Developing a Canadian prescribing practices network

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Abstract • Résumé

Expenditure on drug therapy in Canada has been growing at a faster rate than spending on any other aspect of health care. Increasing societal pressure to use scarce resources more efficiently, advances in communication technology and data indicating that there is room for improvement in drug prescribing suggest that the time has come for an organized linkage of the available drug-utilization and health-outcomes databases across the country. A national prescribing practices network would assist prescribers, researchers and policymakers to optimize prescribing with respect to both cost effectiveness and health outcomes. The authors outline the main concerns addressed in the 1994 report of the National Pharmaceutical Strategy and present the results of discussions by the Canadian Prescribing Practices Network Project with respect to the potential users and data sources of a national network and the communications technology on which it would rely.

Les dépenses consacrées à la pharmacothérapie au Canada augmentent plus rapidement que celles qui sont consacrées à tout autre aspect des soins de santé. Les pressions croissantes que la société exerce pour utiliser des ressources rares de façon plus efficiente, le progrès de la technologie des communications et les données selon lesquelles il est possible d'améliorer les pratiques d'ordonnance des médicaments indiquent que le moment est venu d'établir un lien structuré entre les bases de données sur l'utilisation des médicaments et sur les résultats sur la santé qui sont disponibles dans toutes les régions du pays. Un réseau national sur les pratiques d'ordonnance aiderait les prescripteurs, les chercheurs et les décideurs à optimiser l'établissement des ordonnances en ce qui a trait à la fois à l'efficacité des coûts et aux résultats sur la santé. Les auteurs décrivent les principales préoccupations abordées dans le rapport de 1994 de la Stratégie nationale sur les produits pharmaceutiques et présentent les résultats de discussions tenues par le Projet de réseau canadien sur les pratiques d'ordonnance en ce qui a trait aux utilisateurs possibles et aux sources de données d'un réseau national proposé, ainsi qu'à la technologie des communications qui le soustendrait.

An extensive literature on the benefits and risks of various therapeutic modalities is available to support the prescribing practices of today's physicians. An estimated 500 000 to 1 000 000 randomized controlled trials, most of which involve drug therapy, have been published.[1] Yet, as was described in the first two articles in this series,[2,3] prescribing practices do not always reflect the standards established in the literature. Suboptimal therapy results in suboptimal outcomes and represents a waste of scarce resources. At the level of the

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← For prescribing information see page 1434

individual patient, the financial cost of suboptimal prescribing may not be major; at a national level, however, it can have enormous costs in terms of adverse outcomes and direct expenditures.

"Irrational" prescribing is not a uniquely Canadian problem. Reports from around the world describe the unnecessary use of multiple drug therapies, the prescription of medications that are not indicated by the diagnosis, the selection of expensive drugs for which cheaper and equally effective alternatives exist, inadequate self-medication with subtherapeutic dosages, and the prolonged prescription of time-limited therapies.[4] However, the reader should carefully evaluate the quality of these reports and remember that the judgement that prescribing practice is inappropriate versus appropriate, irrational versus rational or suboptimal versus optimal is the opinion of the evaluator and is not necessarily that of the prescriber or the patient. Few drug utilization reviews give any detail on benefits and risks that actually accrued from the prescribing observed. This detail would be required for an accurate assessment of the "appropriateness" of prescribing practices.

Why is so much attention given to drug prescribing as opposed to the use of diagnostic services and other interventions? First, because most high-quality studies of medical care have been concerned with therapy (particularly drug therapy), standards that withstand rigorous scrutiny are available with which to compare prescribing in actual practice.[5,6] Second, drug therapy is the most common therapeutic intervention and often replaces more invasive and expensive treatments.[7] Third, the misuse of pharmaceuticals can cause great, even fatal, harm. Fourth, the availability of computerized systems to monitor prescriptions and certain patient outcomes makes prescribing patterns one of the more common targets of "outcomes research."[8–10]

Pharmacotherapy is an extremely important component of health care in Canada; approximately 20 000 prescription and over-the-counter products are marketed in this country.[11] The pharmaceutical sector, perhaps more than any other area of health care, is under scrutiny and has become a kind of "lightning rod" for concern about the future of our health care system. In 1993 the total expenditure on prescription and over-the-counter drugs exceeded $10 billion, or 15% of total health care costs, thus surpassing expenditure on all physician services.[12] Expenditure on drugs has grown at a faster rate in the last few years than all other categories of spending in the health care system, and the realization that the average cost per claim for newer drugs is 2.5 times that of existing drugs has alarmed government policymakers and third-party payers.[13] Concerns about costs are heightened by recent proposals to extend certain publicly funded health care insurance programs to include pharmaceuticals.[14,15] At the same time, many provinces are cancelling reimbursement for medications that are not considered cost effective. Clearly, there is an urgent need to define optimal (i.e., the most cost-effective) drug therapy for conditions affecting the health of Canadians. Although costs may differ somewhat from province to province, it is likely that the more important data on efficacy and effectiveness would apply to all provinces and territories. Furthermore, a common approach to the analysis of cost effectiveness could enhance the transfer of information.

Various levels of government have received or contributed to reports attesting to the need to promote more actively the optimal use of drug therapy. These reports represent a thorough contextual analysis that should guide government, industrial and academic research agendas for the next decade.[14–28] The tenor of several of these reports has been echoed by foreign publications calling for the creation of a neutral and objective system for data collection, analysis and dissemination to serve the needs of many stakeholders concerned with the regulation of drugs and the allocation of resources for the purchasing of drugs.[29–31]

The National Pharmaceutical Strategy

The National Pharmaceutical Strategy office was founded in 1992 in response to a directive from the provincial ministers of health to "develop a national strategy for rational and cost-effective development, regulation and use of pharmaceuticals in Canada."[11] A summary report to the deputy ministers of health in December 1994 addressed three areas with respect to pharmaceuticals: research and development, access and use.[11]

Areas of concern

Research and development

The Patented Medicines Prices Review Board reported that more than $504 million had been spent in 1993 on pharmaceutical research and development (including capital equipment costs and allowable depreciation).[32] More than 97% of this amount originated from the pharmaceutical industry. Concern has been expressed that the preponderance of industry-funded research may impede any independent national coordination of research efforts. Such coordination could be useful. For example, there is currently no mechanism to assure Canadians that the pharmaceutical research being planned or carried out in this country actually addresses the nation's most pressing health problems.

In spite of the high per-capita expenditure on health care in Canada (approximately $2500 annually),[33] relatively little has been spent on evaluative research. This is in part because the perceived ineligibility of this type of research for the tax credits usually allowed for research inhibits investment by the private sector. None the less, given the current emphasis on "value for money" and the availability of high-quality evidence in the literature, evaluative research in pharmacoepidemiology will become increasingly important. For example, economic analyses of disease categories and drug groups are urgently needed in many areas to support informed decision making. Guidelines for economic analyses of drug therapies exist, but considerable work remains to be done to clarify methodologies for the comprehensive assessment of the relative safety and effectiveness of drug therapies. Although the total expenditure on drug therapies has increased sharply during the past 15 years, the environment in which drug manufacturers, drug regulators and provincial and private insurers operate has also changed. The effect on prescribing patterns of legislation to extend patent protection on drugs and of the ensuing changes in provincial drug plans needs to be evaluated.

Access

Access to medications by consumers is controlled at a variety of levels, none of which has a coordinating function. Health Canada, the Patented Medicines Prices Review Board, provincial drug plans, private insurance companies and local hospitals all control different aspects of prescribing and self-medication. All have a need for data on the efficacy, relative safety, cost effectiveness and utilization patterns of different medications.

Use

The actual use of pharmaceuticals is influenced in even more complex ways. In addition to the groups that control access, licensing bodies, professional associations, the pharmaceutical industry, special-interest consumer groups, the media, educators and researchers all exert an influence. However large these groups may be, and however complex their interrelationships, they all share one main focus: the one-to-one interaction between prescriber and patient. A large number of initiatives to optimize prescribing have been undertaken to influence the interaction between prescribers and patients; these include focused education on therapeutics, critical appraisal of therapeutics literature, physician detailing, the establishment of clinical practice guidelines, the creation of meta-analysis databases, the use of drug utilization evaluation with outcomes analysis, the introduction of computer-based decision-support systems and the use of patient-oriented interventions.[2,3] What is lacking is not the quantity or quality of individual projects, but a coordination of efforts. This lack of coordination not only delays the incorporation of effective interventions into common practice but also drains financial resources that might be used more efficiently elsewhere.

Recommendations

The participants at meetings convened by the National Pharmaceutical Strategy and the Canadian Coordinating Office for Health Technology Assessment in September and November 1994 agreed that an integrated, interuniversity and interprovincial approach to research supporting optimal pharmacotherapy was needed. Although all the elements necessary for coordinated research and action exist in Canada, practitioners in the relevant disciplines have tended to operate in isolation, sometimes within the confines of their own institutions. It is essential that the efforts being made in basic biomedical science, in clinical science and in population-health science (e.g., pharmacoepidemiology and pharmacoeconomics) converge. This can be facilitated by "bridging disciplines," specifically clinical pharmacology and clinical epidemiology, which have traditionally struck a balance between health as a social good and health as an individual responsibility. Also, because any successful coordination of efforts will require extensive computerization, expertise in clinical informatics will be indispensable.

A National Prescribing Practices Network

The challenge to coordinate efforts to promote the optimal use of medications has been taken up by a prescribing practices network planning group representing medical associations, universities, therapeutics experts, practising physicians, epidemiologists, the pharmaceutical industry, provincial drug plans and the National Pharmaceutical Strategy. This group has been working from the premises expanded from those drafted by the National Pharmaceutical Strategy (Appendix 1). The Network Development Committee was charged with the task of proposing a plan for creating and operating a network. At the Physician Prescribing Practices Workshop, held in Ottawa in October 1995, the committee presented the results of their discussions under three headings: people, data and technology.

People

Ideally, a national prescribing practices network would offer such valuable results that virtually any per-

son or group concerned with quality assurance (including cost effectiveness) in drug therapy would be interested in participating. However, it may be difficult, especially in the early phases of such a huge endeavour, to generate sufficient interest in some quarters, whether because of a perceived lack of relevance, a lack of authority, difficulty of use or some other reason. Indeed, the most important group to involve — individual prescribers — may be the most difficult to interest. It will be vital to the success of any national network to ensure that there is sufficient incentive for individual physicians to participate. This incentive need not be direct reimbursement; it may simply be the understanding that the incorporation of network information products into practice will ultimately increase efficiency. In this era of cost containment, a network that improves the efficiency of drug therapy should become a powerful negotiating tool for physicians to avoid further clawbacks and rollbacks. However, it is not clear whether improvements in the cost effectiveness of therapy will necessarily result in lower drug costs. Other, more expensive technologies may be replaced by drug therapy, and the optimal treatment of some diseases may result in the increased use of drugs. Thus, an unblinkered view of costs and outcomes is required. The drug information component of the proposed network may, on its own, have a significant effect on prescribing patterns, but interventions focused on the point of prescribing will likely be necessary to maximize the effect.

The important stakeholders in such a network are listed in Table 1. This list may well be incomplete; indeed, one of the many challenges in establishing a national network will be to include all important players.

Data

The broad categories of data required for a prescribing practices network include: health utilization data, especially institutional and community drug utilization data; outcomes data, including mortality, morbidity, diagnoses, functional status, quality of life, satisfaction with care, professional satisfaction, costs and charges; therapeutic evidence; and data on interventions intended to bring about changes in practice.

Massive amounts of drug utilization data already exist. Each provincial drug plan and third-party insurance plan collects computerized data to determine the reimbursement of providers.[13,33] In addition, a few private companies such as IMS Canada (Mississauga, Ont.) and Brogan Consulting (Ottawa) collect drug utilization data, mainly for sale to the pharmaceutical industry for use in marketing research. Although the data exist and are, theoretically, available for analysis, a coordinated, national drug utilization review faces major impediments. These include variation in database structures; variation in database content, even in terms of groups of people and drugs covered; lack of information on key variables such as patient diagnoses, allergies, hepatic and renal function, and prescriber and practice characteristics; variation in and poor quality of linkages to other databases; and concerns about ownership, authority and privacy. Nevertheless, a coordinated system is conceptually attractive as a source of large amounts of important information flowing to and from users, and as a method of reducing the expense of the many smaller, currently flawed databases. Such a system could operate using a large centralized database or a number of smaller databases with compatible software. Exactly how and in what quantity the various stakeholders would gain access to data remains uncertain. A functional model that incorporates the breadth of information we propose to include does not appear to exist in Canada. In many provinces, pharmacists are connected to a network that provides limited data; however, physicians are not. Lim-

Table 1: Examples of stakeholders in a national prescribing practices network*

Publicly funded
Adverse drug reaction centres (national and regional)
Educators
Key information sources (e.g., Cochrane Collaboration)
National Pharmaceutical Strategy
Outcomes data analyses groups (e.g., CIHI, ICES, CCOHTA)
Prescribers
Provincial drug plans
Researchers in therapeutics
Privately funded
Claims managers (e.g., Shared Health, Eclipse) and employee-benefit managers
Contract research organizations (e.g., INNOVUS, LAB)
Drug utilization review companies (e.g. IMS Canada, Brogan Consulting)
Pharmaceutical industry (e.g., PMAC, CDMA)
Pharmacies
Professional licensing bodies
Professional societies
Third-party insurance plans (e.g., Green Shield, Blue Cross)
Publicly and privately funded
Consumer advocate groups
Informatics experts
Research granting agencies
Therapeutics research networks (proposed, e.g., HENCE)

*CIHI = Canadian Institute for Health Information, ICES = Institute for Clinical Evaluative Sciences in Ontario, CCOHTA = Canadian Coordinating Office for Health Technology Assessment, PMAC = Pharmaceutical Manufacturers Association of Canada, CDMA = Canadian Drug Manufacturers Association, HENCE = Health Network of Centres of Excellence.

ited data on health outcomes are available; these are mainly restricted to vital statistics,[35] occasional surveys,[36] hospital procedures and discharge diagnoses, and physician billing data.[37] Aside from individual studies, little information exists on quality-of-life outcomes or on costs. The absence of information on costs could be addressed by the coordination of existing Canadian expertise. More sophisticated analyses of Canadian outcomes data do exist, including detailed reviews of selected outcomes[38] and the mapping of outcomes by enumeration area, consumer demographics, physician resources and lifestyle variables.[39]

Therapeutic evidence should be of the highest quality available — a gold standard against which to compare actual practice. Although now in vogue, research on regional variation in practice patterns, including prescribing, is not particularly helpful to clinicians or policymakers without some sort of evidence-based benchmark of reasonable practice. Such high-quality data are already being collected in a number of forms. *ACP Journal Club* scans all the journals germane to internal medicine and summarizes reports of randomized controlled trials and meta-analyses in stuctured-abstract form with accompanying expert commentaries.[40] The *Oxford Database of Perinatal Trials* contains meta-analyses and recommendations in the field of obstetrics and perinatal medicine.[41] In time, the definitive database of medical evidence will be the Cochrane Database of Sytematic Reviews. This database is coordinated and maintained by the Cochrane Collaboration, an international endeavour coordinated from Oxford University, England, that aims to maintain a continuously updated compendium of findings from clinical trials.[42] This effort includes assembling and maintaining a bibliography of relevant randomized trials and overviews of trials through regular computerized database searches and hand searches of the literature; developing an overviews database to be made widely available to clinicians, policymakers and the public; and assisting in the dissemination and incorporation of evidence into practice and policy. Canada, whose Cochrane Centre is located at McMaster University, Hamilton, Ont., is uniquely placed to lead in this endeavour, given the large number of health care researchers in this country who are trained in the critical appraisal of evidence, clinical trials and meta-analyses. Because most clinical trials and, therefore, overviews include drug comparisons, the Cochrane Collaboration will be an extremely valuable source of information for a prescribing practices network.[43]

Effective interventions to promote change in practice or policy must be identified and collated; otherwise, all of the data gained from clinical trials may lie fallow. In Canada, considerable effort has already been spent in collecting this information.[44–46]

Technology

It is in the area of technology that the greatest opportunities and challenges for a national prescribing practices network lie. Such a large, multiuser network would require extensive computer resources. Efficient communication and file transfer across the country could be accomplished through a central repository of programs and databases where all programming would be done and then circulated. Alternatively, analytic programs could be processed in different sites across the country.

The proposed network would need to include database-server capabilities: FTP (file-transfer protocol), Mosaic and gopher servers; specialized Internet communication tools; a secure platform for the exchange of data and other information; open and closed electronic conferencing abilities; and extensive online help and computer-based long-distance education. The Cochrane Collaboration, through the Cochrane Informatics Project, coordinated at McMaster University, Hamilton, Ont., is extensively computerized. Users can gain access through the Internet to virtually all Cochrane documents, instructional aids and discussion lists instantly and at a minimal cost.[1] Similar examples of more restricted continuing education and practice guideline resources are available through the Internet or bulletin-board services.[47,48] Although confined to a small patient population with a specific disease, British Columbia's provincially funded Centre for Excellence in HIV/AIDS is a useful model of a functioning therapeutics network. This centre uses Internet and telephone technology to combine a national clinical trials network with a provincial restricted-drug distribution and postmarketing surveillance network for HIV infection and AIDS.

The main barrier to the success of a completely computerized network is the lack of computerization in physicians' offices. Only 10% to 20% of Canadian physicians are estimated to use computers in their offices for purposes other than billing. Clearly, the computerization of clinicians' offices will be important for the efficient use and application of network endeavours and resources. However, in today's climate of fiscal restraint significant incentives would be required to persuade physicians to make the maximum use of computerization. Moreover, to complement clinical practice, any decision aid must be portable, simple to use, fast and fully integrated with other office software.

Unresolved issues

The main issues surrounding a national prescribing practices network that need to be resolved concern structure, coordination and funding. Given the predominance of prospective interventions in drug utilization

(i.e., those made at the point of prescribing), as well as the rapid growth of clinical evidence and the large distances involved in national linkage, computerization would seem to be the only feasible vehicle for successful networking. A central administrative office would be needed to coordinate financing, standing committees and network liaison. The network itself would likely revolve around two main domains: content (pharmacoepidemiology) and process (informatics). Although, ideally, these would be overseen at the same location, they could operate from separate locations in close communication. The pharmacoepidemiologic component would develop and disseminate prescribing information databases; test drug-utilization review criteria; develop, apply, evaluate and report on interventions to improve prescribing; work with regional databases to improve the quality and consistency of outcomes measured across the country; and communicate with stakeholders. The informatics component, which would include medical computing, "knowledge engineering" and health care telecommunications, would be required to support the entire endeavour. A multidisciplinary committee advising on scientific review, ethical issues and community or stakeholder input and priorities should be established to oversee the network. There is no obvious location from which the network should be coordinated; however, to reflect the nonpartisan character of the network, the coordinating offices should be located apart from any major stakeholder.

The funding required would be considerable: the cost of materials aside, personnel with the expertise to develop and maintain a national network are not currently supported to do so. Suggestions have varied from obtaining only government funding to relying completely on private funding. However, a mix of private and public funding will be required to preserve neutrality. One possibility is for provincial drug plans and private insurance plans to contribute in proportion to the number of their beneficiaries, for pharmaceutical companies to contribute in proportion to their sales volumes or market share and for the public to contribute through a minimal surcharge on prescriptions. For example, $30 million that would be generated from a 10¢ surcharge on the approximately 300 million prescriptions filled each year could well support a multidisciplinary team with interprovincial representation. A "pay-per-use" method of funding, as is used by the US National Library of Medicine to fund the MEDLARS databases, may eventually be feasible once the network is functioning and proves its worth.

Conclusion

The establishment of a national network to consolidate the efforts of health care providers, researchers and policymakers in the field of drug prescribing is a laudable goal and could serve as a prototype for other health care networks. Given the amount and complexity of data available, a computer-based network system would be the most feasible. Although details of structure and funding remain to be determined, the benefits of a national prescribing practices network for everyone with a stake in improving outcomes and increasing cost effectiveness in health care are clear.

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Appendix 1: Rationale for a national prescribing practices network

A significant proportion of drug therapy, especially for "high-risk" groups such as children and elderly people, may be suboptimal. Examples of suboptimal prescribing include: prescribing a medication when none is needed; using an expensive drug when a cheaper and equally effective alternative exists; giving the wrong dose or timing doses incorrectly; prescribing unnecessary drugs to counteract or augment drugs already prescribed; failing to perform ongoing medication review and to discontinue drugs no longer required; failing to inform patients or consumers fully of the expected benefits and risks of drugs and to consult with patients on their choices or preferences with regard to therapies. Concerns regarding suboptimal prescribing are not limited to any single region of the country.

Expenditure on drugs is rising at a faster rate than spending on any other aspect of health care; therefore, the cost effectiveness of drug therapy in comparison with that of other interventions deserves close scrutiny.

Current initiatives by provincial governments to control the costs of pharmaceutical reimbursement through increasingly restrictive formularies, thus shifting costs to third-party payers or patients, urgently requires rigorous evaluation with respect to its impact on health outcomes, spending and pharmaceutical innovation.

There is still a major problem in bringing high-quality, current evidence on therapeutics to influence frontline practising physicians at the time of prescribing. A similar coordinated effort directed at consumers is needed and will require extensive planning in view of the tremendous variability in consumer attitudes.

Data on important clinical outcomes resulting from changes in practice as well as accurate drug-consumption data stratified by prescriber and consumer characteristics are crucial for evaluative research. The coordination, harmonization and communication of such data would be a major task of a national prescribing practices network.