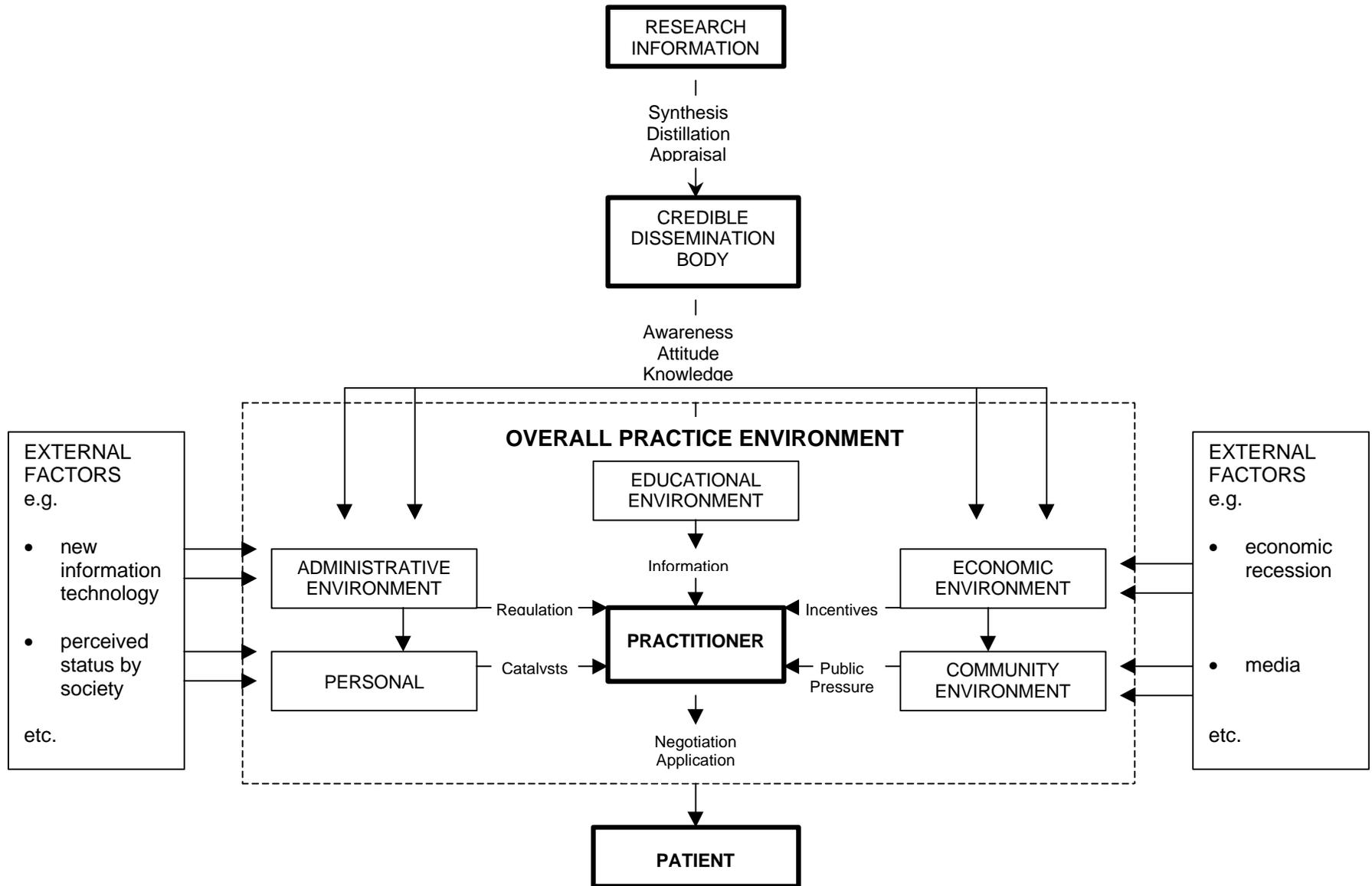


**Figure 3: Orlandi's Linkage Approach Model**



1. The resource system consists of researchers, developers, trainers, consultants, services, products, and materials.
2. The diffusion process is the range of activities carried out specifically to result in the spread of an innovation to specific target groups.
3. The linkage system consists if representatives of the resources system, representatives of the user system, change agents, and strategic planning activities.
4. The implementation process may be carried out either by members of the user system who have received training or by members of the resource system. The important point is that the implementation process and the innovation itself have been developed through collaboration, thus increasing the likelihood that efficacious approaches will be used in a culturally sensitive manner whenever possible.
5. The user system consists of the individuals, organizations, agencies, groups and networks.

**Figure 4: Lomas's Coordinated Implementation Model**  
 (from: *The Milbank Quarterly* 1993;71:439-475)



**Table 2a**Items, Factors, and Reasons for Inclusion  
in EI Identification Instrument

<u>Item</u>	<u>Factors</u>	<u>Reason for Inclusion</u>
They convey information in such a fashion as to provide a learning experience.	Communication	Descriptive & Discriminating
They express themselves clearly and to the point - provide practical information first and then an explanation or rationale if time allows.	Communication	Discriminating
They take the time to answer you completely and do not leave you with the feeling that they were too busy to answer your inquiry.	Communication	Descriptive
They enjoy and are willing to share any knowledge they have.	Communication	Descriptive
They are individuals who like to teach.	Knowledge	Discriminating
They are current and up to date and demonstrate a command of medical knowledge.	Knowledge	Descriptive
They demonstrate a high level of clinical expertise.	Knowledge	Descriptive
They are “caring” physicians who demonstrate a high level of humanistic concern.	Humanism	Descriptive
They never talk down to you, they treat you as an equal even though it’s clear they are helping you.	Humanism	Descriptive

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 Reproduced from Hiss et al., Res. Med. Educ. 1978; 17: 286.

**Table 2b: EI Identification of Instrument**

The three paragraphs that follow are an attempt to describe the behavioural characteristics of physicians as they interact with their colleagues on an informal basis during the course of a typical day in practice. These characteristics have been derived from a survey of over three hundred Michigan physicians. Most physicians demonstrate these characteristics throughout their careers. However, as with any human interaction, some physicians demonstrate such behaviour more often and more consistently than others. What we would like to learn from you is which physician(s) in your hospital best fit the descriptive paragraphs that follow.

Please read each paragraph carefully and indicate the name(s) of the physician(s) that best fit each description. You may write the names of up to three physicians for each paragraph. The same physician may be named in more than one paragraph. Remember all information on this survey is strictly confidential.

Paragraph A

They convey information in such a fashion as to provide a learning experience. They express themselves clearly and to the point--provide practical information first and then an explanation or rationale if time allows. They take the time to answer you completely and do not leave you with the feeling that they were too busy to answer your inquiry. They enjoy and are willing to share any knowledge they have.

NAME \_\_\_\_\_  
NAME \_\_\_\_\_  
NAME \_\_\_\_\_

Paragraph B

They are individuals who like to teach. They are current and up to date and demonstrate a command of medical knowledge. They demonstrate a high level of clinical expertise.

NAME \_\_\_\_\_  
NAME \_\_\_\_\_  
NAME \_\_\_\_\_

Paragraph C

They are “caring” physicians who demonstrate a high level of humanistic concern. They never talk down to you; they treat you as an equal even though it’s clear they are helping you.

NAME \_\_\_\_\_  
NAME \_\_\_\_\_  
NAME \_\_\_\_\_

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Reproduced from Hiss et al., Res. Med. Educ. 1978; 17: 287.

## Appendix 1

### Annotations of Key Papers

**Browman GP, Levine MN, Mohide EA, Hayward RS, Pritchard KI, Gafni A, Laupacis A. The practice guidelines development cycle: a conceptual tool for practice guidelines development and implementation. J Clin Oncol 1995 Feb;13(2):502-12.**

**Browman GP, Newman TE, Mohide EA, Graham ID, Levine MN, Pritchard KI, Evans WK, Maroun JA, Hodson DI, Carey MS, Cowan DH. Progress of clinical oncology guidelines development using the Practice Guidelines Development Cycle: the role of practitioner feedback. J Clin Oncol 1998 Mar;16(3):1226-31.**

These authors developed a model outlining the development of clinical practice guidelines (1995). This model is interesting because it makes the key steps in the development process very explicit. While there are 8 main components to the cycle, starting with identifying the clinical problem, for the purposes of the current report, the focus is primarily on the last three stages: 6. Negotiate practice policies; 7. Adopt guideline, and 8. Scheduled review. While the authors offer no practical strategies for effective dissemination and implementation, they do stress the importance of involving the end-users (clinicians) in the earlier stages of the development process. A method for mediating this participation is the use of formal consensus development processes. Indeed, in the follow-up paper (1998) these authors report on a study to assess the process of involving end-user clinicians in the development cycle, and the success of this approach. They conclude that practitioner feedback is both feasible and useful, and the suggestions made by their respondents enriched the evidence-based guidelines. Of interest is that this study was carried out with Ontario physicians.

**Clarke, A & Associates. A Literature Review to Identify Principles to Facilitate Physician Behaviour Change to Adopt and Implement Clinical Practice Guidelines. Report commissioned for Adult Health Division, Health Canada, November 1998.**

This recent report for Health Canada is a comprehensive overview of the literature that identifies a series of principles, supported by varying types of evidence, underlying effective physician behavior change programs, as related to uptake and implementation of clinical practice guidelines.

**Davis DA, Thomson MA, Oxman AD, Haynes RB. Evidence for the effectiveness of CME. JAMA 1992; 268:1111-7.**

**Davis, DA, Thomson, MA, Oxman, AD, Haynes, RB. Changing physician performance: A systematic review of the effect of educational strategies. JAMA, 1995 274, 700-705.**

These papers by Davis and colleagues review the literature for the effectiveness of continuing medical education (CME) approaches, and other strategies to effect physician behaviour change. The authors conclude that traditional CME methods are often ineffective (1992); and that, in general, educational approaches to changing physician behaviour are less effective than desired (1995).

**Epps RP, Manley MW, Husten CG, Houston TP, Martin LR, Glynn TJ. Transfer of preventive health programs to physicians' practices through medical organizations. Am J Prev Med 1998 Jan;14(1):25-30.**

Describes a study of the effectiveness of transferring a preventive health program to physicians via national medical organizations using a train-the-trainer educational approach. The rationale for using national medical organizations was that they would: have an interest in the content; be able to reach a large number of physicians; would have incentive to participate (i.e. they could use this training as a member benefit to recruit/retrain members); they have pre-existing national, regional and local communications channels; and they afford the opportunity to piggy-back the new training onto existing CME activities at national and regional conferences. The authors suggest 12 strategies for facilitating the collaboration with these groups.

**Grol R, Dalhuijsen J, Thomas S, Veld C, Rutten G, Mokkink H. Attributes of clinical guidelines that influence use of guidelines in general practice: observational study. BMJ 1998 Sep 26;317(7162):858-61.**

These authors developed and examined a list of characteristics of guidelines that facilitate their uptake and implementation in clinical practice. In general, guideline attributes that influence uptake are categorized as those having to do with: scientific validity; relevance and applicability in practice; formulation and style; compatibility with existing values and practices; complexity, consequences for care providers, patients and practice management; risks associated with implementing the guideline; and how much attention is given to disseminating the guideline. The attributes with the greatest influence on whether or not guidelines were used were: 1) "based on scientific evidence"; and 2) "described concretely and precisely". Inversely, the attributes most contributing to non-use were: 1) "vague and not specific"; 2) "controversial and not compatible with current values"; and 3) "demanded changing existing routines and impacts management".

**Hayward RSA, Guyatt GH, Moore K-A, McKibbon KA, Carter AO. Canadian physicians' attitudes about and preferences regarding clinical practice guidelines. Can Med Assoc J 1997; 156:1715-23.**

These authors conducted a study of Canadian physicians to understand their information preferences, needs and uses (note: of the over 3000 Canadian physicians surveyed, about one third were primary care physicians). Informal discussions had the greatest impact on clinical decision-making.. More formal training and reading were also influential. The sources reported as having the least impact on clinical decision-making were: pocket notes, clinical practice guidelines, brief updates, original research articles, position papers, computerized literature searches, and insurance plan policies. These results are consistent with the findings from similar studies of physicians' information source preferences.

**Hiss RG, Macdonald, R, Davis WK. Identification of physician educational influentials (EI's) in small community hospitals. Res Med Educ 1978; 17:283-88.**

These authors developed a process for peer identification of educationally influential physicians. Briefly, educational influentials consistently and more frequently (than other physicians) display 9 characteristics, clustered around three general areas: communication, humanism, and knowledge. The authors subsequently developed an "Educational Influential Identification Instrument" consisting of a brief introductory paragraph, followed by short descriptive paragraphs capturing features of the three areas. Peers are asked to name colleagues that best exemplify each cluster of characteristics. This method has been subsequently used by other researchers to identify opinion leaders in educational intervention studies.

**Hutchison BG, Abelson J, Woodward CA, Norman G Preventive care and barriers to effective prevention. How do family physicians see it? Can Fam Physician 1996 Sep;42:1693-700.**

Hutchison and colleagues (1996) examined the barriers to effective transfer of prevention guidelines, specifically Canadian Task Force recommendations, to Canadian primary care physicians. In the area of prevention, additional barriers to implementation were cited, including patients' lack of motivation, patient expectations regarding health promotion counseling, and a reimbursement system not conducive to increasing preventive practice. Results of the study show a significant difference between how much preventive care physicians think should be given, and how much they actually provide. They conclude that: "this gap could provide motivation for change, creating a receptive climate for strategies to enhance preventive care performance...many [family physicians] might support changes in practice organization, clinical records, and information systems to give greater prominence to preventive and anticipatory care; initiatives to inform the public about preventive care; and development and implementation of effective reminder systems..." (p. 1698).

**Kaluzny AD, Konrad TR, McLaughlin CP. Organizational strategies for implementing clinical guidelines [see comments]. Jt Comm J Qual Improv. 1995;95:347-51.**

These authors highlight some of the features of the implementation process, apart from receiver, sender and message characteristics, which can influence successful implementation. The implementation phase itself is a multi-stage, interactive process consisting of several decision points. The following stages are required: recognition (that a gap exists between current and best practice); identification (by key decision-makers that there is a problem and something should/could be done), implementation (use of the guidelines), and institutionalization (integration of the guidelines into ongoing activities). However, guideline attributes and organizational characteristics will determine how a specific guideline moves through the implementation process. Given the potentially unlimited number of interactions this could entail, it is key to develop implementation strategies tailored to the users' organization/practice setting. Kaluzny et al. (1995) propose strategies aimed at recognizing the complexity of guidelines, organizations, and the interaction thereof. Two of these, continuous quality improvement (CQI) and reengineering are described in the paper.

**Karuza J, Calkins E, Feather J, Hershey CO, Katz L, Majeroni B. Enhancing Physician Adoption of Practice Guidelines. Arch Intern Medicine. 1995;155:625-32.**

Karuza et al. (1995) describe a consensus-based process for dissemination and implementation of a preventive health care guideline. Primary care practices were randomly allocated to participate (or not) in a 1-hour small group session to discuss and reach consensus on the implementation of a guideline on influenza vaccination for the elderly (control groups met to discuss an unrelated topic). Results indicated that those physicians who participated in the consensus process increased their vaccination rates by 34%, compared to controls. Knowledge about influenza and attitudes towards prevention did not change, and did not differ between the two groups.

**Lomas J. Diffusion, dissemination & implementation: who should do what? Ann NY Acad Sci 1993b; 93:226-35.**

Lomas (1993b) echoes Rogers by stating that "information must be part of a communication process before it is available as an input to decision making" (p. 226). However, in terms of effectiveness, the diffusion model has been criticized on several levels. First, diffusion of medical information is often passive, haphazard, not targeted, unplanned, uncontrolled. In effect, information is released "into the void" and those receivers that do come into contact with it were already open to receiving new information as generally active, highly motivated information-seekers. Lomas points out that end-user searching, and indeed active journal readers, are increasingly rare. Thus, he concludes, the true diffusion model is only effective when 1) receivers

are highly motivated; 2) the rewards for finding the information are high; and 3) there is a relatively small pool of information. The problem, according to Lomas, is that none of these conditions exist for physicians today.

**Lomas J. Retailing research: increasing the role of evidence in clinical services for childbirth. *Milbank Q.* 1993c;71(3):439-75.**

In this paper, Lomas (1993c) develops the "Coordinated Implementation Model". As the name implies, it focuses on the implementation of CPGs. The key components of this model are the integration, or at least the acknowledgement, that factors outside of the immediate practice environment impact the individual clinician's adoption decision and subsequent implementation behaviour. The clinician faces demands (often competing) from economic, administrative, personal and community sources, as well as from her patients. External factors, such as new information technologies and social influences also come into play. Lomas' point is that the clinician is not a "blank slate" waiting for information, and the complexity of their unique situations, experiences and needs will impact their adoption and implementation decisions. To aid us, Lomas identifies a series of conditions that must be in place if implementation in practice is to occur. In summary, Lomas states that "local implementation activities [predispose physicians to consider change in their practices]...by enabling and subsequently reinforcing the desired behaviour change. Different skills are needed for each activity." (p. 234). In terms of the roles of key players in the overall process, Lomas states that journals are best suited to the role of "diffusion agents", while academics and medical organizations can facilitate the dissemination process. Finally, local agents, with the proper resources, are best suited to facilitate implementation activities.

**Orlandi MA, Landers C, Weston R, Haley N. Diffusion of Health Promotion Innovations. In: Glanz K, Lewis F, Rimer B, eds. *Health Behaviour and Health Education: Theory, Research and Practice*. San Francisco: Jossey-Bass Publishers; 1991:288-313.**

**Orlandi MA. Health promotion technology transfer: organizational perspectives. *Can.J.Public Health.* 1996;87 Suppl 2:S28-33:S28-33.**

**Orlandi MA. The diffusion and adoption of worksite health promotion innovations: an analysis of barriers. *Prev.Med.* 1986;15:522-36.**

In these three papers, Orlandi sets the stage for and subsequently tests a model, later called the "Linkage Approach Model" for diffusion and uptake of health promotion innovations. Working within the health promotion field, Orlandi (1986, 1996) incorporates approaches from health education and theories of health behaviour. The model provides a general framework for conceptualizing the main actors in the process, and how they are linked together. Orlandi (1991) identifies some key reasons why classic diffusion efforts have failed to successfully transfer health innovations. Having identified the potential for failure, Orlandi (1991) proposes the "linkage approach to innovation-development and diffusion planning (1991, p. 294). "The key to this approach lies in its reliance on increased target group participation in all aspects of the process." (ibid.). The distinguishing feature of this approach, and the key one for our purposes, is the Linkage System and the roles of the resource (CPG developer) and user (physician/patient) systems in creating and maintaining the linkage: "the role of the resource system is to collaborate with the user system in the innovation planning process by helping the user system determine its needs, expectations, and limitations" (Orlandi, 1991, p. 296). This simple model provides an important framework for conceptualizing participative strategies for dissemination and implementation of CPGs.

**Petrie JC, Grimshaw JM, Bryson A. The Scottish Intercollegiate Guidelines Network Initiative: getting validated guidelines into local practice. Health Bull (Edinb). 1995;53:345-8.**

Petrie et al. (1995) suggest a different approach to local implementation of national guidelines. Rather than developing guidelines locally, they state that: "the opportunity of modifying...guidelines to create local protocols offers individual local groups the opportunity to adapt the guidelines - but not the evidence! - to their own 'style' of practice. This local ownership step has been shown to increase the uptake of local protocols" (p 347). The key components of their approach are 1) using a local priority setting process; 2) stressing that the process is not prescriptive or a "straight-jacket"; 3) having adequate resources available, including time and money; and 4) educating participants about the development process and the methodology employed (e.g. evidence-based). Proper planning and management, they claim, can overcome not only the global barriers to CPG use, but also more local barriers, such as lack of protected time, budget pressures/ cost improvement programmes, legal implications, waiting lists and accreditation requirements.

**Rogers, EM. Diffusion of Innovations, 4<sup>th</sup> Edition. New York: The Free Press. 1995.**

This is the fourth edition of the classic work describing diffusion of innovations theory by the noted communications scholar. Briefly, diffusion is "the process by which an innovation is communicated through certain channels over time among members of a social system. It is a special type of communication, in that the messages are concerned with new ideas." (p. 5). This definition outlines the basic elements of the diffusion process: the message, the channel, and the receiver. Further, the notion of a specialized message, comprising a new idea, corresponds to the delivery of CPGs, which provide new clinical information. A fourth element in the process is time. Time is a key factor in that different members of the receiver audience will hear about and adopt innovations at different times. Some because they are further (either geographically or socially) from the source of the message, and some because they are not psychologically ready to adopt an innovation until it has been in the system for a given period of time.

**Soumerai SB, Avorn J Principles of educational outreach ('academic detailing') to improve clinical decision making. JAMA 1990 Jan 26;263(4):549-56.**

These authors describe the principles of academic detailing or educational outreach in the context of improving prescribing practice. The authors outline eight techniques to undertake effective educational outreach: 1) understanding the baseline behaviour by consulting with practitioners; 2) targeting programs to specific groups of physicians, and to their opinion leaders; 3) clearly defining objectives; 4) establishing credibility, particularly via endorsement of a respected organization and establishing unbiased processes for developing and delivering information; 5) finding ways to promote active physician participation; 6) using concise graphic materials; 7) highlighting and repetition; and 8) building-in reinforcement and follow-up strategies.

**Soumerai SB, McLaughlin TJ, Gurwitz JH, et al. Effect of Local Medical Opinion Leaders on Quality of Care for Acute Myocardial Infarction. JAMA. 1998;279:1358-63.**

In a randomized controlled trial (RCT), Soumerai et al. evaluated a guideline implementation intervention of clinician education by local opinion leaders, including a performance feedback component. Using hospitals as the unit of analysis (20 experimental hospitals, 17 control), they tested an intervention consisting of clinician education by local opinion leaders (plus performance feedback) engaged to train their peers in use of a guideline for treatment of acute myocardial infarction (AMI). The authors concluded that, overall, the use of opinion leaders and performance feedback increased compliance with beneficial AMI therapies, as outlined in the guideline. Local changes in hospital protocols, facilitated by the influence of the new information in the system, may also have contributed to the decline in use of outdated practices. However, increasing the use of riskier treatments (e.g. thrombolysis), was more difficult to accomplish.

**Thomson MA, Oxman AD, Haynes RB, Davis DA, Freemantle N, Harvey EL. Local opinion leaders to improve health professional practice and health care outcomes. The Cochrane Library. 1998;1998:1-11.**

Thomson et al. (1998) examined effectiveness of using local opinion leaders (LOLs) to improve professional practice and patient outcomes by conducting an overview analysis of 6 relevant trials (selected according to Cochrane Collaboration criteria). Their premise is say that “using local opinion leaders to transmit norms and model appropriate behaviour has the potential to change health care professional practice” (p.2). Five of the six trials showed some improvement in professional practice on at least one outcome measure (the target behaviour of interest was “general management” of patient problems by physicians). Three of the trials examined patient outcomes, and of these, only one showed a clinically important impact of LOL use. These authors conclude that while local opinion leaders can: “perform a ‘sanctioning function’ (ibid. p. 2); “enhance the ability of local providers to determine root causes of variation in practice” (ibid. p. 2); and “enhance the adaptation of general practice guidelines to suit the local environment” (ibid. p. 2), the use of LOLs has mixed effect on professional practice, and what function they perform requires further research.

**Wensing M, Grol R. Single and combined strategies for implementing changes in primary care: a literature review. Int J Qual Health Care 1994 Jun;6(2):115-32.**

**Wensing M, Van Der Weijden T, Grol R. Implementing Guidelines and Innovations in General Practice: which interventions are effective? British Journal of General Practice. 1998;48:991-7.**

Wensing and colleagues (Wensing & Grol, 1994; Wensing et al., 1998) systematically reviewed the literature for single and combined strategies for implementing change in primary care. The 1998 review identified 61 studies that, according to the strength of their methodologies, were deemed "best evidence" (39 RCTs and 22 controlled before-after studies). The conclusions drawn by the authors were based on this "best evidence". Results of their reviews indicated that the most commonly evaluated single strategies were feedback, reminders, and group education. Group education combined with feedback was the most common multiple strategy. Their findings support the notion, found elsewhere in the literature, that combining strategies tends to have the greatest impact on effecting practice change.

**Wise CG, Billi JE. A model for practice guideline adaptation and implementation: empowerment of the physician [see comments]. Jt Comm J Qual Improv. 1995;21:465-76.**

These authors stress the importance of involving local physician leaders in designing implementation strategies, while highlighting the role of social learning theory and self-efficacy in any successful implementation initiative. They identify the common failings of existing implementation initiatives, in particular the use of the ‘simple dissemination’, or diffusion approach and the lack of involvement of the target audience (local physicians). They also identify three aspects of national CPGs that can inhibit local uptake: (i) uncertainty and the inherent limits to specificity of national guidelines for local practice; (ii) too general, and not reflective of local constraints (e.g. resource limits); and (iii) barriers to acceptance, including, as mentioned above, threats to clinical autonomy and suspicion about standardization (the authors identify this latter as possibly the most difficult barrier to overcome). In their view a key step often missing in an implementation initiative is to allow local leaders active participation in evaluating the application of the guideline in their local setting while also soliciting their input in developing the local dissemination/ implementation model.