



Education

Éducation

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Translating guidelines into practice

A systematic review of theoretic concepts, practical experience and research evidence in the adoption of clinical practice guidelines

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Abstract

Objective: To recommend effective strategies for implementing clinical practice guidelines (CPGs).

Data sources: The Research and Development Resource Base in Continuing Medical Education, maintained by the University of Toronto, was searched, as was MEDLINE from January 1990 to June 1996, inclusive, with the use of the MeSH heading "practice guidelines" and relevant text words.

Study selection: Studies of CPG implementation strategies and reviews of such studies were selected. Randomized controlled trials and trials that objectively measured physicians' performance or health care outcomes were emphasized.

Data extraction: Articles were reviewed to determine the effect of various factors on the adoption of guidelines.

Data synthesis: The articles showed that CPG dissemination or implementation processes have mixed results. Variables that affect the adoption of guidelines include qualities of the guidelines, characteristics of the health care professional, characteristics of the practice setting, incentives, regulation and patient factors. Specific strategies fell into 2 categories: primary strategies involving mailing or publication of the actual guidelines and secondary interventional strategies to reinforce the guidelines. The interventions were shown to be weak (didactic, traditional continuing medical education and mailings), moderately effective (audit and feedback, especially concurrent, targeted to specific providers and delivered by peers or opinion leaders) and relatively strong (reminder systems, academic detailing and multiple interventions).

Conclusions: The evidence shows serious deficiencies in the adoption of CPGs in practice. Future implementation strategies must overcome this failure through an understanding of the forces and variables influencing practice and through the use of methods that are practice- and community-based rather than didactic.

Résumé

Objectif : Recommander des stratégies efficaces de mise en oeuvre des guides de pratique clinique (GPC).

Sources de données : On a effectué une recherche dans la base de ressources de recherche et développement en éducation médicale continue que tient l'Université de Toronto, ainsi que dans MEDLINE, de janvier 1990 à juin 1996 inclusivement, en utilisant la rubrique MeSH «practice guidelines» et des mots pertinents.

Sélection d'études : On a choisi des études portant sur des stratégies de mise en oeuvre de GPC et des revues d'études de cette nature. On a mis l'accent sur les études contrôlées randomisées et les études qui ont mesuré objectivement le rendement des médecins ou les résultats des soins de santé.

Extraction de données : On a passé en revue des articles afin de déterminer l'effet de divers facteurs sur l'adoption de guides.

Synthèse des données : Les articles ont démontré que les processus de diffusion ou de mise en oeuvre des GPC ont des résultats mitigés. Parmi les variables qui jouent sur l'adoption des guides, mentionnons leurs qualités, les caractéristiques des profes-



sionnels de la santé, celles du contexte de la pratique, les incitations, la réglementation et des facteurs liés aux patients. Il y avait 2 catégories de stratégies en particulier : les stratégies primaires comportant l'envoi ou la publication des guides mêmes et les stratégies d'interventions secondaires visant à renforcer les guides. On a démontré que les interventions étaient peu efficaces (éducation médicale continue et didactique et traditionnelle et envois postaux), moyennement efficaces (vérification et rétroaction, surtout simultanées, visant des fournisseurs en particulier et exécutées par des pairs ou des meneurs d'opinion) et relativement efficaces (systèmes de rappel, formation théorique et interventions multiples).

Conclusions : Les données révèlent que l'adoption des GPC dans la pratique présente de sérieuses lacunes. Les stratégies futures de mise en oeuvre doivent combler cette lacune en comprenant les forces et les variables qui jouent sur la pratique et en recourant à des méthodes fondées sur la pratique et la communauté plutôt que sur des interventions didactiques.

The movement to develop and disseminate clinical practice guidelines (CPGs) has been well established for more than a decade. This movement is rooted somewhat in the need to curtail or restrict practice variation in the US health care system and is clearly linked to the evidence-based medicine movement.¹⁻⁵ The CPG movement has evolved from being haphazard and irregular to being well integrated into the thinking of practising clinicians and professional clinical organizations.

In acknowledgement of the significant role that quality of care initiatives, especially CPGs, may play in Canadian health care, the CMA established a Quality of Care Committee in 1990 and subsequently facilitated the development of the National Partnership for Quality in Health (NAPAQH)⁶ and 2 national consensus conferences on the CPG process.^{7,8} This review is based on a presentation to a national conference held in 1996 by the NAPAQH, for which a workbook was developed.

In this article we focus on one particular aspect of the CPG process: ensuring timely adoption of guidelines by practising clinicians in a way that optimizes the health of their patients and communities. Specifically, we explored the conceptual and theoretic aspects of how, why and in what circumstances health care professionals adopt new information and change their practices. We described and characterized these concepts to facilitate a literature search. From the results of this search, we present studies that exemplify implementation strategies and make recommendations for professional organizations and others interested in implementing guidelines. Throughout the review, we use definitions derived from several sources (Table 1).⁹⁻¹¹

Development and implementation of guidelines

The production and dissemination of CPGs has several components, outlined in previous CMA/NAPAQH guideline conferences and other publications (Table 2).¹²⁻¹⁶

First, a local group or, more often, a national body decides to develop guidelines in a clinical area in which there is a demonstrated need for such guidelines. Second, data are synthesized from research information and relevant practice patterns by searching the literature (including existing guidelines) and then weighing the strength of the evidence from the resulting trials or studies. Third, these data are further reviewed, appraised, distilled and collated as guidelines; that is, as recommendations about strategies for investigation and management. Fourth, the sponsoring organization and other interested organizations then endorse the guidelines. Fifth, CPGs are disseminated, usually by traditional means such as mailing them to members or publishing them in recognized professional clinical journals. Sixth, various groups or individual practitioners may attempt to implement the guidelines more actively, through various, often multiple, strategies to assist, convince or otherwise influence physicians, patients and their caregivers. Finally, the guidelines are subjected, albeit irregularly, to re-appraisal, evaluation and reiteration of the process. This review focuses on the sixth step: ensuring the translation of CPGs into practice.

Methods

To develop a search and categorization strategy, we first reviewed the key concepts and theoretic models pertaining to the learner-practitioner and to the guideline development process, and we categorized the variables or forces for change in the clinical milieu. Second, we searched the Research and Development Resource Base in Continuing Medical Education (RDRB/CME), a database of more than 7000 references to continuing health professional education. This database is maintained by the Office of Continuing Education, Faculty of Medicine, University of Toronto. Third, we supplemented our search of the inhouse RDRB/CME with MEDLINE



searches for the period from January 1990 to June 1996, inclusive. We combined the MeSH heading “practice guidelines” with variations of relevant text words (e.g., “improvement,” “impact,” “effectiveness,” “implementation” and “compliance”) and the text word or publication type “randomized controlled trials.” Fourth, we reviewed the resulting articles to determine the effect of these variables on the adoption of guidelines. We gave particular emphasis to randomized controlled trials and to trials that objectively measured physicians’ performance or health care outcomes.

Findings

From the results of this search, we examined answers to the following questions. First, do CPG dissemination processes generally work? Second, do natural and non-educational factors affect the natural or unaided adoption of guidelines? Third, which specific educational interventions facilitate the implementation of CPGs? Findings reflecting answers to the latter question were categorized under review articles or specific educational strategies.

Do CPG dissemination or implementation processes work?

The answers are mixed. Grimshaw and Russell¹⁷ noted that 55 of 59 published assessments of CPGs reported statistically significant improvements in the process of care (i.e., changes in the performance of health care professionals, such as changes in prescribing patterns). A further 9 of 11 studies showed a significant improvement in health care outcomes (e.g., lowered cholesterol levels in patients). However, the results of these 55 studies were variable, often weak or positive for only 1 of several possible outcomes. Furthermore, positive outcomes often reflected the intensity of the intervention; for example, the use of information-only approaches resulted in less change than more complex interventions.

Studies conducted after the release of guidelines have often shown that practitioners had less than satisfactory awareness of or compliance with the guidelines. For example, a survey of New Zealand physicians after the release of a guideline on the management of hypertension showed that only 40% had read the guideline.¹⁸ In the

Table 1: Definitions used in this review

Academic detailing, educational outreach	Education of an individual physician by a pharmacist or other health care professional, usually in the physician’s office and most often in the area of prescribing
Adoption	Health care providers’ commitment and decision to change their practices; the actual change in practices
Consumers	Patients and public
Diffusion	Distribution of information and the practitioners’ natural, unaided adoption of policies and practices
Dissemination	Communication of information to clinicians to improve their knowledge or skills; more active than diffusion, dissemination targets a specific clinical audience
Educational intervention	Any strategy, program or manoeuvre intended to persuade physicians to change their performance and maintain their competence
Guidelines, clinical practice guidelines (CPGs), practice parameters	Systematically developed statements about specific clinical problems, intended to assist practitioners and patients in making decisions about appropriate health care
Implementation	Putting a guideline in place; more active than dissemination, it involves effective communication strategies and identifies and overcomes barriers to change by using administrative and educational techniques that are effective in the practice setting
Opinion leaders, educationally influential clinicians	Clinicians identified by their colleagues in the community as being respected clinicians and effective communicators
Providers	Health care professionals, including physicians; in some instances, may also be nonprofessionals such as office staff
Setting	The practice site — not so much its location, although this may be important, as its type — the setting may also imply, but not define, aspects of workload, relevant health care team members, mix of patients and funding mechanisms



US, a chart review of patients with diabetes mellitus, conducted after the release of the American Diabetes Association standards of care, revealed major deficiencies in care except in 3 areas: foot care, eye care and lipid screening.¹⁹ Rosser²⁰ surveyed Ontario family physicians about their knowledge of lipid-lowering guidelines. Although 78% of the physicians surveyed indicated that they complied with the guidelines, further questioning revealed that only 5% of the respondents actually followed them.

The findings of the literature review may be grouped into 2 broad areas: those exploring the variables affecting physicians' adoption of CPGs in a naturalistic manner, and those describing outcomes of trials of educational interventions to change physicians' behaviour or health care outcomes.

**The natural diffusion process:
Which variables affect adoption of guidelines?**

In addition to the research described earlier, we found several articles that further explored the variables that impede or facilitate adoption of innovation or medical information (Table 3).

Qualities of the guidelines

First, Rogers²¹ described the qualities of the guideline or innovation itself; namely, its relative advantage, compatibility with existing beliefs and values, complexity, "trialability," "observability" and cost, among other factors (Table 4). Grilli and Lomas²² validated Rogers' research in their review of 23 trials measuring the effectiveness of guideline dissemination. They found that guidelines that were relatively uncomplicated and could be observed or tried by the clinician were more effectively adopted.

Table 2: Steps in development and dissemination of CPGs

Select clinical problem
Rank in order of priority
Define and refine the problem
Frame the clinical problem
Synthesize data
Search the literature
Develop consensus
Develop guidelines
Iterate and reiterate
Distribute to a sample of clinicians
Endorse guidelines (sponsoring body)
Disseminate guidelines
Encourage implementation of guidelines
Monitor and evaluate impact

Characteristics of the health care professional

Second, various authors have described characteristics of the physician or health care professional that impede or facilitate guideline adoption.^{18,23,24} They have described demographic variables, particularly age and country of training, as factors. For example, Ferrier and associates²⁴ found that young Ontario medical graduates were more favourably inclined toward the concept of CPGs than their US colleagues. Tunis and collaborators²⁵ noted serious concerns among US internists about effects on clinical autonomy, satisfaction with practice and health care costs.

An attempt to improve physicians' attitudes by having them develop their own guidelines has been described by Wachtel and O'Sullivan.²⁶ They recruited a group of hospital physicians to develop their own guidelines about test ordering. This group exhibited a nonsignificant trend toward reducing their test ordering in comparison with a control group. The members of the control group were, however, nonvolunteers and ordered tests more frequently in any case. A similar study among physicians in the Maritime provinces also showed no significant improvement in their patients' blood pressure control as a result of locally approved guidelines.²⁷

Table 3: Noneducational variables affecting adoption of CPGs

Qualities of the guidelines or practice change
Characteristics of the health care professional
Characteristics of the practice setting
Incentives
Legal
Financial
Other
Regulation
Patient factors

Table 4: Attributes of innovations (guidelines) that affect adoption

Relative advantage	Is the new practice demonstrably superior to the old one?
Compatibility	Does the CPG represent existing beliefs or values? Is it basically similar to prior experience or practice?
Complexity	How difficult is the CPG to understand and incorporate into current practice?
"Trialability"	Can the provider "try on" parts of or all of the new CPG with comparative ease?
"Observability"	Can the provider observe practices or other providers that have incorporated the new CPG?

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Characteristics of the practice setting

The third element, the practice setting or environment, has been explored by several authors.²⁸⁻³¹ Ellrodt and colleagues³¹ reviewed the failure of guidelines to reduce the hospital stay of patients with chest pain; they concluded that system inefficiency and implementation issues (e.g., the reluctance of staff physicians to discharge patients on weekends and comorbidity among patients) were factors.

Conroy and Shannon³² extended the consideration of the practice environment in their exploration of the role of social influence. They described a model in which factors such as habit and custom, beliefs of peers and social norms appear to be major determinants of physicians' behaviour.

Incentives

The fourth element may best be described as incentives related to legal (i.e., malpractice)^{33,34} or financial issues (such as overall physician compensation or reimbursement incentives for particular procedures). Robinson³⁵ reported that, although few trials employ financial incentives to affect outcomes, many "naturalistic experiments" (e.g., comparison of physicians' practice patterns under fee-for-service systems and under managed care systems) confirm the effect of compensation on clinical behaviour.

Regulation

The fifth element is regulation by accreditation or licensing bodies. Regulatory bodies have shown their ability to affect adoption of CPGs by clinicians.³⁶ Adherence to guideline standards may be the basis of accreditation for hospitals as well: in the US, the Joint Commission on the Accreditation of Healthcare Organizations has selected some CPG-based measures — for example, the rate of cesarean section after previous vaginal birth — to assist in the accreditation process.³⁷

Patient factors

The sixth and final element is the patient. Patient factors may involve individual demands and clinical problems (e.g., individual patient presentations and compliance patterns) or population (demographic) perspectives.^{38,39}

Results of intervention trials: Which specific strategies facilitate implementation of guidelines?

Review articles

Several reviews of the educational intervention litera-

ture were retrieved.⁴⁰⁻⁴⁴ We selected for analysis the 3 most recent reviews by the same group, of which 1 of us (D.A.D.) was a member. The first⁴² stressed the continuing medical education (CME) methods that seem to be most effective in changing physicians' performance or health care outcomes: those that predispose to change by disseminating information and improving knowledge, skills or attitudes (that is, the competence of providers); those that enable or facilitate the adoption of guidelines in the practice setting (e.g., preventive care recall systems); and those that reinforce the change (e.g., audit and feedback).

One of the most recent reviews by this group⁴³ stressed the importance of needs assessment — the process of determining the gap between ideal and actual performance and targeting the educational intervention to the specific gap or need. The other recent review⁴⁴ focused on the methods involved in the review process and more clearly delineated and categorized the methods of CME delivery.

These reviews indicated that, when changes in provider performance or patient outcome are measured, the interventions generally fall into the following categories.

Weak interventions: didactic lecture-based CME (e.g., conferences and seminars) and mailed, unsolicited materials.

Moderately effective interventions: audit and feedback, especially if done concurrently, directed at specific providers and delivered by peers or opinion leaders.

Relatively strong interventions: reminder systems, academic detailing and multiple interventions.

Results of trials of specific educational strategies

Traditional CME methods

Educational materials: In describing a trial that employed mailed materials (an introductory letter and radiographic guidelines), Oakeshott, Kerry and Williams⁴⁵ showed a positive effect on general practitioners' ordering of radiographs in the UK.

Formal CME conferences and workshops: Often referred to as CME, formal conferences, courses, symposia, workshops and small-group discussions are among the most common methods for physicians to maintain their competence. Karuza and coworkers⁴⁶ found that CME involving a small-group process and chart review led to an increased rate of influenza vaccination among elderly patients. However, Browner and associates⁴⁷ found little or no improvement in cholesterol management after a 3-hour seminar, even when enhanced by follow-up meetings and printed material, a result that supports others' findings that formal CME fails to effect change in physicians' performance.



Community-based interventions

Academic detailing: Nardella, Pechet and Snyder⁴⁸ used a modification of academic detailing, in which the study investigators met with and persuaded surgeons to reduce their use of laboratory investigations around the time of operations. The educational effort was extensive, and the authors reported a significant reduction in test ordering and a substantial cost saving as a result.

Opinion leaders: Lomas and collaborators,⁴⁹ in their study of the effectiveness of guidelines for vaginal birth after a previous cesarean section, showed the effectiveness of promoting these guidelines at the local hospital level by training and deploying community-based “opinion leaders” — educationally influential and respected clinicians identified by their own colleagues.

Practice-based interventions

Patient-based interventions: Several patient-based educational interventions, especially those involving patient-education materials, have been reported to be effective in implementing CPGs concerning diabetes mellitus management,⁵⁰ preventive strategies⁵¹ and smoking cessation.⁵² Katon and colleagues⁵³ described an intervention that aided the implementation of CPGs concerning the management of depression through the creation of patient-education materials; this intervention increased the number of outpatient visits and improved patients' compliance with drug therapy.

Audit and feedback: Reviews of CME^{43,44} have shown that audit and feedback methods have a mixed effect on physicians' behaviour. This was confirmed by Robinson,³⁵ who suggested that the timing of the feedback is important: it is more effective when given concurrently than when given later and retrospectively. Johnson and Martin⁵⁴ reported that provider-specific feedback is effective in reducing the consumption of hospital resources by orthopedic surgeons performing total hip replacements.

Reminders: Dartnell and coworkers⁵⁵ described a successful intervention involving posters and pocket-sized laminated cards to augment dissemination of anticoagulation guidelines on hospital wards. Emslie, Grimshaw and Templeton⁵⁶ showed that a structured infertility-management reminder sheet improved management of this disorder by general practitioners in the UK.

Multiple-intervention strategies

Educational programs or strategies that involve 2 or more interventions appear to have more impact on physician behaviour and health care outcomes than single interventions.^{43,44} Benninger, King and Nichols⁵⁷ described

an implementation process for guidelines for otolaryngology referrals by primary care physicians; the process used mailed materials, follow-up phone calls and presentations at meetings. Follow-up meetings with each primary care department were attended by an otolaryngologist who presented global audit findings and encouraged continuing discussion. A subsequent audit showed a significant decrease in inappropriate referrals and increased appropriate referrals.

Discussion

We have focused on the dissemination of CPGs and the resulting adoption of practice changes. Although our findings may be significant for the continuation of the CPG movement, several cautions need to be offered. First, the search process was limited to the RDRB/CME and MEDLINE and may have excluded relevant articles from other databases such as EMBASE. Second, we made no analysis or comparison of effect sizes, since the interventions were usually not comparable. Third, many articles could be classified in more than 1 area; therefore, it may be difficult to generalize a particular intervention because it may depend on the practice environment in which the study took place or on other factors. Finally, this review has been condensed from a larger review (available upon request) submitted as a workbook at the most recent NAPAQH conference.⁵⁸

Nonetheless, clear statements can be made about CPGs and their implementation process. These statements are presented as a theoretic basis for understanding the adoption of CPGs and as a practical, intervention-based approach to their adoption.

A theoretic base for facilitating implementation of guidelines

The adoption of any innovation or the dissemination of new medical knowledge should be considered in a holistic, contextual manner. Although medical practice may be altered by interventions such as views expressed by opinion leaders or academic detailing, a host of other factors, from those specific to the health care provider to social and cultural forces, may play a role.

These forces and variables are shown in Fig. 1. Three large areas of influence on physician acceptance of and compliance with CPGs are represented as circles and are derived from Fox, Mazmanian and Putnam.⁵⁹ The circles represent large social and political forces such as group norms and professional regulations, environmental considerations such as practice location, demographics, setting and patient issues, and intraprovider issues such as motivation, age and attitudes. There are major areas of



overlap in these forces; examples of each are given in the figure. Rectangles represent steps in the guideline development and implementation process.

From this contextual standpoint, it seems clear that, to be successfully implemented, any guideline must include strategies to facilitate its adoption. Thus, consideration of the nature of the guideline, the nature and beliefs of the physicians to whom it is directed, and environmental factors that could facilitate or impede its adoption, is a necessary ingredient in the translation of practice guidelines into improved performance or health care outcomes.

Design and implementation of specific guideline adoption strategies

In the design of interventions, the implementation process appears to possess at least 2 stages: primary dissemination strategies, in which a common body of infor-

mation is made available to as many health care professionals as possible, and secondary implementation strategies, which enable or reinforce changes in the practice setting.⁶⁰ Although several interventions appear to be effective, trials of practice-based strategies such as concurrent reminders or of community-based interventions such as academic detailing have yielded the most consistently positive results.

An earlier, pre-intervention phase also appears to be important in determining, objectively and subjectively, that there are needs in the area targeted by the guideline. These needs may be of several types, including the expressed or perceived needs of the learner, those of the practice and those of the patient.

Organizational issues

Although the evidence about dissemination and adop-

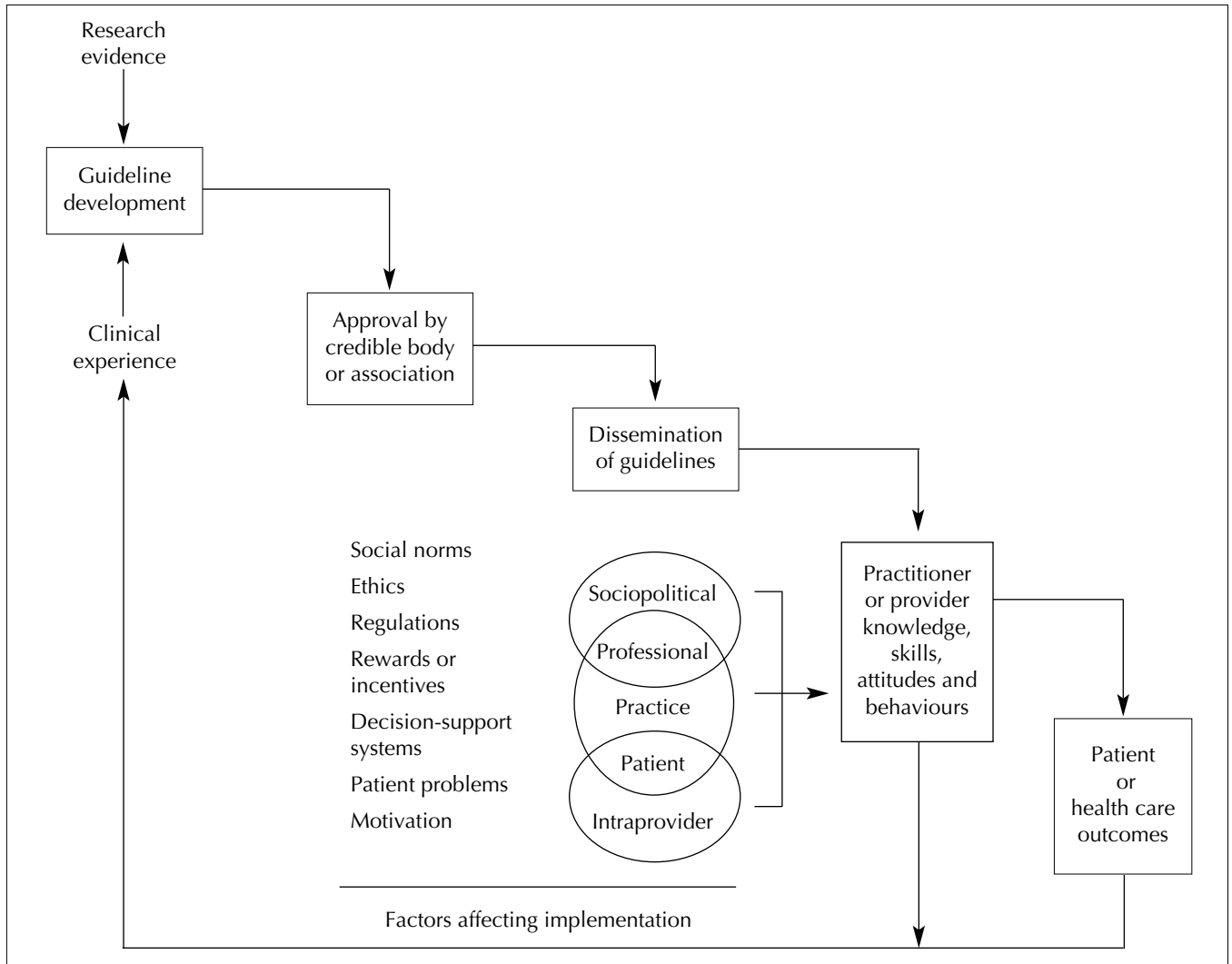


Fig. 1: The guideline cascade: steps in the development and implementation of clinical practice guidelines, and factors influencing the adoption of guidelines. Adapted from Fox, Mazmanian and Putnam.⁵⁹



tion of CPGs is relatively clear, it is far less apparent who should develop the necessary interventions, what coordination and funding are needed and what means should be used in implementation. Coordination of data sources involved in determining practice patterns and needs, professional associations interested in CPG development, hospitals, CME providers and patient or health care provider groups is clearly necessary; leadership and direction in this area is also needed.

As a small example of the potential for such links, Dodek and Ottoson⁶¹ propose that CPG dissemination and implementation strategies be integrated with CME programs. They believe that such integration would provide a platform for disseminating CPGs as early as possible, permit a variety of "take-home" strategies to reinforce and enable implementation of CPGs, and offer an opportunity for evaluation of the outcomes of CPGs. However, this type of integration calls for closer working relationships between providers of CME events, specialty societies and guideline developers.

Past experience, future directions

The past decade has seen a remarkable growth in the development of CPGs and an increased sense of their value. Initially driven by the principles of evidence-based medicine, the need for cost-efficient care and the desire to optimize the health outcomes of Canadians, the CPG movement is now firmly ensconced in the literature and in the minds of many practising clinicians. However, evidence about the effect of CPGs on practice shows serious deficiencies in their adoption; these deficiencies are reminiscent of the similar failure of CME to effect change in practice.

The reasons for this failure are increasingly clear. They involve understanding the large number of forces or variables that influence the practice of health care providers and the growing body of evidence about the interventions or strategies that succeed in changing providers' performance. Much research on transforming practice remains to be done. Primary dissemination strategies clearly need to be buttressed by secondary, effective implementation and education methods that are more practice- and community-based than those of traditional CME. Such methods will be enhanced by clinical practice and outcomes data, new dissemination vehicles such as the Internet, practice-linked strategies such as computer-generated reminders and increased links with broadly defined CME and CME providers. Furthermore, an enhanced understanding of the contextual influences that modify performance may lead to the further development of community-based strategies such as the use of opinion leaders.

Finally, the creation of guidelines, without significant

attention to their adoption, is clearly a sterile exercise. At worst, it wastes precious intellectual and human resources. At best, the creation and adoption of practice guidelines, augmented by appropriate implementation strategies, can reduce inappropriate practice variation, improve practices among Canadian physicians and lead to superior health care for their patients.

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