HEALTHCARE

POLICY

Politiques de Santé

Health Services, Management and Policy Research
Services de santé, gestion et recherche de politique

Volume 3 • Number 1

Data Matters • Discussion and Debate • Research Papers
Knowledge Translation, Linkage and Exchange

A LONGWOODS PUBLICATION Fonds WWW.HEALTHCAREPOLICY.NET

HEALTHCARE QUARTERLY: Best practices, policy and innovations in the administration of healthcare. For administrators, academics, insurers, suppliers and policy leaders. *Edited by* Dr. Peggy Leatt, University of North Carolina, Chapel Hill ✦ CANADIAN JOURNAL OF NURSING LEADERSHIP: Covering politics, policy, theory and innovations that contribute to leadership in nursing administration, practice, teaching and research. Peer reviewed. *Edited by* Dr. Dorothy Pringle, University of Toronto, Toronto ✦ HEALTHCARE PAPERS: Review of new models in healthcare. Bridging the gap between the world of academia and the world of healthcare management and policy. Authors explore the potential of new ideas. *Edited by* Dr. Peggy Leatt, University of North Carolina, Chapel Hill. ✦ HEALTHCARE POLICY: Healthcare policy research and translation. Peer reviewed. For health system managers, practitioners, politicians and their administrators, and educators and academics. Authors come from a broad range of disciplines including social sciences, humanities, ethics, law, management sciences, and knowledge translation. *Edited by* Dr. Brian Hutchison, McMaster University, Hamilton. ✦ ELECTRONIC HEALTHCARE: Best practices, policy and innovations exploring e-models, e-practices and e-products for e-health. For administrators, academics, insurers, suppliers and policy pundits. *Edited by* Dr. Michael Guerriere, University of Toronto, Toronto and Denis Protti, University of Victoria, Victoria. ✦ LAW & GOVERNANCE: Within the framework of the law and the role of governance providing policies, programs, practices and opinions for the providers, administrators and insurers of healthcare services. *Editorial Chair,* Dr. Kevin Smith, McMaster University, Hamilton. ✦ HRRESOURCES: Cases, commentary and policy reviews for healthcare clinicians, human resources managers and the policy leaders, insurers, academics, administrators, boards and advisors of all healthcare organizations. *Editorial Chair,* Dr. Louise Lemieux-Charles, University of Toronto, Toronto. ✦ JOURNAL OF WORLD HEALTH & POPULATION: Best practices, policy and innovations in the administration of healthcare in developing communities and countries. For administrators, academics, researchers and policy leaders. Includes peer reviewed research papers. *Edited by* Dr. John Paul, University of North Carolina, Chapel Hill. ✦ LONGWOODS.COM: Enabling excellence in healthcare. Providing electronic access to news, information, career opportunities, conference schedules, research, case studies, policy reviews and commentary that cover politics, policy, theory, best practices and innovations in healthcare.

HEALTHCARE
POLICY
Politiques de Santé

Health Services, Management and Policy Research
Services de santé, gestion et recherche de politique

VOLUME 3 NUMBER 1 • AUGUST 2007

Healthcare Policy/Politiques de Santé seeks to bridge the worlds of research and decision-making by presenting research, analysis and information that speak to both audiences. Accordingly, our manuscript review and editorial processes include researchers and decision-makers.

We publish original scholarly and research papers that support health policy development and decision-making in spheres ranging from governance, organization and service delivery to financing, funding and resource allocation. The journal welcomes submissions from researchers across a broad spectrum of disciplines in health sciences, social sciences, management and the humanities and from interdisciplinary research teams. We encourage submissions from decision-makers or researcher–decision-maker collaborations that address knowledge application and exchange.

While *Healthcare Policy/Politiques de Santé* encourages submissions that are theoretically grounded and methodologically innovative, we emphasize applied research rather than theoretical work and methods development. The journal maintains a distinctly Canadian flavour by focusing on Canadian health services and policy issues. We also publish research and analysis involving international comparisons or set in other jurisdictions that are relevant to the Canadian context.

—

Healthcare Policy/Politiques de Santé cherche à rapprocher le monde de la recherche et celui des décideurs en présentant des travaux de recherche, des analyses et des renseignements qui s'adressent aux deux auditoires. Ainsi donc, nos processus rédactionnel et d'examen des manuscrits font intervenir à la fois des chercheurs et des décideurs.

Nous publions des articles savants et des rapports de recherche qui appuient l'élaboration de politiques et le processus décisionnel dans le domaine de la santé et qui abordent des aspects aussi variés que la gouvernance, l'organisation et la prestation des services, le financement et la répartition des ressources. La revue accueille favorablement les articles rédigés par des chercheurs provenant d'un large éventail de disciplines dans les sciences de la santé, les sciences sociales et la gestion, et par des équipes de recherche interdisciplinaires. Nous invitons également les décideurs ou les membres d'équipes formées de chercheurs et de décideurs à nous envoyer des articles qui traitent de l'échange et de l'application des connaissances.

Bien que *Healthcare Policy/Politiques de Santé* encourage l'envoi d'articles ayant un solide fondement théorique et innovateurs sur le plan méthodologique, nous privilégions la recherche appliquée plutôt que les travaux théoriques et l'élaboration de méthodes. La revue veut maintenir une saveur distinctement canadienne en mettant l'accent sur les questions liées aux services et aux politiques de santé au Canada. Nous publions aussi des travaux de recherche et des analyses présentant des comparaisons internationales qui sont pertinentes pour le contexte canadien.

CONTENTS

Guest Editorial

The Undisciplined Economist

Discussion and Debate

Data Matters

Book Review

Research Papers

Questions de données

Compte rendu de livre

Documents de recherche

The Canadian Institutes of Health Research Institute of Health Services and Policy Research (CIHR - IHSPR) is a proud supporter of *Healthcare Policy/Politiques de Santé*.

IHSPR provides financial and in-kind support for the publication of *Healthcare Policy/Politiques de Santé*, and has played a key role in the journal's inception and development.

Longwoods Publishing gratefully acknowledges the financial support of the following organizations:

Institute of Aboriginal Peoples' Health
Institute of Musculoskeletal Health and Arthritis
Institute of Nutrition, Metabolism and Diabetes

Institute of Aging
Institute of Cancer Research
Institute of Gender and Health
Institute of Genetics
Institute of Infection and Immunity
Institute of Neurosciences, Mental Health and Addiction

Canadian Association for Health Services and Policy Research

l'Association canadienne pour la recherche sur les services et les politiques de la santé

HEALTHCARE
POLICY
Politiques de Santé

MANAGING EDITOR
REBECCA HART
rhart@longwoods.com

EDITORIAL DIRECTOR
DIANNE FOSTER-KENT
dkent@longwoods.com

COPY EDITOR
FRANCINE GERACI

TRANSLATOR
JOSEPHINE VERSACE

PROOFREADER
WAYNE HERRINGTON

PUBLISHER
ANTON HART
ahart@longwoods.com

ASSOCIATE PUBLISHER/ADMINISTRATION
BARBARA MARSHALL
bmarshall@longwoods.com

ASSOCIATE PUBLISHER/MEDIA
SUSAN HALE
shale@longwoods.com

DIRECTOR, DESIGN AND PRODUCTION
YVONNE KOO
ykoo@longwoods.com

GRAPHIC DESIGNER
JONATHAN WHITEHEAD
jwhitehead@longwoods.com

HOW TO REACH THE EDITORS AND PUBLISHER
Telephone: 416-864-9667 Fax: 416-368-4443

ADDRESSES
All mail should go to: Longwoods Publishing Corporation, 260 Adelaide Street East, No. 8, Toronto, Ontario M5A 1N1, Canada.

For deliveries to our studio: 54 Berkeley St., Suite 305, Toronto, Ontario M5A 2W4, Canada

SUBSCRIPTIONS
Individual subscription rates for one year are [C] $100 for online only and [C] $150 for print + online. For individual subscriptions contact Barbara Marshall at telephone 416-864-9667, ext. 100 or by e-mail at bmarshall@longwoods.com.

Institutional subscription rates are [C] $450 for online only and [C] $550 for print + online. For institutional subscriptions, please contact Rebecca Hart at telephone 416-864-9667, ext. 105 or by e-mail at rhart@longwoods.com.

Subscriptions must be paid in advance. An additional 6% Goods and Services Tax (GST) is payable on all Canadian transactions. Rates outside of Canada are in US dollars. Our GST number is R138513668.

SUBSCRIBE ONLINE
Go to www.healthcarepolicy.net and click on "Subscribe now."

REPRINTS/SINGLE ISSUES
Single issues are available at $25. Includes shipping and handling. Reprints can be ordered in lots of 100 or more. For reprint information call Barbara Marshall at 416-864-9667 or fax 416-368-4443, or e-mail to bmarshall@longwoods.com.

Return undeliverable Canadian addresses to: Circulation Department, Longwoods Publishing Corporation, 260 Adelaide Street East, No. 8, Toronto, Ontario M5A 1N1, Canada

EDITORIAL
To submit material or talk to our editors please contact Rebecca Hart at 416-864-9667, ext. 105 or by e-mail at rhart@longwoods.com. Author guidelines are available online at http://www.longwoods.com/pages.php?pageid=39&cat=247

ADVERTISING
For advertising rates and inquiries, please contact Susan Hale at 416-864-9667, ext. 104 or by e-mail at shale@longwoods.com.

PUBLISHING
To discuss supplements or other publishing issues contact Anton Hart at 416-864-9667, ext. 109 or by e-mail at ahart@longwoods.com.

Healthcare Policy / Politiques de Santé is published four times per year by Longwoods Publishing Corp., 260 Adelaide St. East, No. 8, Toronto, ON M5A 1N1, Canada. The journal is published with support from the Canadian Institutes of Health Research's Institute of Health Services and Policy Research. Manuscripts are reviewed by the editors and a panel of peers appointed by the editors. Information contained in this publication has been compiled from sources believed to be reliable. While every effort has been made to ensure accuracy and completeness, these are not guaranteed. The views and opinions expressed are those of the individual contributors and do not necessarily represent an official opinion of *Healthcare Policy* or Longwoods Publishing Corporation. Readers are urged to consult their professional advisers prior to acting on the basis of material in this journal.

No liability for this journal's content shall be incurred by Longwoods Publishing Corporation, the editors, the editorial advisory board or any contributors. ISSN No. 1715-6572

Publications Mail Agreement No. 40069375
Printed by Harmony Printing

GUEST EDITORIAL

Pharmaceutical Use and Outcomes: Always a Need for a Sober Second Look

STEVE MORGAN, PHD
Assistant Professor, Department of Health Care and Epidemiology
Centre for Health Services and Policy Research
University of British Columbia
Vancouver, BC

BRENDA MACGIBBON, PHD
Adjunct Professor, Département de mathématiques
Université du Québec à Montréal
Montreal, QC

Pharmaceuticals are undeniably one of the cornerstones of modern medicine. Appropriately used, many pharmaceutical agents can provide powerful health improvements and tremendous value for money in the healthcare system. Despite this remarkable promise, pharmaceuticals have important characteristics that necessitate careful appraisal of their safety, effectiveness and economic value, both before market entry and after.

The paper by O'Reilly et al. in this issue illustrates the need to monitor pharmaceutical use and the related impacts on patient health and the healthcare system. Under an unrestricted-access policy, utilization of relatively expensive treatment options (atypical antipsychotic agents) generated a more than 17-fold increase in provincial expenditure on antipsychotic medication for the Newfoundland and Labrador Prescription Drug Program. The pharmacoeconomic models that manufacturers use to justify the higher costs of atypical antipsychotic agents promise significant reductions in hospital expenditure. Yet, data reported by O'Reilly et al. indicate that the extra $3.5 million spent as a result of unrestricted access to atypical antipsychotics

in Newfoundland and Labrador was associated with little or no change in hospital costs for psychotic patients. While further study of patient impact is clearly needed, something went wrong in the translation of promising economic models to real-world health system impacts.

If there is any sector in which independent investigation and careful regulation are required to ensure that products deliver as promised by sellers (and as expected by consumers), it is in the pharmaceutical sector. Pharmaceuticals are not ordinary "goods" purchased to meet a consumer desire or preference. They are inputs into healthcare intended to address identified needs. This difference has several important implications for regulation, utilization and financing (Temin 1980; Evans 1984; Avorn 2004).

First, by definition, those who would consume pharmaceuticals – "patients" – are currently in poor health, or at a risk of becoming so. Unlike consumers of ordinary products, patients may not have the option to defer or decline a purchase owing to cost, uncertainty or other considerations. They are sick, often in pain, worried and sometimes desperate. Second, patients would not knowingly consume medicines that do not address their healthcare needs. There is no intrinsic value of a pharmaceutical product; a drug is of value to the extent that it generates desired health outcomes for those who consume it. The final major implication of pharmaceuticals as inputs into care is the fact that drugs are agents that interact with the body, literally changing biologic functions within us – hence their great potential for beneficial as well as harmful effects.

Human biology is sufficiently complex, and pharmacological actions sufficiently potent, that a full spectrum of positive and negative outcomes is possible. And just as patients in dire need may suffer from delay in treatment, those patients that experience unwanted effects of medicines suffer personal, potentially irreversible harms.

Given the unique circumstances of medicinal need, patients are often dependent upon others to look after their interests. Healthcare professionals, industry, regulators and public funders all play a role in informing and guiding drug licensing, utilization and product selection. Despite (or perhaps because of) the hope and faith that patients might place in pharmaceutical treatments, most would agree that licensing, utilization and product selection decisions ought to be based on scientific evidence concerning the extent to which a drug safely and effectively improves the health status of a patient, relative to available treatment options.

Particularly for the purpose of product licensing, the burden of proof regarding drug safety and efficacy typically falls on the manufacturer. Such proof is generally established through clinical trials, which are very expensive.

Drug trials represent a majority of the $33 billion that pharmaceutical manufacturers reported spending on R&D in 2004 (PhRMA 2006). Conducting such trials is both a regulatory requirement and a commercial investment. Indeed, "commercial confidentiality" is the typical grounds on which scientists and regulators are often kept from disclosing trial results to the public and even to health professionals. As trials are

a commercial investment, manufacturers will carefully design them to minimize costs and maximize the likelihood of findings needed to license or promote their product. Often, regulatory authorities merely require that a drug be shown to be better than a placebo in such a trial or, at most, not worse than a comparative drug in current use (Tunis et al. 2003; Wiktorowicz 2003; Deyo 2004). Trials are therefore often designed as short-term, placebo-controlled studies that focus on surrogate indicators of desired effects rather than the actual health outcomes that are being sought, which may occur only after years of drug use.

For example, trials of a drug may focus on whether it lowers blood pressure more than a placebo rather than studying whether it improves patient survival or quality of life better than treatment alternatives. The focus on surrogate outcomes saves costs but may reduce the value of information generated if the surrogate marker of impact has not been proven to relate closely with outcomes in other trials. The placebo comparison may satisfy regulatory requirements that a drug be better than nothing, but will not provide evidence necessary to determine whether it is better than the best available treatment alternatives. Similarly, trials often enlist just enough patients to determine with statistical certainty whether the drug produces the main, desired result. This too saves cost, but may mean that the trial does not enroll enough patients to detect (with statistical significance) events that occur less often but are nevertheless important: i.e., the rare and serious adverse drug reaction.

There are a number of other design features of trials that make their results somewhat different from what could be expected in the real world (Laupacis et al. 2003; Tunis et al. 2003). Trials are conducted in highly controlled circumstances in which patients have extensive information and support from practitioners, encouraging appropriate use, whereas patients in the real world often stop taking their medicines or use them in ways that are inconsistent with the proper regimen (Urquhart 1999; Caetano et al. 2006). Trials are generally tested in population groups that are healthier than the eventual users in real-world circumstances. For instance, women who are pregnant or lactating or not practising effective birth control are not generally permitted to participate in clinical trials in order to prevent harm to children and foetuses. While this policy may be ethically appealing, pregnant and lactating women will often be treated with the same drug in the real world. Similarly, trials seldom involve the very frail, the elderly or children; yet, in reality, drugs will often be used by members of these groups. Finally, trials often test drugs for effectiveness in treating highly specific needs but, once licensed for sale, the drugs then go on to be used for a wider variety of needs in actual clinical settings.

Given the above, there is reason to believe that clinical trials conducted by manufacturers provide a necessary but incomplete view of the safety and effectiveness of a drug. Given the reasons for differences between findings of clinical trials and actual use, it is in the public interest for public bodies (drug plans, regulators or both)

to undertake regular assessments of pharmaceuticals on behalf of the prescribers, patients and the broader public. In some cases, those assessments will reveal that drugs perform very well, generating expected or even better outcomes in real-world settings. In other cases, as O'Reilly et al. indicate might be the case with atypical antipsychotics, actual results may not be as expected.

If risks of harm are significant (as evidenced by some popular drugs being rather publicly withdrawn from the market within the past few years), or cost implications extraordinary (as appears to be the case with unrestricted access to atypical antipsychotics), it may even be necessary to require patients to go without a drug (e.g., withdraw it from the market or from a drug plan) or to make them pay privately for drugs that are not deemed to be cost-effective from the perspective of broader public health goals (e.g., use reference pricing policies within drug classes).

There are, of course, weaknesses of observational studies in real-world contexts. For example, it is often very difficult to control for unobserved differences between patients receiving different levels or types of drug treatment. However, when conducted according to high scientific standards, observational studies can become a vital component of an overall pharmaceutical surveillance strategy aimed at improving patient safety, health outcomes and overall health system effectiveness. The study by O'Reilly et al. illustrates a case in which observational data suggest the need for more detailed investigation that could be carried out through a variety of mechanisms, including real-world randomized trials.

We believe that Canada is in a position of great opportunity in this area. Canada is home to some of the world's leading clinical scientists, methodologists, epidemiologists and economists in the field of observational healthcare research. The necessary data are already being collected in many jurisdictions, and some have already established mechanisms to make related data available for scientific evaluation. Furthermore, the Canadian public appear to understand and support the use of their healthcare data for the purpose of improving the safety, effectiveness and performance of health products and healthcare delivery, particularly when such research is conducted by organizations independent of commercial interests (Willison et al. 2003).

What Canada requires are mechanisms to strengthen data holdings and processes for accessing those data for the purpose of evaluation research in every province and jurisdiction. The weakness of the study by O'Reilly et al. lies primarily in the lack of suitably anonymized, patient-level, linked data to test their hypotheses more rigorously. Along with data infrastructure, expertise is also needed in all regions of the country so that those with intimate knowledge of local data, health system context and patient and professional communities are involved in research and communication. Finally, Canada requires a national strategy for work of this kind. Given what is known about the potential benefits, risks and costs associated with steadily increasing use of medicines in Canada, conducting evaluation research on an ad hoc basis borders on unethi-

cal. Canada needs a means to make evaluation an ongoing and coordinated activity that would communicate timely research findings to manufacturers, regulators, healthcare professionals, patients and drug benefit providers. To make the work credible and free of the potential biases that could come from being closely associated with providers of and payers for pharmaceuticals, the coordination of research investments should be at arm's length from both manufacturers and drug plans.

Fortunately, Canada has credible institutions that might play a role in real-world pharmaceutical evaluation, as well as a commitment of the National Pharmaceuticals Strategy to make this a priority action item for pharmaceutical policy in Canada (NPS 2006). The benefits of such a national network could be very important for Canada. For example, a recent article in the *New England Journal of Medicine* reports an elevated coronary risk with the use of rosiglitazone maleate (Avandia®) by diabetics (Nissen and Wolski 2007). Canadian researchers had previously recommended a study of such drugs (glitazones) as one of the priorities to be investigated by a national network for real-world drug evaluation in Canada. Had such a network been in place three years ago, Canada might have brought such risks to the surface earlier. Thus, what is most needed now is a commitment from governments, the public, patient groups, professionals and other stakeholders to act on a strategy for real-world evaluation of medicines. Modest investments in data, infrastructure, processes and expertise would enable routine monitoring of Canadians' utilization of medicines, the consequences for their health and the impacts on the healthcare system. Given the nature of pharmaceuticals and the pharmaceutical market, such a sober second look at medicine use will always be necessary.

REFERENCES

Avorn, J. 2004. *Powerful Medicines: The Benefits, Risks, and Costs of Prescription Drugs*. New York: Knopf.

Caetano, P.A., J. Lam and S.G. Morgan. 2006. "Toward a Standard Definition and Measurement of Persistence with Drug Therapy: Examples from Research on Statin and Antihypertensive Utilization." *Clinical Therapeutics* 28(9): 1411–24.

Deyo, R.A. 2004. "Gaps, Tensions, and Conflicts in the FDA Approval Process: Implications for Clinical Practice." *Journal of the American Board of Family Practice* 17(2): 142–49.

Evans, R.G. 1984. *Strained Mercy: The Economics of Canadian Health Care*. Toronto: Butterworths.

Laupacis, A., J.M. Paterson, M. Mamdani, A. Rostom and G.M. Anderson. 2003. "Gaps in the Evaluation and Monitoring of New Pharmaceuticals: Proposal for a Different Approach." *Canadian Medical Association Journal* 169(11): 1167–70.

National Pharmaceuticals Strategy (NPS) First Ministers' Task Force. 2006. *Progress Report* (p. 50). Ottawa: Health Canada. Retrieved July 11, 2007. <http://www.councilofthefederation.ca/pdfs/npsreport_web.pdf>.

Nissen, S.E. and K. Wolski. 2007. "Effect of Rosiglitazone on the Risk of Myocardial Infarction and Death from Cardiovascular Causes." *New England Journal of Medicine* 356(24): 2457–71.

O'Reilly, D., D. Craig, L. Phillips, R. Goeree, J. Tarride and P. Parfrey. 2007. "Costs of New Atypical Antipsychotic Agents for Schizophrenia: Does Unrestricted Access Reduce Hospital Utilization?" *Healthcare Policy* 3(1): 58–79.

Pharmaceutical Research and Manufacturers of America (PhRMA). 2006 (March). *Pharmaceutical Industry Profile 2006*. Washington, DC: Author. Retrieved July 11, 2007. <http://www.phrma.org/files/2006%20Industry%20Profile.pdf>.

Temin, P. 1980. *Taking Your Medicine: Drug Regulation in the United States*. Cambridge, MA: Harvard University Press.

Tunis, S.R., D.B. Stryer and C.M. Clancy. 2003. "Practical Clinical Trials: Increasing the Value of Clinical Research for Decision Making in Clinical and Health Policy." *Journal of the American Medical Association* 290(12): 1624–32.

Urquhart, J. 1999. "Pharmacoeconomic Consequences of Variable Patient Compliance with Prescribed Drug Regimens." *Pharmacoeconomics* 15(3): 217–28.

Wiktorowicz, M.E. 2003. "Emergent Patterns in the Regulation of Pharmaceuticals: Institutions and Interests in the United States, Canada, Britain, and France." *Journal of Health Politics, Policy and Law* 28(4): 615–58.

Willison, D.J., K. Keshavjee, K. Nair, C. Goldsmith, A.M. Holbrook and Computerization of Medical Practices for the Enhancement of Therapeutic Effectiveness Investigators. 2003. "Patients' Consent Preferences for Research Uses of Information in Electronic Medical Records: Interview and Survey Data." *British Medical Journal* 326(7385): 373.

STEVE MORGAN, PHD

BRENDA MACGIBBON, PHD

Utilisation des médicaments et effets : nécessité constante d'un second regard réfléchi

STEVE MORGAN, PH.D.
Professeur adjoint, Département des soins de santé et d'épidémiologie
Centre de recherche sur les services et les politiques de santé
Université de la Colombie-Britannique
Vancouver, C.-B.

BRENDA MACGIBBON, PH.D.
Professeur, Département de mathématiques
Université du Québec à Montréal
Montréal, QC

Les médicaments sont indéniablement une des pierres angulaires de la médecine moderne. Utilisés de façon appropriée, beaucoup d'agents pharmaceutiques peuvent contribuer de façon significative à l'amélioration de la santé et être extrêmement rentables pour le système de soins de santé. Malgré cette promesse remarquable, les médicaments comportent d'importantes caractéristiques qui nécessitent une soigneuse évaluation de leur innocuité, de leur efficacité et de leur valeur économique, et ce, avant et après leur mise en marché.

L'article d'O'Reilly et al figurant dans ce numéro illustre le besoin de surveiller l'utilisation des produits pharmaceutiques et les répercussions connexes qu'ils ont sur la santé des patients et sur le système de soins de santé. En vertu de la politique d'accès libre, l'utilisation de traitements relativement peu dispendieux (agents antipsychotiques atypiques) a fait augmenter d'un facteur de 17 les dépenses provinciales en médicaments antipsychotiques pour le programme de médicaments sur ordonnance de Terre-Neuve-et-Labrador. Les modèles pharmaco-économiques qu'utilisent les fabricants pour justifier les coûts plus élevés des agents antipsychotiques atypiques promettent des réductions significatives des dépenses hospitalières. Pourtant, les données rapportées par O'Reilly et al indiquent que les 3,5 M$ supplémentaires dépensés à la suite de l'accès sans restriction aux agents antipsychotiques atypiques à Terre-Neuve-et-Labrador n'ont eu qu'une incidence faible ou nulle sur les dépenses hospitalières pour les patients psychotiques. Bien que la nécessité d'une étude plus poussée sur les répercussions sur les patients se fasse clairement sentir, quelque chose a dérapé et les modèles économiques prometteurs ne se sont pas traduits par des changements notables dans le système de santé dans le monde réel.

S'il y a un secteur où des enquêtes indépendantes et une réglementation rigoureuse sont nécessaires afin de s'assurer que les produits procurent effectivement les bienfaits promis par les vendeurs (et auxquels s'attendent les consommateurs), c'est bien le secteur pharmaceutique. Les médicaments ne sont pas des « marchandises » ordinaires visant à satisfaire un désir ou un goût du consommateur. Ce sont plutôt des intrants des soins de santé visant à combler des besoins précis. Cette différence a d'importantes répercussions en ce qui a trait à la réglementation, à l'utilisation et au financement (Temin 1980; Evans 1984; Avorn 2004).

Tout d'abord, par définition, ceux qui consomment les produits pharmaceutiques – les « patients » – sont actuellement en mauvaise santé ou à risque de l'être. Contrairement aux consommateurs de produits ordinaires, les patients peuvent ne pas avoir la possibilité de reporter ou de refuser un achat pour des raisons de coût, d'incertitude ou autres. Ils sont malades, souvent aux prises avec la douleur, inquiets et parfois désespérés. De plus, les patients ne consommeraient pas sciemment des médicaments qui ne répondent pas à leurs besoins de santé. Un produit pharmaceutique n'a pas de valeur intrinsèque; un médicament n'a de valeur que dans la mesure où il produit les effets désirés sur la santé de ceux qui le consomment. Enfin, en tant qu'intrants des soins de santé, les produits pharmaceutiques sont des agents qui interagissent avec le corps et qui changent littéralement les fonctions biologiques de l'organisme – d'où leur grand potentiel d'avoir des effets bénéfiques et néfastes. La biologie humaine est suffisamment complexe et les actions pharmacologiques suffisamment puissantes qu'un éventail complet d'effets positifs et négatifs est possible. Tout comme les patients qui ont des besoins aigus peuvent souffrir s'il y a des retards dans le traitement, les patients qui éprouvent des effets indésirables avec des médicaments subissent des préjudices personnels potentiellement irréversibles.

Étant donné les circonstances uniques des besoins en médicaments, les patients dépendent souvent des autres pour protéger leurs intérêts. Les professionnels en soins de santé, l'industrie, les organismes de réglementation et les bailleurs de fonds publics ont tous un rôle à jouer pour ce qui est d'informer et de guider l'homologation des médicaments, leur utilisation et la sélection des produits. Malgré (ou peut-être à cause de) l'espoir et la confiance que peuvent avoir les patients à l'endroit des traitements pharmaceutiques, la plupart conviendraient que les décisions liées à l'homologation, à l'utilisation et à la sélection des produits devraient être fondées sur des preuves scientifiques de la mesure dans laquelle un médicament contribue à améliorer de façon sécuritaire et efficace l'état de santé d'un patient, selon les choix de traitement offerts.

En particulier, aux fins de l'homologation des produits, le fardeau de la preuve concernant l'innocuité et l'efficacité incombe typiquement au fabriquant. De telles preuves sont généralement établies au moyen d'essais cliniques, qui sont très dispendieux.

Les essais de médicaments représentent la majorité des 33 milliards de dollars que les fabricants de produits pharmaceutiques disent avoir dépensé en recherche et déve-

loppement en 2004 (PhRMA 2006). La réalisation d'essais cliniques constitue à la fois une exigence réglementaire et un investissement commercial. La « confidentialité commerciale » est en effet la raison typique invoquée pour expliquer la fréquente non-divulgation, par les scientifiques et les organismes de réglementation, des résultats des essais de médicaments au public et même aux professionnels de la santé. Étant donné que les essais constituent un investissement financier, les fabricants les conçoivent soigneusement afin de minimiser les coûts et de maximiser la probabilité d'obtenir les résultats nécessaires pour homologuer ou promouvoir le produit. Souvent, les autorités réglementaires exigent seulement qu'il soit démontré, dans le cadre des essais, que le médicament est meilleur que le placebo ou, tout au plus, qu'il n'est pas pire qu'un médicament comparable déjà sur le marché (Tunis et al 2003; Wiktorowicz 2003; Deyo 2004). Les essais sont donc souvent conçus comme des études contrôlées, à court terme, qui mettent l'accent sur des indicateurs de substitution des effets désirés, plutôt que sur les effets réels sur la santé, lesquels pourraient ne se produire qu'après plusieurs années d'utilisation.

Par exemple, les essais d'un médicament peuvent mettre l'accent sur ses propriétés antihypertensives par comparaison au placebo, au lieu d'étudier s'il améliore le taux de survie ou la qualité de vie des patients mieux que les autres traitements disponibles. Le fait de mettre l'accent sur les effets de substitution peut faire économiser de l'argent mais peut réduire la valeur des renseignements produits s'il n'est pas prouvé que l'indicateur de substitution est étroitement associé aux effets obtenus dans d'autres essais. La comparaison avec le placebo peut satisfaire aux exigences réglementaires voulant qu'un médicament soit mieux que rien, mais ne fournira pas les preuves nécessaires pour déterminer s'il est meilleur que le meilleur traitement déjà disponible. Dans le même ordre d'idées, on ne recrute souvent que juste assez de patients pour déterminer avec une certitude statistique si le médicament produit l'effet principal désiré. Cela fait également économiser de l'argent, mais peut signifier que l'essai ne comporte pas suffisamment de patients pour déceler (avec une importance statistique) les effets moins fréquents mais néanmoins importants, c.-à-d. les rares et graves effets indésirables d'un médicament.

La conception des essais cliniques comporte plusieurs autres caractéristiques qui font que les résultats qu'ils produisent sont quelque peu différents de ce qu'on obtiendrait dans le monde réel (Laupacis et al 2003; Tunis et al 2003). Les essais sont effectués dans des circonstances hautement contrôlées où les patients reçoivent, de la part des praticiens, des renseignements détaillés et un soutien poussé afin d'encourager une utilisation appropriée, tandis que les patients dans le monde réel cessent souvent de prendre leurs médicaments ou ne respectent pas les prescriptions du médecin (Urquhart 1999; Caetano et al 2006). Les essais utilisent généralement des sujets en meilleure santé que les utilisateurs éventuels dans des circonstances réelles. Par exemple, les femmes enceintes, qui allaitent ou qui n'utilisent pas des méthodes de contra-

ception efficaces ne sont généralement pas autorisées à participer à des essais cliniques afin de prévenir tout préjudice aux enfants ou aux fœtus. Aussi attrayante que cette politique puisse paraître sur le plan de l'éthique, les femmes enceintes ou qui allaitent seront souvent traitées avec les mêmes médicaments dans le monde réel. Également, les personnes très fragiles, les aînés et les enfants prennent rarement part à des essais cliniques; pourtant, dans la réalité, les médicaments seront souvent utilisés par des personnes de ces groupes. Enfin, les essais cherchent souvent à déterminer l'efficacité d'un médicament pour le traitement d'affections très précises, mais une fois la mise en marché du produit autorisée, il peut alors être utilisé à de nombreuses autres fins dans des environnements cliniques réels.

À la lumière de ce qui précède, il y a raison de croire que les essais cliniques menés par les fabricants fournissent un aperçu nécessaire mais incomplet de l'innocuité et de l'efficacité d'un médicament. Étant donné les raisons expliquant les différences entre les résultats obtenus lors des essais cliniques et dans le monde réel, il est dans l'intérêt du public que les organismes publics (régimes d'assurance-médicaments, organismes de réglementation ou les deux) effectuent des évaluations régulières des médicaments au nom des prescripteurs, des patients et du grand public. Dans certains cas, ces évaluations révèleront que les médicaments donnent de très bons résultats et produisent des effets équivalents ou même meilleurs dans le monde réel. Dans d'autres cas, les résultats réels peuvent ne pas être ceux qui étaient prévus – comme cela semble être le cas pour les médicaments antipsychotiques atypiques, tel que constate par O'Reilly et al.

Si les risques de préjudice sont significatifs (comme en témoigne le retrait public du marché de certains médicaments populaires au cours des dernières années) ou que les implications de coûts sont extraordinaires (comme cela semble être le cas avec l'accès libre aux antipsychotiques atypiques), il pourrait s'avérer nécessaire de demander aux patients de s'abstenir de prendre un médicament (par ex., le retirer du marché ou d'un régime d'assurance-médicaments) ou de les faire payer eux-mêmes pour des médicaments qui ne sont pas jugés rentables à la lumière des objectifs plus vastes de santé publique (par ex., utiliser des politiques d'établissement du prix de référence à l'intérieur des catégories de médicaments).

Les études par observation dans le monde réel comportent bien sûr certaines faiblesses. Par exemple, il est souvent très difficile de vérifier les différences non observées entre les patients qui reçoivent différents niveaux ou types de traitements pharmacothérapeutiques. Cependant, lorsqu'elles sont effectuées selon des normes scientifiques élevées, les études par observation peuvent s'inscrire dans une stratégie globale de surveillance pharmaceutique visant à améliorer la sécurité des patients, les effets sur la santé et l'efficacité globale du système de santé. L'étude d'O'Reilly et al illustre un cas où les données obtenues par observation suggèrent le besoin d'une enquête plus détaillée qui pourrait être réalisée grâce à une variété de mécanismes, y compris des essais randomisés dans le monde réel.

Nous croyons qu'une excellente occasion s'offre au Canada à ce chapitre. Certains des plus éminents scientifiques, spécialistes de la méthodologie, épidémiologistes et économistes au monde dans le domaine de la recherche par observation en soins de santé résident ici. Les données nécessaires sont déjà en train d'être recueillies dans plusieurs provinces et territoires, et certains chercheur sont déjà établi des mécanismes pour fournir des données connexes à des fins d'évaluation scientifique. En outre, le public canadien semble comprendre et appuyer l'utilisation des renseignements sur leur santé pour améliorer l'innocuité, l'efficacité et le rendement des produits de santé et de la prestation des soins de santé, surtout quand cette recherche est effectuée par des organismes indépendants qui n'ont aucun intérêt commercial dans l'étude (Willison et al 2003).

Le Canada a besoin de mécanismes pour renforcer les fonds de données et les processus d'accès à ces données aux fins d'études d'évaluation dans chaque province et territoire. La faiblesse de l'étude d'O'Reilly et al tient principalement au manque de données adéquates et anonymes sur les patients et reliées entre elles afin de permettre de vérifier les hypothèses des chercheurs de façon plus rigoureuse. En plus d'une infrastructure de données, une expertise est également nécessaire dans toutes les régions du pays de manière à ce que ceux qui possèdent une connaissance poussée des données locales, du contexte du système de santé et des communautés professionnelles et de patients puissent participer à la recherche et à la communication. Enfin, le Canada a besoin d'une stratégie nationale pour les travaux de ce genre. Étant donné ce que l'on sait au sujet des avantages, risques et coûts potentiels associés à l'utilisation accrue des médicaments au Canada, mener des études d'évaluation de façon ponctuelle revient à frôler les limites de l'éthique. Le Canada a besoin de moyens qui lui permettent de faire de l'évaluation une activité courante et coordonnée qui permet de communiquer, en temps opportun, les résultats de recherche aux fabricants, aux organismes de réglementation, aux professionnels des soins de santé, aux patients et aux responsables des régimes d'assurance-médicaments. Afin d'assurer que la recherche soit crédible et dénuée de tout biais potentiel pouvant découler d'une étroite association avec les fournisseurs de produits pharmaceutiques et les payeurs, la coordination des investissements dans la recherche devrait s'effectuer indépendamment des fabricants et des régimes d'assurance-médicaments.

Heureusement, le Canada est doté d'institutions crédibles qui pourraient jouer un rôle dans l'évaluation des médicaments dans le monde réel, et bénéficié d'un engagement de la Stratégie nationale sur les produits pharmaceutiques de faire de cette question une priorité dans l'élaboration des politiques pharmaceutiques au Canada (SNPP 2006). Un tel réseau national pourrait comporter d'importants avantages pour le Canada. Par exemple, un récent article publié dans le *New England Journal of Medicine* rapporte un risque accru de maladies cardiovasculaires chez les personnes diabétiques qui prennent du maléate de rosiglitazone (Avandia®) (Nissen et Wolski 2007). Les chercheurs canadiens avaient antérieurement recommandé qu'un réseau national d'évaluation des

médicaments dans le monde réel effectue, entre autres priorités, une étude sur les glitazones. Si un tel réseau avait été en place il y a trois ans, le Canada aurait peut-être pu signaler de tels risques plus tôt. Donc, ce dont on a le plus besoin pour l'instant est un engagement de la part des gouvernements, du public, des groupes de patients, des professionnels et d'autres intervenants à l'effet qu'une stratégie sera élaborée pour évaluer les médicaments dans le monde réel. De modestes investissements dans les données, l'infrastructure, les processus et l'expertise permettraient d'assurer une surveillance systématique de l'utilisation des médicaments par les Canadiens, des répercussions sur leur santé et de l'incidence sur le système de soins de santé. Étant donné la nature des produits pharmaceutiques et du marché des médicaments, il sera toujours nécessaire de poser un second regard serein sur l'utilisation des médicaments.

RÉFÉRENCES

Avorn, J. 2004. *Powerful Medicines: The Benefits, Risks, and Costs of Prescription Drugs*. New York : Knopf.

Caetano, P.A., J. Lam et S.G. Morgan. 2006. « Toward a Standard Definition and Measurement of Persistence with Drug Therapy: Examples from Research on Statin and Antihypertensive Utilization. » *Clinical Therapeutics* 28(9) : 1411–24.

Deyo, R.A. 2004. « Gaps, Tensions, and Conflicts in the FDA Approval Process: Implications for Clinical Practice. » *Journal of the American Board of Family Practice* 17(2) : 142–49.

Evans, R.G. 1984. *Strained Mercy: The Economics of Canadian Health Care*. Toronto : Butterworths.

Laupacis, A., J.M. Paterson, M. Mamdani, A. Rostom et G.M. Anderson. 2003. « Gaps in the Evaluation and Monitoring of New Pharmaceuticals: Proposal for a Different Approach. » *Canadian Medical Association Journal* 169(11) : 1167–70.

Groupe de travail ministériel fédéral-provincial-territorial sur la Stratégie nationale relative aux produits pharmaceutiques. 2006. Rapport d'étape (p. 50). Ottawa : Santé Canada. Extrait le 11 juillet 2007. <http://www.councilofthefederation.ca/pdfs/npsreport_web.pdf>.

Nissen, S.E. et K. Wolski. 2007. « Effect of Rosiglitazone on the Risk of Myocardial Infarction and Death from Cardiovascular Causes. » *New England Journal of Medicine* 356(24) : 2457–71.

O'Reilly, D., D. Craig, L. Phillips, R. Goeree, J. Tarride et P. Parfrey. 2007. « Costs of New Atypical Antipsychotic Agents for Schizophrenia: Does Unrestricted Access Reduce Hospital Utilization? » *Healthcare Policy* 3(1) : 58–79.

Pharmaceutical Research and Manufacturers of America (PhRMA). 2006 (mars). Pharmaceutical Industry Profile 2006. Washington, DC : Author. Extrait le 11 juillet 2007. <http://www.phrma.org/files/2006%20Industry%20Profile.pdf>.

Temin, P. 1980. *Taking Your Medicine: Drug Regulation in the United States*. Cambridge, MA : Harvard University Press.

Tunis, S.R., D.B. Stryer et C.M. Clancy. 2003. « Practical Clinical Trials: Increasing the Value of Clinical Research for Decision Making in Clinical and Health Policy. » *Journal of the American Medical Association* 290(12) : 1624–32.

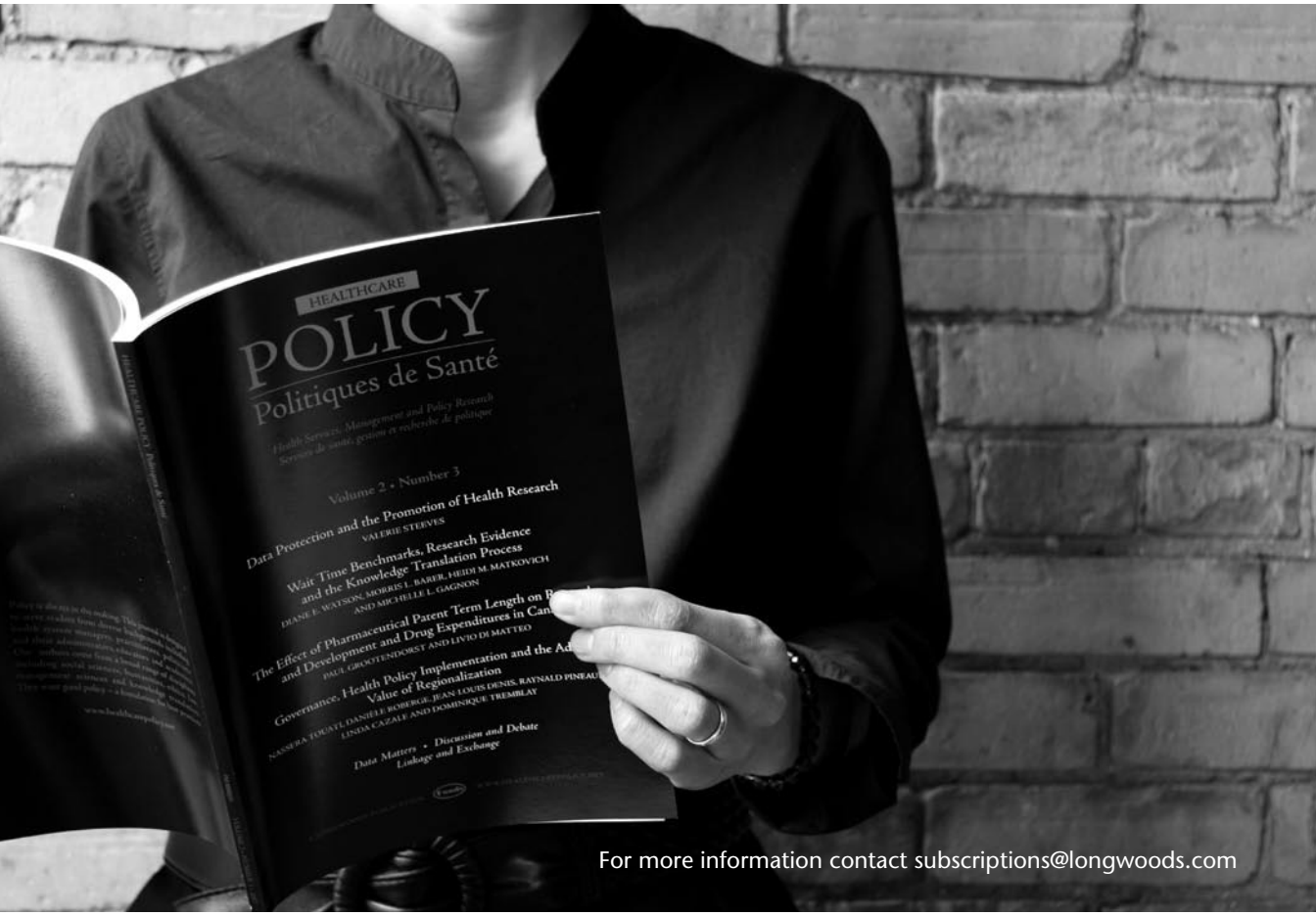
Urquhart, J. 1999. « Pharmacoeconomic Consequences of Variable Patient Compliance with Prescribed Drug Regimens. » *Pharmacoeconomics* 15(3) : 217–28.

Wiktorowicz, M.E. 2003. « Emergent Patterns in the Regulation of Pharmaceuticals: Institutions and Interests in the United States, Canada, Britain, and France. » *Journal of Health Politics, Policy and Law* 28(4) : 615–58.

Willison, D.J., K. Keshavjee, K. Nair, C. Goldsmith, A.M. Holbrook et les investigateurs de Computerization of Medical Practices for the Enhancement of Therapeutic Effectiveness. 2003. « Patients' Consent Preferences for Research Uses of Information in Electronic Medical Records: Interview and Survey Data. » *British Medical Journal* 326(7385) : 373.

STEVE MORGAN, PH.D.

BRENDA MACGIBBON, PH.D.



Peer reviewed research and knowledge translation

Longwoods Publishing
Enabling Excellence

HEALTHCARE
POLICY
Politiques de Santé

www.healthcarepolicy.net

Plastic Brains

Cerveaux plastiques

by ROBERT G. EVANS
Professor of Economics
University of British Columbia
Vancouver, BC

Abstract

Memories fade, alas, and more rapidly with age, though the aging brain holds more tenaciously to the longer past. Or does it? The brain may be continually editing those seemingly clear memories. That the immature brain constructs, "sculpts" itself by configuring its neural linkages to make best use of the sensory input received in early life has been known for decades. The more recent news is that mature brains also re-arrange these linkages as sensory inputs change. So what? Well, by some estimates inadequate stimulation in early childhood leaves 25% of Canadians neurally challenged by the modern world. Countries with systematic early child development programs show better results. Are there also opportunities for exploiting the plasticity of adult brains? (Or is that already happening, all around us?)

Résumé

Les souvenirs s'estompent, hélas, et encore plus rapidement avec l'âge, bien que le cerveau vieillissant ait davantage tendance à se rappeler le passé plus lointain. Est-ce réellement le cas? Il se pourrait que le cerveau soit continuellement en train de modifier

des souvenirs apparemment clairs. On sait depuis des décennies que le cerveau encore en développement se construit et se « façonne » en configurant ses liens neuronaux de manière à faire le meilleur usage possible des données sensorielles reçues tôt dans la vie. Selon les données récentes, les cerveaux pleinement développés réorganisent ces liens à mesure que les données sensorielles changent. Et alors? D'après certaines estimations, 25 % des Canadiens affichent des déficiences neuronales qui les limitent dans le monde moderne en raison d'une stimulation inadéquate dans la première enfance. Les pays dotés de programmes systématiques de développement des jeunes enfants présentent de meilleurs résultats. Y a-t-il aussi des occasions d'exploiter la plasticité des cerveaux adultes? (Ou cela se produit-il déjà tout autour de nous?)

—

"T'aint what a man don't know as makes him ignorant, it's what he knows that aint so."

– variously attributed

I seem to be forgetting things lately. My memory used to be excellent – at least that's how I remember it – and my (very) long-term memory remains pretty good. But it is not clear how great an advantage that is. As the late middle-aged chap in the *New Yorker* cartoon says wistfully, "I think I've learned quite a few things over the years. But there doesn't seem to be much demand for them." Remembering what my wife told me this morning might be more useful.

This seems to be the common experience of aging, just part of the general decay (a.k.a. golden years). My mother-in-law referred to it as "CRAFT." (It's an acronym.)

But there is something else, perhaps a bit more interesting. The contents of the long-term memory, still apparently very clear, seem to shift over time. If I go back to check the sources, they do not always exactly match. Memory tells a simpler, neater, more consistent story than the originals. It seems to have been edited – selectively.

There is an obvious way of dealing with such lapses: assert confidently and never look things up. As Satchel Paige said, "Don't look back. Something might be gaining on you." If you are fortunate, no one else will remember, or still have the originals.

Occasionally, however, some other scholarly pack-rat does. Milton Friedman's famous claim to have distilled his 1950s monetary doctrines from some deep-rooted and subtle "oral tradition" at the University of Chicago ran into just that problem. The equally distinguished, though much less celebrated, monetary scholar Don Patinkin, a contemporary of Friedman's at Chicago, had kept his graduate class notes. These contained no trace of the doctrines that Friedman had attributed to their eminent instructors. Paul Samuelson, an undergraduate at Chicago in those years, later made the same

observation: "I believe that this nominated myth should not be elevated to the rank of plausible history of ideas" (Barnett 2004: 526).

Friedman was engaged in constructing a set of economic doctrines to advance his political ideology – not the first to do that! To add weight and plausibility in a then relatively hostile intellectual environment, he recruited an array of distinguished (and conveniently defunct) supporters. But was he deliberately lying? Perhaps not. The more interesting possibility is that he sincerely believed his own myth. His brain may have been editing his memory to create the story that assisted his ideological agenda. Thank heavens you and I never do that.

This could be scary stuff. But the fact that Friedman appears to have made up the story – and his doctrines – from whole cloth has had no apparent bearing on their subsequent impact. Maybe Satchel Paige got it right.

One-Eyed Kittens

That the immature brain edits itself has long been known. Hubel and Wiesel shared the Nobel Prize in 1981 for demonstrating that the developing brain organizes its own neuronal wiring in response to the information being received from peripheral sense organs – eyes, ears and so on. In the classic experiment, the lids of one of a kitten's eyes are sewn together when the animal is four weeks old, and opened again at six weeks. The kitten will now have only monocular vision; it will not able to see out of the perfectly normal and healthy eye that was temporarily sewn shut during this critical period of neural development.

Subsequent microscopic examination of the experimental animal's visual cortex shows that the neurons are now linked dendritically so as to process information only from the eye that was not sewn up. The kitten is blind not in the sewn-up eye itself, but in the brain that is no longer capable of responding to electrical signals from that eye. Processing capacity had been reallocated, during the critical four- to six-week period of development, away from the apparently non-functioning peripheral organ. Once that period is past, the brain does not go back to revisit the allocation; the kitten is permanently monocular. The brain has organized itself – establishing the connections between neurons – to make best use of the sensory data coming in during the critical period.

Research ethics committees are unlikely to approve replication of this experiment in humans; there might also be legal complications. But everyone is aware that there is a critical period, perhaps somewhat less well mapped, for the learning of languages. Early exposure to two or several languages results in children becoming multilingual as easily and naturally as they learn their "native" language. But try it yourself: for an adult to learn another language is certainly possible, but the task is much more difficult and is rarely as well achieved.

There are two fundamental points here. First, the brain is "plastic" for a more or less extended period after birth. The immature brain is busy organizing itself – establishing the pattern and density of neuronal linkages (more is better) in response to the patterns of sensory data coming in. Neuronal linkages that are not receiving input are pruned away. The mature brain is "sculpted," in Cynader's (1994) felicitous phrase, from a huge initial oversupply of neurons in a process of competitive cooperation. Those that are successful in becoming active links in networks processing sensory input survive; the others do not.

Second, however, this sculpting process takes place according to a relatively precise sequence, so that different phases of development are coordinated. Critical periods, once missed, are gone forever – like the kitten's binocular vision. Other brain processes may be mobilized to remedy deficits – like the learning of a language in adult life – but they will never work as well. These two fundamental ideas drive the efforts in Canada to establish public policies and institutions to promote early childhood development (ECD), to which we will return below.

All this is interesting enough, but what does it have to do with me or with Milton Friedman? The plasticity of the developing brain would seem to lead naturally to the mature brain, with all its neuronal linkages in place and, for better or for worse, impervious to further external input. (There seems to be a lot of casual empirical support for this view.) But in fact, it is possible to teach an old dog new tricks – and it had better be, if the rhetoric of "lifelong learning" is to have any correspondence to the real world.

There are optimistic examples. London taxi drivers must "do the knowledge," learn the intricacies of the city's streets, to qualify to drive one of those big black cabs. Subsequent brain scans of drivers found that this demanding task was associated with enlargement of the hippocampus, a region associated with learning (Maguire et al. 2000). The adult brain apparently created the extra neuronal capacity to acquire and store all this new information.

The Monkey's Finger

The plasticity of the adult brain is addressed by Doidge (2007). He highlights in particular the work of Michael Merzenich, whose research program uses techniques that go back to the pioneering work of Wilder Penfield at the Montreal Neurological Institute in the 1930s. Penfield used electrical probes to stimulate particular areas of the exposed brains of conscious patients. As patients reported their sensations, he was able to "map" the brain, identifying the regions in which different types of information were processed and stored, and their linkages via the nervous system to other parts of the body. With much finer instrumentation, Merzenich and his associates have been able to "micro-map" areas of the adult monkey brain exposed in living experimental animals.

The striking finding is that these maps do not stay still. The boundaries between

micro-areas shift, over relatively short periods of time, depending upon how intensely they are being used.

As a leading example, a monkey's hand, like the human hand, is linked to the brain by three main nerves (radial, medial and ulnar) that transmit electric signals to specific and adjacent areas of the brain. Viewed by magnetic resonance imaging, these areas "light up," indicating neuronal activity, in response to stimulation of the corresponding regions of the hand. Modifying or blocking the transmission of signals from hand to brain not only changes or shuts down the neuronal activity in that micro-region, but also leads to rearrangement of the linkages among the neurons themselves.

In one experiment, the medial nerve was cut; in a more extreme intervention, the middle finger served by that nerve was amputated. The corresponding brain area became inactive. But, some months later, that area was remapped in the experimental animal and found to respond (light up the MRI image) to stimuli in adjacent areas of the hand served either by the radial or by the ulnar nerve. The neurons no longer receiving signals from the medial nerve had been appropriated by the networks responding to signals from the other, still functioning nerves. Just as in the developing kitten brain, unused neuronal processing capacity in the adult monkey brain was reassigned, and over quite a short time interval.

Another intriguing result emerged when two of the fingers of an experimental animal, served by different nerves, were linked together so that they could only be moved simultaneously. Later micro-mapping indicated that the separate neuronal networks that had previously responded to the signals from the distinct fingers/nerves were now merged into a single network, responding to the signals from what was now in effect one "finger."

Merzenich's monkey experiments demonstrate that the mature brain rearranges itself in response to external stimuli. This finding would appear to provide an increasingly secure neurological basis for the common wisdom, "Use it or lose it." Why does one have to keep practising a foreign language, or a physical skill? Because if the neurons that support it are left unused, they will be recruited by some other network.

But there is clearly more to the story. High levels of skill – in professional athletes, musicians or surgeons, for example – do require very frequent practice. It is well established that surgeons who operate infrequently have on average poorer outcomes. But if the "edge" is lost for lack of practice, it is also regained by further practice. And that further practice builds on a basic level of skill that, once acquired, remains for a long time, perhaps for life. Important neuronal linkages apparently persist, even without continuing stimulation. One never forgets how to ride a bicycle, for example. Nor does one's native language require constant practice.

All this is very interesting, but the findings for both immature and mature brains show self-reorganization in response to external stimuli, or lack of it. That is still some considerable distance from explaining the mechanisms whereby the brain quietly goes

about editing its own contents to make them more compatible with its proprietor's interests, purposes or ideological agenda. The human heart may be "deceitful above all else, and desperately wicked"; I suspect the human brain is only trying to be helpful. How does the internally driven editing process work?

Kids and Kittens: ECD and the Children Left Behind

Furthermore, what does all this have to do with health policy? In the case of the developing brain, quite a lot. Here is where we come back to ECD, and the evidence assembled by McCain and Mustard in the Early Years Studies (McCain and Mustard 1999; McCain et al. 2007).

The socio-economic gradient in health status is well known: higher income, education and social status are closely associated with better health and longer life expectancy. Perhaps less widely known is that the gradients in adult health correspond to earlier gradients in readiness to learn at school entry, in school performance, in post-secondary education, in contacts with the justice system, in attachment to employment and quality of jobs (Keating and Hertzman 1999). These self-reinforcing life trajectories are strongly influenced by the early life experiences that promote or inhibit the neural development of the immature brain – even including the expression or suppression of particular genes. Experiences become embedded in "coping styles," or patterns of behavioural and biological responses, to the later opportunities and challenges of life. The so-called "lifestyle choices" by which socio-economic health gradients are so often trivialized have deep roots in early environments and neural development.

These social gradients in health, literacy, school and work performance are much steeper in some societies than in others, meaning that they can be modified through public policies. Societies with flatter gradients are not only healthier but have higher literacy and educational attainment, lower poverty rates and smaller prison populations, and just plain work better. And they have serious ECD programs.

This is now all pretty well understood, though the evidence has yet to penetrate our political leadership. By some estimates, about 25% of Canadian children reach adulthood without the competencies they need to cope in the modern economy. The result is a large burden of social overhead costs, and of sheer human distress. It does not have to be this way. But ideology and economic interest trump science.

Messing with Your Head – To What End?

Well and good, but what about the mature brain? The evidence for continuous neuronal reorganization is intriguing, but how far does it take us? Presumably I too can reorganize my own neurons by duct-taping two of my fingers together for six months, but the operational significance is unclear.

The fact that the micro-map of the brain changes in response to particular external stimuli suggests the possibility of therapies for some forms, at least, of brain injury or illness, though these may be a long way off.

There are indications from brain scans that rigorous training in meditation enables adepts to modify their own brain functions. The Dalai Lama has an understandable interest in these observations, but I no longer have 20 years to spare. (I used that time studying economics – wonder what *that* did to my brain?)

There is also evidence that cultural norms, habits of thought, ideological preconceptions, even perceptions themselves may be neuronally embedded ("I wouldn't have seen it if I hadn't believed it"). This has rather disturbing implications.

If the Jesuits' insight ("Give me the child until he is seven and I will show you the man") is as solidly rooted neurologically as the one-eyed kittens, that suggests pretty radical limitations on the communicative and, *a fortiori*, the motivational power of "fact and argument" – evidence, as we might call it. In particular, school systems fragmented along sharply divergent religious or cultural lines may produce a citizenry whose brains are actually wired differently. And immigration … let's not go there. No wonder politics is such a difficult art.

So what does it all mean? Frankly, I don't know. And I still don't know why or how my brain is editing my memory – in response to some sort of internal stimulus, I guess. To support further wholesale returns of conjecture, we probably need a greater investment of fact. Stay tuned.

REFERENCES

Barnett, W.A. 2004. "An Interview with Paul A. Samuelson." *Macroeconomic Dynamics* 8: 519–42. Retrieved July 9, 2007. <http://129.3.20.41/eps/mhet/papers/0405/0405006.pdf>.

Cynader, M.S. 1994. "Mechanisms of Brain Development and Their Role in Health and Well-being." *Daedalus* 123(4): 155–66.

Doidge, N. 2007. *The Brain That Changes Itself*. New York: Viking.

Keating, D.P. and C. Hertzman. 1999. *Developmental Health and the Wealth of Nations*. New York: Guildford Press.

Maguire, E.A., D.G. Gadian, I.S. Johnsrude et al. 2000. "Navigation-Related Structural Change in the Hippocampi of Taxi Drivers." *Proceedings of the National Academy of Sciences* 97(8): 4398–403.

McCain, M.N. and J.F. Mustard. 1999. *Early Years Study: Final Report*. Toronto: Children's Secretariat.

McCain, M.N., J.F. Mustard and S. Shanker. 2007. *Early Years Study 2: Putting Science into Action*. Toronto: Council for Early Child Development.

LESLIE DAN FACULTY OF pharmacy University of Toronto

Murray Koffler Chair in Pharmacy Management

Leslie Dan Faculty of Pharmacy, University of Toronto

The Leslie Dan Faculty of Pharmacy, University of Toronto, is seeking to fill the Murray Koffler Chair in Pharmacy Management. The University is seeking an accomplished scholar to mount a program of research and teaching into the business and management aspects of community pharmacy. The appointment can be at the Assistant/Associate/or Full Professor level.

We encourage applications from individuals, preferably with a pharmacy background, who are excited about working in a multi-disciplinary environment. The ideal candidate will have a Ph.D. or equivalent, be eligible for tenure, be familiar with community pharmacy management issues, have effective interpersonal skills, and an established, extramurally funded research program. Researchers with an international perspective will be considered favourably.

The successful candidate will join a team of faculty members in the Division of Social and Administrative Pharmacy who have research interests in the sociology of health, patient decision making, pharmacoeconomics, pharmacoepidemiology, pharmacy services/program evaluation, pharmaceutical policy, and complementary/alternative medicine. The successful candidate will have the opportunity to collaborate with other researchers within the University.

Applicants must submit a curriculum vitae, a brief statement of their teaching philosophy and a brief outline of a proposed research plan, indicating the relevance of the research to pharmacy management, and three letters of reference: The Chair, Search Committee, Leslie Dan Faculty of Pharmacy, University of Toronto, 144 College St., Toronto, Ontario, Canada M5S 3M2. Applications by email are encouraged; they should be addressed to phmsearch@utoronto.ca; please use Microsoft Word (doc) or Adobe Acrobat (pdf) format. Evaluation of applications will begin 10 September 2007.

The University is strongly committed to diversity within its community and especially welcomes applications from visible minority group members, women, Aboriginal persons, persons with disabilities, members of sexual minority groups and others who may contribute to further diversification of ideas. We offer opportunities to work in many collaborative programs, including Aboriginal, Canadian, environmental, ethno-cultural, sexual diversity, gender and women's studies. The University of Toronto offers the opportunity to teach, conduct research and live in one of the most diverse cities in the world. All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority.

DISCUSSION AND DEBATE

Où Sont les Chercheurs? Speaking at Cross-Purposes or Across Boundaries?

Où sont les chercheurs? Parlent-ils à contre-courant ou transcendent-ils les frontières?

by CRAIG MITTON, PHD
Assistant Professor, University of British Columbia Okanagan
Michael Smith Foundation for Health Research Scholar
Kelowna, BC

ANGELA BATE, MSC
Research Associate, Newcastle University
Newcastle, UK

Abstract

Knowledge transfer and exchange (KTE) relates to both the translation and transfer of information, as well as the exchange of information, between researchers and decision-makers. Despite recent advances, KTE efforts may be compromised on two fronts: first, the existing reward structure for university-based researchers may not be compatible with applied research; and second, there appears to be a lack of research capacity in healthcare organizations. In this short paper, we contest the first of these points, suggesting that applied research can and should be published in high-index journals, and thus the tenure and promotions process does not need reform.

Regarding the second point, we suggest that partnerships be formed across healthcare organizations, universities, government agencies and research funders to support the positioning of PhD-trained researchers directly in healthcare delivery organizations. In our view, it is here, once organizational boundaries are crossed, that significant progress will be made in completing the health policy and health research cycles.

Résumé

Le transfert et l'échange de connaissances (TEC) a trait à la fois à l'application, au transfert et à l'échange d'information entre chercheurs et décideurs. Malgré des progrès récents, les initiatives de TEC peuvent être doublement compromises : premièrement, l'actuelle structure du système de rétribution pour les chercheurs qui évoluent en milieu universitaire peut ne pas être compatible avec la recherche appliquée; deuxièmement, il semble que les capacités de recherche soient plutôt limitées dans les organismes de soins de santé. Dans ce court article, nous contestons le premier de ces points et suggérons que la recherche appliquée peut et devrait être publiée dans des revues savantes fortement cotées; ainsi, le processus de permanence et de promotion n'a pas besoin d'être remanié. Quant au second point, nous proposons que des partenariats soient formés entre organismes de soins de santé, universités, organismes gouvernementaux et ceux qui financent la recherche afin de favoriser le placement des chercheurs détenant un doctorat directement dans les organismes de santé. Selon nous, c'est ici – une fois les frontières organisationnelles franchies – que des progrès significatifs pourront être réalisés dans l'exécution des cycles d'élaboration des politiques de santé et de recherche en santé.

Knowledge transfer and exchange (KTE) and its application to health services research has been gaining prominence internationally. This trend has been exemplified through the creation of national organizations whose role is to promote the principles of KTE both by facilitating knowledge transfer and information exchange between researchers and decision-makers, and in providing training for such activity, in order to improve the evidence base upon which decisions are made.[1]

The growing focus on the importance and relevance of KTE was highlighted in presentations and subsequent discussion generated by the 2005 International Conference on the Scientific Basis of Health Services in Montreal, which had as its aim to "promote the practical application of health research in health systems and settings." The question transcending the program was how to ensure successful KTE and bridge the perceived divide that currently exists between research undertaken in univer-

sities and research that decision-makers and healthcare organizations need to work to better effect. While presentations addressed the "push" and "pull" agendas for KTE, discussed the barriers and facilitators for attaining success in knowledge transfer and provided theoretical frameworks describing such processes, the solution remained elusive.

In attempting to address this question, we acknowledge that our collective experience is confined to the countries where we respectively reside: Canada and the United Kingdom. In both contexts, the perceived divide that exits between high-quality research produced by university researchers and the practically applicable and locally relevant research required by decision-makers has resulted in the view that researchers and decision-makers are speaking incompatible languages and often at cross-purposes. While KTE serves to provide translation and foster exchange between the academic and applied worlds, successful KTE may be compromised in two ways. First, the existing reward structure for university-based researchers may give rise to incentives that are incompatible with producing good-quality applied research. Second, there is a lack of research capacity and skills in healthcare organizations to conduct primary research and direct the research agenda to fulfill local decision-making needs.

… applied researchers do not need a parallel incentive system within the current university system for promotion and tenure.

The first of these points is contestable. Of course, some researchers have no interest in conducting applied research, or once it is conducted, in spending time to ensure the use of that research in practice. This is their prerogative. However, for those interested in completing the research cycle, there are indeed forces at play that mitigate involvement in applied research. For example, applied research can take longer and may differ in terms of the rate at which it can be published; thus, applied researchers may encounter bias in the tenure/promotions process. Further, applied research may not be compatible with peer-reviewed journals (e.g., because it is too context-specific). Even if such research is published, peer-reviewed journals may not foster KTE, as the research may be neither accessible nor relevant in its application to decision-makers (owing to long time lags between submission and publication, publication bias and an unfamiliar scientific reporting format).

Nonetheless, in contrast to the groundswell at some universities, we would argue that applied researchers do not need a parallel incentive system within the current university system for promotion and tenure. Good research is good research, regardless of

whether it is applied or not. Thus, there should be little excuse for not achieving high-index, peer-reviewed publications on applied research activity. We would contend that all researchers have a myriad of responsibilities and masters. While applied researchers may indeed have at least one additional master, does this mean that peer-reviewed publications cannot be attained? An applied researcher interested in KTE will likely be interested in publishing – both as an academic pursuit in and of itself, and as a career-promoting activity. Moreover, in achieving successful KTE, peer-reviewed publications are but one way through which such applied research can be promoted. With the ever-growing heterogeneity among researchers at universities, we believe that there should be at least one common metric across all disciplines against which researchers are measured: peer-reviewed publications. Thus, despite counter-arguments, we would still contend that peer-reviewed publication is a relevant metric for applied researchers, and as such, the university tenure/promotions process does not need fundamental reform.

Turning now to the second point, we suggested that successful KTE may also be compromised because healthcare organizations lack research capacity. Because this proposition is more widely accepted, it may consequently be easier to resolve. While many healthcare organizations currently have a research mandate, the lack of in-house research capacity often means consulting out to university-based researchers, expressing a "willingness" to partner on research projects and funding university-based research centres. This situation gives rise to a view of KTE as the one-way flow of information from the academic world into the applied, with the onus for the translation and uptake of new knowledge resting with the researchers. In our opinion, these actions have widened the perceived divide between researchers and decision-makers, creating a "them-and-us" culture, and is the primary reason that so much research today is published and then shelved. KTE should be about mutual engagement in a two-way, dynamic process.

So, where do we go from here if we are to see greater use of research in practice over the next decade? The approach we discuss counters the view outlined at the start, which implies that the divide between researchers and decision-makers can be attributed to the notion that they speak incompatible languages and are consequently at cross-purposes. Instead, we would argue that this divide is both reinforced and, at the same time, maintained by existing organizational boundaries that cannot be bridged by KTE alone.

Our model, therefore, attempts to bring together those conducting and applying research into the same organization. In this model, healthcare organizations would develop and sustain research and development (R&D) departments that, rather than focusing solely on coordinating and validating external research, would initiate and drive their own research agendas housing PhD-trained researchers wanting to conduct and implement applied research. Instigating this shift requires at least four key stake-

holders to come on board: the healthcare organization, the researcher/university, the government and the funding agencies.

First, the healthcare organizations themselves would have to give the R&D department sufficient profile to attract applied researchers. Salaries would have to be competitive with, or exceed, those in university research centres; researcher time would have to be protected to enable academic freedom and pursuits alongside investigation of important organizational issues; and roles would have to be clearly differentiated from healthcare analysts, who respond to daily issues such as utilization and capacity. Organizationally, such activity would need to receive high-level support, as on its own a given R&D unit (and, indeed, the individual scientists that comprise it) may be unable to navigate within the decision-making environment and to influence change. Second, the universities would have to provide some level of institutional support for these researchers. Currently in Canada and the United Kingdom, the majority of junior university-based health research positions are funded through salary awards or other external funding sources. That is, the university often does not pay the salary, yet expects service in the form of teaching and student supervision in return for a departmental position. The model we propose would provide greater security for junior researchers by offering a salaried position (perhaps cross-funded), unparalleled opportunities to carry out research at local levels, and ready-made partnerships. Application for provincial and national grants, and submission for peer-reviewed publication, would of course be part of the position. Having a joint appointment, or being cross-appointed with a university department (in a similar way to academic physicians), would also ensure peer interaction and additional academic pursuits.

Third, the government would need to provide protected funding to support R&D. Healthcare organizations should not have to choose between R&D and patient care initiatives. These resources could be redirected from current health innovation pools, and could be viewed as a strategic investment in the application of research. Governments could also provide coordination and education functions, so that healthcare organizations do not excessively duplicate research projects and researchers have the opportunity to attend annual workshops to share ideas.[2]

Finally, health research funding agencies (e.g., Canadian Health Services Research Foundation, Canadian Institutes of Health Research, the Economic and Social Research Council, and the UK Department of Health National Coordinating Centre for Research Capacity and Development) are currently funding KTE programs. Some of these resources could be re-allocated to healthcare organizations to recruit and retain applied researchers. These organizations could also put their significant weight behind the model redesign and provide practical advice to the healthcare organizations.

By proposing this model, we aim to stimulate debate in this area, noting that questions do remain. For example: Will a broad group of applied researchers "jump

ship" from existing university-based positions? Will junior researchers look at this opportunity merely as an initial stepping stone to advance their ultimate career path at university-based research centres? Will healthcare organizations be able to resist the temptation to use the researchers in putting out fires instead of protecting time and providing a stimulating academic environment? And will the key stakeholders have the foresight to invest in a vision for applied research that would take us from the current situation, of trying to bridge a divide that may be too wide, to a place where researchers and decision-makers are genuinely working together for the betterment of health policy and practice?

Ultimately, any innovation in this area would need to be evaluated on predefined, mutually agreeable measures of success. Any takers?

Correspondence may be directed to: Dr. Craig Mitton, Faculty of Health and Social Development, University of British Columbia Okanagan, 3333 University Way, Kelowna, BC, Canada V1V 1V7; tel.: 250-807-8704; fax: 1-250-807-8085; e-mail: craig.mitton@ubc.ca.

ACKNOWLEDGMENTS

The authors would like to thank Professor Cam Donaldson, Newcastle University, for his helpful comments on this paper. We also appreciate the insightful comments of two anonymous reviewers.

Conflict of interest: The authors are both applied health researchers without university tenure.

NOTES

1. Examples of such national bodies include:
   - The UK NHS Service Delivery and Organisation (SDO) R&D Programme. This is a UK-based national research program that has been established to consolidate and develop the evidence base on the organization, management and delivery of healthcare services.
   - The Centre for Knowledge Transfer. This is a Canadian national training centre in the area of knowledge utilization and policy implementation relating to health services research.

2. It should be noted that since this paper was written, there have been some reforms to R&D funding in England. Most notably, the National Institute for Health Research has been established to deliver the new R&D strategy for England – "Best Research for Best Health" – which aims to establish the NHS as an international centre of research excellence.

DISCUSSION AND DEBATE

Commentary: Speaking at Cross-Purposes or across Boundaries?

by JOHN MALCOM
Chief Executive Officer
Cape Breton District Health Authority
Cape Breton, NS

Mitton and Bate ask healthcare organizations whether there are "any takers?" to move forward with the concept of true R&D in Canadian healthcare organizations. From a systems point of view, the uptake on this challenge is long overdue. As the authors point out in their paper, however, this initiative would require a new partnership to be truly successful.

It is interesting that the authors have used the industry term "R&D" (research and development) throughout their paper, yet the paper deals only with the research component of the partnership. One of the many definitions for "research" in Webster is "studious inquiry or examination," whereas the definition for "development" is "to make visible or manifest." While progress has been made in breaking down the barriers between researchers and decision-makers, it is also crucial to advance the need to eliminate the barriers between research and development.

Defending the status quo of "publish or perish" in academic environments for researchers misses the key development requirement: that the research results be evident in improving the delivery of service. True R&D departments in healthcare organizations will have to demonstrate not only the importance of the benefit of the search for new knowledge, but also how this new knowledge, when applied, advances the objectives of the organization. While not every advance needs to have a substantial return, no organization should or could expect to be rewarded without evidence of return on the investment. Partnerships between academic health centres and health districts will fail without clear understanding of this expectation and the means by which it can be evaluated from the start.

With the many challenges facing healthcare organizations, this bold commitment to a true R&D strategy, and true partnerships between research and services, offers potential not only for a more sustainable future, but for even better returns on the resources already available to organizations.

Commentary: Complementary Perspectives on "Speaking at Cross-Purposes or across Boundaries"

by RÉJEAN LANDRY
CHSRF/CIHR Chair on Knowledge Transfer and Innovation
Department of Management, Faculty of Business
Laval University, Quebec City, QC

In their provocative paper, Craig Mitton and Angela Bate make three claims: first, they contest the view that the university incentive system is incompatible with knowledge transfer; second, they contend that the lack of in-house research and development (R&D) capacity of health services organizations prevents knowledge uptake; and third, they argue that in order to enhance knowledge transfer, health services organizations should be given resources necessary to develop their own research agendas. I would like to consider these three claims in turn.

The first claim developed by the authors is supported by an increasing volume of evidence in the field of knowledge and technology transfer. Here is a brief summary of the argument and evidence emerging from this literature: Academics engage in three broad categories of activities – the creation of knowledge (research), the transmission of knowledge (teaching) and the transfer of knowledge. The knowledge transfer activities include patenting, spin-off formation, consulting and the production of knowledge spillovers[1] (which is what most of us do in health services and health policy). Given free choice, the resources dedicated to different academic activities are likely to differ

from one academic to another. This raises the question: "How do academics decide what academic activities to invest their resources in?"

Two hypotheses emerge (Mitchell and Rebne 1995; Colbeck 1998; Walckiers 2004; Landry et al. 2007). The first, a complementary hypothesis, suggests that resources invested in one activity predict performance in that activity as well as in other associated activities. The second, a substitution hypothesis, rests on the idea that investments in one activity come at the expense of investments, and therefore performance, in other activities.

The complementary hypothesis suggests that each academic activity generates ideas that become inputs for other activities. More concretely, the outputs of certain academic activities may become the asset base upon which other academic activities may be built. As a consequence, performance in certain academic activities may generate a leverage effect on other activities. There is a growing empirical literature pointing to the fact that publications are not in conflict with patents and may even be complementary (Godin and Gingras 2000; Van Looy et al. 2004; Meyer 2006; Landry et al. 2006a,b). Similarly, Mitchell and Rebne (1995) have shown that consulting and research performance are complementary up to a certain point.

A recent study based on data regarding 1,554 faculty members supported by the Natural Sciences and Engineering Research Council of Canada (Landry et al. 2007) pointed to the existence of three very different types of academic portfolios. The first portfolio is made up of complementary activities that are interdependent and reinforce one another. This portfolio included publications, patenting, spin-off creation, consulting and production of knowledge spillovers. A second portfolio includes teaching activities and publication outputs that are substitutes for one another. A third portfolio comprises teaching and other activities independent from teaching, namely, patenting, spin-off creation, consulting and the production of knowledge spillovers.

The evidence provided by the literature on knowledge transfer and technology transfer suggests that the existence of complementary activities may facilitate entry into and successful performance of other activities, while the existence of substitution effects may hamper entry into some activities and come at the expense of successful performance in those activities. The management of complementary, substitute and independent academic activities is important if one aims to facilitate entry and derive the benefits resulting from involvement in different academic endeavours. Hence, a failure to recognize complementarities between publications, patenting, creation of spin-offs, consulting and production of knowledge spillovers may lead to the underexploitation of synergies, and therefore lower performance. Consequently, university managers and policy makers should attempt to provide incentives that would induce academics to use the outputs of their complementary activities as inputs for other activities, instead of attempting to prevent entry into new and complementary activities. I therefore agree with Mitton and Bate, and I would support their first claim:

increasing high-quality research fosters knowledge transfer. Ultimately, knowledge transfer is a tool used to promote evidence-based decision-making, and evidence-based decision-making must rest on solid scientific evidence.

I also agree with the second claim made by Mitton and Bate but, again, for different reasons. The evidence on innovation in manufacturing firms shows that the absorptive capacity of external research knowledge by firms depends on their in-house R&D investments. I suggest that this argument also applies to health services organizations. The lack of in-house R&D limits the capabilities of health services organizations to identify, assess, integrate and exploit research knowledge produced by other organizations in order to develop or improve services and practices. The acquisition of external knowledge by health services organizations provides opportunities to recombine internal and external knowledge in order to innovate, that is, to develop new or improved services and professional practices based on evidence.

Let us now turn to Mitton and Bate's third claim, which proposes to "bring together those conducting and applying research into the same organization." I agree with the idea, but I am not comfortable with how they propose to implement it. If we want to promote evidence-based decision-making in health services organizations, we should consider more than just how to create and consolidate research capability within these organizations. Until now, existing R&D units in university hospitals have contributed more significantly to the advancement of knowledge than to the development or improvement of services and professional practices in their host hospitals. We need to develop a complementary model in which R&D would be more closely coupled with the production and delivery of services. Such R&D departments or units would be mandated to conduct research and development activities that support the development, but primarily the improvement, of the services provided by their host organizations, as well as clinical and management practices. This R&D model would improve the capacity of health services organizations to absorb external research knowledge and, therefore, their ability to integrate external and internal knowledge in order to develop and improve their services and professional practices. In the end, one has to keep in mind that more than 99.99% of the research

The lack of in-house R&D limits the capabilities of health services organizations to identify, assess, integrate and exploit research knowledge …

evidence will always be developed by other organizations, often in other countries. As a consequence, it is important to develop and consolidate strong knowledge absorptive capabilities in order to benefit from the knowledge created by others.

In short, we will increase knowledge transfer to the extent that we reinforce our university research capacities, as well as the research absorptive capabilities of health services organizations.

NOTES

1. Research knowledge accessed by people based in firms, government agencies and other organizations, for which university researchers are the source of the knowledge but are not fully compensated (Landry et al. 2006a).

REFERENCES

Colbeck, C.L. 1998. "Merging in a Seamless Blend. How Faculty Integrate Teaching and Research." *Journal of Higher Education* 69(6): 647–71.

Godin, B. and Y. Gingras. 2000. "The Impact of Collaborative Research on Academic Science." *Science and Public Policy* 27(1): 65–73.

Landry, R., M. Aaïhi, N. Amara and M. Ouimet. 2007. "Evidence on How Academics Manage Their Portfolio of Activities." Paper presented at the 6th Triple Helix International Conference on University, Industry & Government Linkages, Singapore, May 16–18.

Landry, R., N. Amara and M. Ouimet. 2006a. "Determinants of Knowledge Transfer: Evidence from Canadian University Researchers in Natural Sciences and Engineering." *Journal of Technology Transfer* DOI 1010007-s10961-006-0017-5.

Landry, R., N. Amara and I. Rherrad. 2006b. "Why Are Some University Researchers More Likely to Create Spin-offs Than Others? Evidence from Canadian Universities." *Research Policy* 35(10): 1599–1615.

Meyer, M. 2006. "Are Patenting Scientists the Better Scholars? An Exploratory Comparison of Inventor–Authors with Their Non-Inventing Peers in Nano-Science and Technology." *Research Policy* 35(10): 1646–62.

Mitchell, J.E. and D.S. Rebne. 1995. "The Nonlinear Effects of Teaching and Consulting on Academic Research Productivity." *Socio-Economic Planning Sciences* 29(1): 47–57.

Van Looy, B., M. Ranga, J. Callaert, K. Debackere and E. Zimmermann. 2004. "Combining Entrepreneurial and Scientific Performance in Academia: Towards a Compounded and Reciprocal Matthew Effect?" *Research Policy* 33(3): 425–41.

Walckiers, A. 2004. "Multidimensional Screening and University Output, Part Two: Should Universities Produce Both Research and Teaching?" Mimeo. Department of Economics, Université Libre de Bruxelles.

Full Text Online

Could MRI and CT Scanners Be Operated More Intensively in Canada?

Les appareils IRM et les tomodensitomètres pourraient-ils être utilisés de façon plus intensive au Canada?

RUOLZ ARISTE AND GILLES FORTIN

Abstract

Although availability of necessary equipment could play a role in wait times for MRI and CT exams in Canada, there are other dimensions to this issue. More machines in operation do not necessarily reduce wait times. It is important also to consider the level of utilization of the existing pool of scanners.

This paper analyzes utilization of MRI and CT scanners (machines) by focusing on two indicators: the number of exams per machine per year and the number of hours of operation per machine per week. These values were calculated and reported by province, followed by an assessment of the average level of utilization of MRI and CT scanners in Canada. The findings suggest that some provinces use their MRI or CT scanners less intensively than others. On average, in Canada, an additional 31% operating capacity may exist for MRI and 68% for CT without additional capital or infrastructure investments. However, supply-side as well as demand-side constraints may prevent a given jurisdiction from operating at full capacity.

Résumé

Bien que la disponibilité de l'équipement nécessaire pourrait jouer un rôle dans les temps d'attente pour les examens IRM et les tomodensitogrammes au Canada, d'autres facteurs entrent en ligne de compte. Le fait d'avoir davantage d'appareils ne contribuera pas nécessairement à réduire les temps d'attente. Il est également important de tenir compte du niveau d'utilisation des appareils existants.

Cet article examine l'utilisation des appareils IRM et des tomodensitomètres en mettant l'accent sur deux indicateurs : le nombre d'examens effectués par appareil par année et le nombre d'heures de fonctionnement par appareil par semaine. Ces valeurs ont été calculées et présentées par province, suivies d'une évaluation du niveau moyen d'utilisation des appareils IRM et des tomodensitomètres au Canada. Ces

constatations suggèrent que certaines provinces utilisent leurs appareils IRM ou leurs tomodensitomètres de façon moins intensive que d'autres. En moyenne, au Canada, les appareils IRM et les tomodensitomètres pourraient fonctionner respectivement à une capacité 31 % et 68 % plus élevée qu'actuellement, et ce, sans aucune nouvelle injection de capitaux ou d'investissements supplémentaires dans l'infrastructure. Toutefois, les contraintes de l'offre et de la demande pourraient empêcher certaines provinces d'utiliser ces appareils à leur pleine capacité.

To view the full article, please visit
http://www.longwoods.com/product.php?productid=19141&cat=499&page=1

Same Question, Different Data Source, Different Answers? Data Source Agreement for Surgical Procedures on Women with Breast Cancer

Même question, sources de données différentes, réponses différentes? Concordance entre les sources des données pour les interventions chirurgicales pratiquées sur les femmes atteintes de cancer du sein

by D. TURNER, PHD
Department of Epidemiology and Cancer Registry
CancerCare Manitoba
Winnipeg, MB

K.J. HILDEBRAND, MSC
Department of Epidemiology and Cancer Registry
CancerCare Manitoba
Winnipeg, MB

K. FRADETTE
Department of Epidemiology and Cancer Registry
CancerCare Manitoba
Winnipeg, MB

S. LATOSINSKY, MD, MSC, FRCSC
Division of Surgical Oncology
Health Sciences Centre
Winnipeg, MB

Abstract

This study assessed the accuracy of the Manitoba Cancer Registry (MCR) and two administrative data sources, the Manitoba Health hospital discharge file and the Manitoba Health medical claims file, for capturing surgical procedures related to the treatment of breast cancer. The study cohort included all women diagnosed in Manitoba with invasive or in situ breast cancer between 1995 and 1999. The surgical procedures of interest were mastectomy, breast conserving surgery and axillary node dissection. Analysis focused on assessing concordance between data sources following record linkage. Agreement was measured using the kappa statistic, and chart reviews of discordant information were completed to identify the more reliable data source and to validate data files. The effect of using each data set alone to calculate procedure rates was determined to identify any clinically important differences arising from the choice of data source. Results indicate that capture of breast cancer patients using administrative data sets alone can be quite good and that the population-based cancer registry is superior to other administrative data sets for capturing surgical treatment information on cancer cases.

Résumé

Cette étude visait à évaluer l'exactitude du Manitoba Cancer Registry (MCR) et de deux sources de données administratives – le dossier des congés des hôpitaux et le dossier des demandes d'indemnisation de Santé Manitoba – pour le recensement des interventions chirurgicales relatives au traitement du cancer du sein. La cohorte de l'étude comprenait toutes les femmes chez qui on a diagnostiqué un cancer du sein invasif ou in situ au Manitoba entre 1995 et 1999. Les interventions chirurgicales concernées étaient la mastectomie, la chirurgie mammaire conservatrice et l'évidement ganglionnaire axillaire. L'analyse visait surtout à évaluer la concordance entre les sources de données après avoir établi des liens entre les dossiers. La concordance a été mesurée en utilisant l'analyse statistique kappa et en examinant les dossiers médicaux pour les données discordantes en vue de déterminer la source de données la plus fiable et de valider les fichiers de données. L'utilisation isolée de chaque ensemble de données pour calculer les taux d'intervention chirurgicale a permis de repérer les différences cliniques significatives découlant du choix de la source de données. Les résultats indiquent que la saisie de données sur les patientes atteintes de cancer du sein en uti-

lisant les ensembles de données administratives séparément peut s'avérer très bonne et que le registre du cancer axé sur la population est supérieur aux autres ensembles de données administratives pour ce qui est de la saisie de renseignements sur les traitements chirurgicaux liés au cancer du sein.

Introduction

A number of data sources have been employed in the many published studies of breast cancer diagnosis and surgery, including prospectively collected clinical data sets, retrospective chart review, administrative data and cancer registries (Malin et al. 2002a). Good-quality clinical data sets are not widely available, however, and often cover only small populations or even a single hospital, while chart review or abstraction is resource intensive and costly. Consequently, administrative data sets are employed extensively because of their availability, coverage and low cost, but their accuracy has been questioned (Pinfold et al. 2000). Administrative data errors may result from incomplete information available to the coder, transcription errors during data capture or incorrect coding due to differences in the interpretation of coding rules (Middleton et al. 2000); indeed, all data sources require some form of quality control.

This study assessed the accuracy of the Manitoba Cancer Registry (MCR) and two administrative data sources, the Manitoba Health hospital discharge file and the Manitoba Health medical claims file, for capturing surgical procedures related to the treatment of female breast cancer.

Methods

The study cohort, identified from the population-based MCR, comprised all women diagnosed in Manitoba with invasive or in situ breast cancer between 1995 and 1999. Recent case ascertainment studies supported jointly by Statistics Canada and CancerCare Manitoba indicate that the MCR captures more than 99.5% of all cancers and 100% of breast cancers in the province. For women with multiple tumours, one "index" tumour was chosen using the following hierarchy: earliest diagnosis, highest stage and largest size. If these criteria were identical, then the index tumour was randomly selected.

Treatment information is routinely collected for each primary tumour in the MCR and was recorded according to ICD9-CM coding standards for the study period. MCR coders are certified as either health records technicians or health information technologists and receive one year of intensive on-the-job training in oncology

coding. The hospital discharge file includes records of all inpatient and day surgery admissions to Manitoba's acute and chronic care hospitals. All treatments were coded by hospital coders trained as health records technicians or health information technologists using ICD9-CM standards. The medical claims file is generated by fee-for-service claims made by Manitoba physicians. Staff in physicians' offices and claims-processing centres focus on coding jurisdiction-specific fee codes (tariff codes) for medical activities following rules specified by Manitoba Health.

The ability of the data sets to accurately capture mastectomy, breast-conserving surgery (BCS, also known as lumpectomy) and axillary node dissection (AND) was investigated. Relevant codes for each data set are shown in Table 1. BCS was defined in two ways: (1) by ICD9-CM codes 85.21–85.23, as suggested by others (Iscoe et al. 1997; C. DeCoster, Community Health Sciences, University of Manitoba, personal communication 2005); and (2) by ICD9-CM codes 85.21–85.23 and 85.12. Tariff codes for BCS were not introduced until 1999, and thus could not be captured from the medical claims data for the study period.

The ability of the data sets to accurately capture mastectomy, breast-conserving surgery (BCS, also known as lumpectomy) and axillary node dissection (AND) was investigated.

Procedures associated with the cohort that occurred within one month prior to one year after diagnosis were extracted from each data source. For multiple procedures, the most extensive procedure within one year of diagnosis was considered definitive. For example, if a mastectomy followed a BCS, the mastectomy was selected.

Analysis focused on assessing concordance between data sources following record linkage. Agreement was measured using the kappa statistic, which determines non-random agreement between two measurements of a categorical variable. Agreement indicated by kappa coefficients <0.00 is considered poor; 0.00–0.20, slight; 0.21–0.40, fair; 0.41–0.60, moderate; 0.61–0.80, substantial; and 0.81–1.00, almost perfect (Landis and Koch 1977). Chart reviews of discordant information were completed to identify the more reliable data source and to validate data files. The effect of using each data set alone to calculate procedure rates (the total number of procedure occurrences divided by the total number of women in the defined subgroup from the original cohort) was determined to identify any clinically important differences arising from the choice of data source.

TABLE 1. Breast surgery procedures defined by codes

Procedure	ICD9-CM code*	Tariff code*
BCS, Definition 1[1]	85.12, 85.22, 85.23	0442
BCS, Definition 2[2]	85.12, 85.21, 85.22, 85.23	0442
Axillary node dissection (AND) ("Regional node dissection" in MCR)	40.3, 40.51	2658
Breast conservation surgery + AND		0443
Simple mastectomy (removal of breast only, not nodes)	85.41, 85.42	0449, 0457, 0477, 0478
Modified radical mastectomy (simple mastectomy + AND)	85.43, 85.44	0471
Radical mastectomy (includes removal of chest wall – pectoralis major muscle)	85.45–85.48	0470

* Code descriptors found in Appendix A online at http://www.longwoods.com/product.php?productid=19140&cat=499&page=1

[1] ICES Definition

[2] Current Study Definition

Results

The MCR captured information on 4,079 cases of breast cancer diagnosed in Manitoba in 3,956 women between 1995 and 1999. Of these women, 3,950 (99.8%) had a valid Personal Health Identification Number (PHIN), the key variable used in record linkage.

A surgical treatment record was found in the hospital discharge file for 95.7% of the women in the cohort, where only 33 (<1%) did not have an ICD9-CM breast cancer diagnostic code. Similarly, a medical claims record indicating breast cancer surgery was found for 96.2% of the women in our cohort, and only 22 (<1%) did not have a breast cancer diagnosis coded in the claim record. Agreement between these databases, in terms of their ability to capture breast cancer surgery, is shown in Table 2. All kappas indicated substantial or almost perfect agreement between data sets.

A review was conducted of 60 charts from the 345 patients recorded as having mastectomy in the medical claims database but not in the MCR. All but two of these patients were confirmed to have had BCS as their surgical procedure. A chart review of the discordant MCR and medical claims file AND cases found that the MCR always reflected what was described in the operative report. The majority of the discordance between the MCR and the hospital data was therefore attributed to an AND being performed but the hospital discharge file failing to record it.

TABLE 2. Treatment coding agreement by the kappa statistic, by database

	Hosp†	Yes	Yes	No	No	
Treatment	**MCR†**	**Yes**	**No**	**Yes**	**No**	**Kappa**
BCS, Definition 1[3]		1,246	23	474	2,213	0.74
BCS, Definition, 2[4]		1,600	57	120	2,179	0.91
Mastectomy		1,969	45	39	1,903	0.96
AND		2,538	36	368	1,014	0.76

	Hosp†	Yes	Yes	No	No	
Treatment	**Med†**	**Yes**	**No**	**Yes**	**No**	**Kappa**
BCS, Definition, 1[3]		NA	NA	NA	NA	NA
BCS, Definition, 2[4]		NA	NA	NA	NA	NA
Mastectomy		1,993	21	343	1,599	0.82
AND		2,507	67	360	1,022	0.75

	Med†	Yes	Yes	No	No	
Treatment	**MCR†**	**Yes**	**No**	**Yes**	**No**	**Kappa**
Breast Conservation[1]		NA	NA	NA	NA	NA
Breast Conservation[2]		NA	NA	NA	NA	NA
Mastectomy		1,991	345	17	1,603	0.82
AND		2,796	71	110	979	0.88

† Hosp: Hospital records, MCR: Manitoba Cancer Registry, Med: Medical claims
NA: Not available
[3] ICES definition – Codes 85.21–85.23
[4] Current Study definition – Codes 85.21–85.23 and 85.12

Procedure rates by data set are shown in Table 3. Using different sources of treatment information produced somewhat different estimates of treatment prevalence. To assess the healthcare system's treatment of breast cancer patients in our jurisdiction, we also report rates of primary breast cancer surgery, i.e., all women receiving either BCS or mastectomy. Primary breast cancer surgery was not performed in 5.8% of patients in the MCR; the majority of these patients had advanced (Stage IV) disease at diagnosis.

TABLE 3. Surgical procedure rates by data source

	Manitoba Cancer Registry		Medical Claims File		Hospital Discharge File	
	N	%	*N*	%	*N*	%
BCS[3]	1720	43.5	NA	NA	1269	32.1
BCS[4]	1720	43.5	NA	NA	1657	41.9
Mastectomy	2008	50.8	2336	59.0	2014	50.9
Surgery in the Breast (BCS[3]+Mastectomy) (BCS[4]+Mastectomy)	 3728 3728	 94.2 94.2	 NA NA	 NA NA	 3283 3671	 83.0 92.8
AND	2906	73.5	2867	72.5	2574	65.1

NA: Not available
[3] ICES definition – Codes 85.21–85.23
[4] Current study definition – Codes 85.21–85.23 and 85.12

Discussion

This investigation was performed as part of a larger population-based study designed to look at variations in patterns of breast cancer care. Since clinical acceptance of results rests heavily on the ability to identify breast cancer treatment accurately in the population, it was imperative that the strengths and limitations of our data sources be understood. While most studies examining breast cancer treatment patterns utilize only one data source (Malin et al. 2002b), this study employed multiple sources to explore the accuracy of surgical treatment information for breast cancer patients. Because we found that the MCR provides consistently accurate surgical treatment information for all procedures examined, future work exploring variations in patterns of care in Manitoba will focus on this data source.

Treatment information is often captured in administrative databases. However, when used alone, these files may not capture all patients in the region with the cancer of interest (Malin et al. 2002b). This study provides evidence that capture of breast cancer patients using administrative data sets alone can be quite good; more than 95% of breast cancer patients found in the MCR had treatments recorded in the hospital discharge and the medical claims files; more than 99% of these patients were found to have a breast cancer diagnosis coded in the administrative records. Our linkage rates are consistent with other studies that have found that 80% to 95% of women with known cancers have records in administrative data sets (Pinfold et al. 2000; Ayanian et al. 1993; Potosky et al. 1993). However, this finding does not ensure that everyone with breast cancer recorded in administrative data is found to have breast cancer in the

MCR; our registrars examine many reports that have cancer diagnoses assigned on an interim basis that are ruled out on closer investigation.

A challenge to the accurate reporting of cancer surgery involved identifying data on primary breast procedures (BCS and mastectomy). Other researchers may also find that data sources – even if they cover the entire population – are not equal in their ability to report treatment comprehensively, owing to coding limitations. Our findings indicate that healthcare management agencies must take care to include appropriate activity codes in a timely fashion when new technologies are introduced, and that analysts must take care in understanding the underlying accounting nature of the data system when they use billing data for research.

We were able to confirm the accuracy of several data sources and resolve discrepancies through targeted chart reviews with relatively little effort, considering the thousands of patients and procedures included in the analysis. We have also shown that the population-based cancer registry proved to be superior to other administrative data sets for capturing surgical treatment information on cancer cases. More broadly, we have demonstrated that using different data sets can result in rates for breast surgery that are sufficiently disparate as to warrant some concern and that certain data sources will accurately reflect one procedure while being inaccurate on other procedures. This study illustrates the importance of critically examining and evaluating data sources in health services research in order to select those that will be most appropriate and accurate for the treatments being studied. Care should be taken in the interpretation of results of health services research if the accuracy of the information has not been ascertained.

… the population-based cancer registry proved to be superior to other administrative data sets for capturing surgical treatment information on cancer cases.

Correspondence may be directed to: Donna Turner, Epidemiology & Cancer Registry, CancerCare Manitoba, 675 McDermot Ave., Winnipeg, MB Canada R3E 0V9. Tel.: 204-787-2573. E-mail: Donna.turner@cancercare.mb.ca.

REFERENCES

Ayanian, J.Z., B.A. Kohler, T. Abe and A.M. Epstein. 1993. "The Relation between Health Insurance Coverage and Clinical Outcomes among Women with Breast Cancer." *New England Journal of Medicine* 329(5): 326–31.

Iscoe, N., T. To, E. Gort and M. Tran. 1997. *Cancer Surgery in Ontario.* Toronto: Institute for Clinical Evaluative Sciences.

Landis, J.R. and G.G. Koch. 1977. "The Measurement of Observer Agreement for Categorical Data." *Biometrics* 33(1): 159–74.

Malin, J.L., K.L. Kahn, J. Adams, L. Kwan, M. Laouri and P.A. Ganz. 2002a. "Validity of Cancer Registry Data for Measuring the Quality of Breast Cancer Care." *Journal of the National Cancer Institute* 94(11): 835–44.

Malin, J.L., M.A. Schuster, K.A. Kahn and R.H. Brook. 2002b. "Quality of Breast Cancer Care: What Do We Know?" *Journal of Clinical Oncology* 20(21): 4381–93.

Middleton, R.J., A.T. Gavin, J.S. Reid and D. O'Reilly. 2000. "Accuracy of Hospital Discharge Data for Cancer Registration and Epidemiological Research in Northern Ireland." *Cancer Causes and Control* 11(10): 899–905.

Pinfold, S.P., V. Goel and C. Sawka. 2000. "Quality of Hospital Discharge and Physician Data for Type of Breast Cancer Surgery." *Medical Care* 38(1): 99–107.

Potosky, A.L., G.F. Riley, J.D. Lubitz, R.M. Mentnech and L.G. Kessler. 1993. "Potential for Cancer Related Health Services Research Using a Linked Medicare-Tumor Registry Database." *Medical Care* 31(8): 732–48.

Call to Authors

Data Matters presents brief, focused papers that report analyses of health administrative or survey data that shed light on significant health services and policy issues. Submissions to Data Matters should be a maximum of 1,500 words, exclusive of abstract (max. 100 words), tables, figures and references, and should include no more than three tables or figures.

Appel aux auteurs

« Questions de données » présente de brefs articles ciblés portant sur des analyses de données administratives ou d'enquêtes sur la santé ou de données d'enquête et qui font la lumière sur d'importantes questions liées aux services et aux politiques de santé. Les articles soumis à « Questions de données » doivent être d'au plus 1 500 mots, excluant le résumé (100 mots au plus), les tableaux, diagrammes et références et ne doivent pas comprendre plus de trois tableaux ou diagrammes.

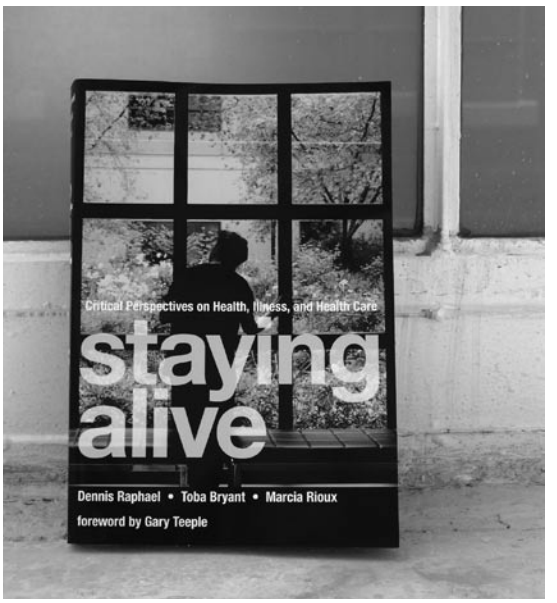
For more information contact Rebecca Hart, Managing Editor, at rhart@longwoods.com.

Pour de plus amples renseignements, veuillez communiquer avec Rebecca Hart, rédactrice, á rhart@longwoods.com.

BOOK REVIEW

Staying Alive: Critical Perspectives on Health, Illness and Health Care

Reviewed by MARY ELLEN JEANS, RN, PHD
Health Research and Policy Consultant



Edited by Dennis Raphael, Toba Bryant and Marcia Rioux
ISBN 1551302969
Canadian Scholars' Press Inc., 2006
Paperback, 420 pp.
C$49.95; US$44.95

Abstract

Staying Alive: Critical Perspectives on Health, Illness and Health Care is a Canadian text that looks at health and healthcare through the lens of social epidemiology, critical sociology, political economics and human rights. These perspectives and analyses provide dramatic new insights into our understanding of health and healthcare. The editors have drawn on the work of 20 authors (including their own research) to provide a rich and comprehensive approach to the subject.

Résumé

Staying Alive: Critical Perspectives on Health, Illness and Health Care est un ouvrage canadien qui examine le monde de la santé et des soins de santé par la lentille de l'épidémiologie sociale, de la sociologie critique, de l'économie politique et des droits de la personne. Ces perspectives et analyses enrichissent de façon surprenante notre compréhension de la santé et des soins de santé. Les éditeurs de ce livre se sont appuyés sur le travail de 20 auteurs (y compris leurs propres recherches) pour dresser un portrait riche et exhaustif du sujet.

Staying Alive builds a case for the power of social, economic and political variables in the production of health and illness and the structure and organization of the healthcare industry. It invokes the involvement of competing interests in health and healthcare that many of the players in the field would prefer not to acknowledge. These include, but are not limited to, demands for higher profits (the authors note that despite what we like to admit publicly, approximately 30% of healthcare in Canada is for profit); wages and salaries; provincial and federal expenditures on health; continual monopolies and patents over knowledge, technology and procedures; and the continuing lobby to preserve Canada's premier social program: in other words, keeping the status quo. The insights provided by these diverse and important perspectives are, according to the editors, intended to bring about change to the health system.

While most readers would agree with the changes suggested, they will also detect in the book's tone a somewhat naive confidence. This is reflected in the apparent lack of appreciation of the difficulties in changing major public policy at the provincial/territorial and federal government levels and in achieving consensus between and among the 14 governments.

Despite this naivete, *Staying Alive* has many strengths. It is well organized into four units, with unit openers that introduce chapter content and bring cohesiveness to the range of perspectives.

The first unit deals with four different conceptual perspectives on health, illness and healthcare, from the fields of epidemiology, sociology, political economy and human rights. The book's second unit provides further discussion and elaboration on the social determinants of health. The major thesis here is that not only are the social determinants of health a rich area for research; they also serve as a platform for social and political action to change public policy in support of societal health.

Part three contains three chapters dedicated to Canada's healthcare system. This unit addresses the evolution of healthcare in Canada and compares it to developments

in the United States. Such forces as power and influence, politics and economics are described, together with their impact on the development of healthcare and recent attempts at reform. Integral to this discussion is the "private versus public" debate.

The book's final unit examines critical issues in health, illness and healthcare today: gender in health and healthcare, understanding disability and illness, pharmaceutical policy and public health.

The final chapter, written by the three editors, is an excellent summary of the key themes arising from the previous chapters. These include defining the field of health; conflict versus consensus models; prevention versus cure; the "public versus private" debate; constructing illness and disability; the role of public policy; and the future of the welfare state. The editors maintain that Canada's current political environment is one of opportunity to influence public policy in support of health. Affordable housing, adequate income and a national child care program are all current debates.

The editors maintain that Canada's current political environment is one of opportunity to influence public policy in support of health.

The recent Supreme Court of Canada ruling on the unconstitutionality of banning health insurance for private healthcare providers has intensified the dialogue about the funding and delivery of healthcare. The editors argue that the issues and questions they address deserve attention by health researchers, policy makers, service providers and the public. I agree, and would add that these issues have profound implications for the education of future healthcare professionals if Canada is to make progress in health and healthcare.

Overall, *Staying Alive* is a valuable addition to Canadian healthcare literature. It provides a rich yet broad social, economic and political analysis of health, illness and healthcare that offers some candid observations. For policy makers, including politicians, public servants and healthcare professionals, this text argues the necessity of investing in social policies to support health while continuing to invest in the healthcare industry to provide safe, ethical care. For students in the health professions, this text is a "must" for understanding the broader perspectives on health and illness while valuing the professions' role in healthcare.

RESEARCH PAPER

Costs of New Atypical Antipsychotic Agents for Schizophrenia: Does Unrestricted Access Reduce Hospital Utilization?

Coûts des nouveaux agents antipsychotiques atypiques pour le traitement de la schizophrénie : l'accès libre réduit-il les taux d'hospitalisation?

by DARIA O'REILLY, MSC, PHD
Program for Assessment of Technology in Health (PATH), St. Joseph's Hospital
Department of Clinical Epidemiology and Biostatistics, McMaster University
Hamilton, ON

DAVID CRAIG, MD
Department of Psychiatry, Memorial University of Newfoundland
St. John's, NL

LESLIE PHILLIPS, PHARMD
Faculty of Pharmacy, Memorial University of Newfoundland
St. John's, NL

RON GOEREE, MA
Program for Assessment of Technology in Health (PATH), St. Joseph's Hospital
Department of Clinical Epidemiology and Biostatistics, McMaster University
Hamilton, ON

JEAN-ERIC TARRIDE, PHD
Program for Assessment of Technology in Health (PATH), St. Joseph's Hospital
Department of Clinical Epidemiology and Biostatistics, McMaster University
Hamilton, ON

PATRICK PARFREY, MD
Clinical Epidemiology Unit, Memorial University of Newfoundland
St. John's, NL

Abstract

Objectives: To determine whether increased expenditures to provide unrestricted access to expensive atypical antipsychotic drugs would be associated with a reduction in hospital utilization and cost by patients with schizophrenia. Secondary objectives were to determine the factors associated with length of stay (LOS) and readmission for schizophrenia sufferers.

Methods: Retrospective chart review identified all acute hospitalizations for schizophrenia in the province of Newfoundland and Labrador. LOS and readmission rates, as well as risk factors influencing them, were measured during three time periods: (1) 1995/96, beginning of restricted access; (2) 1998, last year of restricted access; and (3) 2000, second year of open access. Average per diem costs were multiplied by LOS to determine hospital expenditures, and the provincial drug plan database provided the amount of money reimbursed for antipsychotic drugs.

Results: Days of hospitalization for schizophrenia totalled 15,089 in 1995/96, 16,318 in 1998 and 15,691 in 2000, resulting in per annum costs of $6,474,095, $7,080,065 and $6,615,795, respectively. There were 57 (18.2%) fewer patients hospitalized and 98 (16.7%) fewer admissions during open access (2000) when compared to a period of restricted access (1995/96). However, median LOS in 2000 was significantly longer than in 1995/96 (22.0 vs. 15.0 days, $P<0.001$), and was independent of other factors significantly associated with LOS (e.g., suicidal ideation on admission). No change in the number of readmissions was observed. Government expenditures for atypical agents were $217,273 in 1995/96 and $3.8 million in 2000, a 17.5-fold increase.

Conclusions: The unrestricted reimbursement policy for atypical antipsychotics was associated with a large increase in drug plan expenditure, which was not offset by a decrease in hospital utilization by schizophrenia sufferers. Although a decrease in hospital admissions occurred, any associated savings were negated by an increase in LOS.

Résumé

Objectifs : Déterminer si l'engagement des fonds nécessaires pour assurer le libre accès aux médicaments antipsychotiques atypiques dispendieux s'associerait à une réduction des coûts et du recours aux soins hospitaliers par les patients atteints de schizophrénie. Les sous-objectifs de l'étude avait pour but de cerner les facteurs associés à la durée du séjour et à la réadmission des personnes atteintes de schizophrénie, ainsi que la consommation de médicaments antipsychotiques atypiques et leur coût pour le gouvernement.

Méthode : L'étude rétrospective des dossiers hospitaliers a permis d'identifier tous les cas d'hospitalisation aiguë pour schizophrénie dans la province de Terre-Neuve-et-Labrador. On a mesuré la durée du séjour et le taux de réadmission, ainsi que les facteurs de risque qui influent sur ces variables, pour trois périodes différentes : 1) 1995-1996 – début du système d'accès restreint, 2) 1998 – dernière année de l'accès restreint, et 3) 2000 – deuxième année de l'accès libre. Pour évaluer les frais d'hôpitaux, on a multiplié le coût moyen par jour par la durée du séjour, et on a utilisé la base de données du régime d'assurance-médicaments provincial pour calculer les sommes remboursées pour des médicaments antipsychotiques.

Résultats : Le nombre total de jours d'hospitalisation pour schizophrénie s'élevait à 15 089 en 1995-1996, à 16 318 en 1998 et à 15 691 en 2000, ce qui a entraîné des coûts annuels de 6 474 095 $, 7 080 065 $ et 6 615 795 $ respectivement. Le nombre de patients hospitalisés a diminué de 18,2 p. cent (57 cas de moins) et le nombre d'admissions, de 16,7 p. cent (98 cas de moins) pendant la période d'accès libre (2000) par rapport à la période d'accès restreint (1995-1996). Cela dit, la durée médiane du séjour était considérablement plus longue en 2000 qu'en 1995-1996 (22 jours comparativement à 15, $P < 0{,}001$), indépendamment d'autres facteurs fortement liés à la durée du séjour (p. ex., idées suicidaires au moment de l'admission). Aucun changement n'a été relevé dans le nombre de réadmissions. Les dépenses gouvernementales pour les antipsychotiques atypiques se sont multipliées par un facteur de 17,5 entre 1995-1996 et 2000, passant de 217 273 $ à 3,8 M$.

Conclusions : La politique de remboursement sans restriction des antipsychotiques atypiques a entraîné une sérieuse augmentation des dépenses du régime d'assurance-médicaments, augmentation non compensée par une diminution du recours aux soins hospitaliers par les personnes atteintes de schizophrénie. Bien qu'on ait constaté une réduction du nombre d'admissions, les économies ainsi réalisées ont été annulées par l'augmentation de la durée du séjour.

The burden of schizophrenia is considerable. Although the disease occurs in only 1% of the general population (Hafner and der Heiden 1997), it has a much greater impact on healthcare costs than the prevalence rates suggest (Goeree et al. 1999). The disease has an early age of onset, causes long-term morbidity and necessitates maintenance drug therapy and frequent admissions to hospital. In 2004, the total financial burden of schizophrenia in Canada was estimated at $6.85 billion, with the direct healthcare and non-healthcare costs estimated at $2.02 billion (Goeree et al. 2005). The majority of this cost was for acute (23%) and non-acute (38%) hospital care.

At present there is no cure for schizophrenia, and antipsychotic medication is the cornerstone of treatment. These drugs help manage the symptoms of the disease and delay or prevent relapse. In the last decade, new "atypical" antipsychotics have been introduced. Compared to the older "conventional" or "traditional" antipsychotics, these medications appear to be equally effective for helping reduce such positive symptoms as hallucinations and delusions (Beasley et al. 1999; Schillevoort et al. 2001; Lieberman et al. 2005), but may be better than the older medications at relieving the negative symptoms of the illness (e.g., social withdrawal, lack of motivation) (Baldwin and Montgomery 1995). The primary advantage of these new drugs is the decreased risk of developing extrapyramidal side effects (EPS) or movement disorders (Beasley et al. 1999; Schillevoort et al. 2001). It has been argued that medications with fewer and milder adverse effects may increase adherence and thus improve effectiveness when used in clinical practice (Glazer and Johnstone 1997; Kane 1999; Lindstrom and Bingefors 2000; Chakos et al. 2001). As a result, the value of reduced or absent side effects may have economic implications by reducing the need for hospital admission that may justify the higher acquisition costs associated with atypical antipsychotic medications. In fact, two Canadian economic evaluations concluded that clozapine and risperidone produced an annual cost savings of $389 million and $662 million respectively, with most of the savings due to reduced hospitalizations, offsetting the associated incremental increase in drug costs (Oh et al. 1996).

The Newfoundland and Labrador Prescription Drug Program (NLPDP) provides prescription drug coverage for all residents of the province who are either receiving social assistance or are aged 65 or older and in receipt of the Guaranteed Income Supplement (GIS). Prior to December 1998, the NLPDP relied on a restricted-access policy for atypical antipsychotic medications. Reimbursement was based on defined criteria: a diagnosis of schizophrenia and either failure to respond to two adequate trials of conventional agents, or intolerance of conventional agents. In 1999, the Department of Health and Community Services, Government of Newfoundland and Labrador introduced an unrestricted reimbursement policy for four of the newer atypical antipsychotic medications: risperidone (Risperidal®), clozapine (Clozaril®), quetiapine (Seroquel®) and olanzapine (Zyprexa®). The decision was influenced by a

combination of factors, including mounting pressure from the schizophrenia community, psychiatrists, the pharmaceutical industry, the media and, more significantly, by the observation that the increased drug acquisition costs could be offset by decreased hospital utilization (Oh et al. 1996).

An important aspect of the policy change was that it depended upon an evaluation of the policy by an independent academic research group sponsored by the four companies that produce each of the atypical antipsychotics affected by the policy. The decision was to be revisited pending the results of the evaluation. This current evaluation is significant in that it represents the first time the NLPDP has evaluated the impact of a policy decision on another healthcare sector.

The primary objective of this study was to determine whether the increased expenditure for unrestricted access to expensive atypical antipsychotic medications would be associated with a reduction in hospital utilization and cost for schizophrenia in the province of Newfoundland and Labrador. The main hypothesis was that as a result of unlimited access to atypical antipsychotic medications, the additional cost of such drug use would be more than offset by a reduction in hospitalization costs through reduced admissions and length of hospital stay (LOS) for persons with schizophrenia.

Secondary objectives were to determine the factors associated with LOS and readmission for schizophrenia sufferers.

Methods

The consequences to the healthcare sector of replacing the prior authorization program with open access to atypical agents were assessed using a pre–post design. This research project was designed to evaluate two separate but related issues surrounding unrestricted access to atypical antipsychotic medications: (1) utilization of and expenditure for these new agents by the NLPDP and (2) hospital utilization by persons suffering from schizophrenia. The study consisted of three phases of data collection: (1) at the beginning of restricted access (April 1, 1995 through March 31, 1996); (2) at the end of restricted access (January 1, 1998 through December 31, 1998); and (3) in the second year of open access (January 1, 2000 through December 31, 2000). Hospital utilization was determined by measuring LOS, total hospital days and readmission rates, as well as the factors influencing LOS and time to readmission, using regression techniques.

Antipsychotic medication utilization and expenditure

We used NLPDP drug claims data to measure the utilization of and expenditures for antipsychotic medications during the study period. The database includes all pre-

scriptions from all therapeutic categories reimbursed by the program and uses the American Hospital Formulary System (AHFS), a classification system that groups drugs according to their therapeutic use. The therapeutic category corresponding to the relevant products (28:16.08) was used to import data regarding antipsychotic drugs for the fiscal years 1995/1996 to 2002/2003 into an Excel database. These data permitted analysis of the utilization of individual pharmaceutical agents covered by the provincial drug plan as well as the amount paid by the program. Utilization was defined as the volume of prescriptions and type of antipsychotic medication reimbursed by the NLPDP. Because the NLPDP database does not accurately record the number of pills dispensed per prescription, it was not possible to determine the duration of treatment. All antipsychotic agents were grouped into one of two categories: atypical and conventional. The atypical antipsychotic agents considered in this study were clozapine, risperidone, olanzapine and quetiapine.

Hospital utilization

The hospital utilization portion of the study measured total number of admissions, LOS, total number of hospital days and time to readmission for those individuals who had a diagnosis of schizophrenia, received treatment for this illness and were subsequently discharged from acute care psychiatry.

The data source for the hospitalization analysis was the hospital medical charts of all patients older than 18 years who were discharged from all general and psychiatric hospitals in Newfoundland and Labrador with a diagnosis of schizophrenia (ICD-9 diagnosis codes of 295.0–295.9) (WHO 1977) during the three 12-month periods. Each admission to hospital was screened to determine whether it was related to the patient's psychiatric illness. This screening allowed the research team to capture all hospitalizations resulting from an exacerbation of schizophrenia (e.g., suicide attempts). Any admission not related to a patient's psychiatric diagnosis (e.g., patients admitted for the treatment of pneumonia with a secondary diagnosis of schizophrenia) was excluded from the analysis.

The LOS was calculated by subtracting the date of admission from the date of discharge. Transfers between hospitals were treated as a single episode of care, and LOS that exceeded 365 days were excluded. The first episode of care identified in each study year was considered the index admission for that year, and the first admission identified for the three study years was referred to as the study index admission. Kaplan-Meier methods were used to evaluate the LOS for each study year. LOS were compared using the log rank test statistic.

The cost per day in each hospital was obtained from the Department of Health and Community Services, Financial Services Division, Government of Newfoundland and Labrador. The average per diem costs for each hospital for 2000 were multiplied

by the total number of days to calculate the total hospital costs for each study year. The year 2000 costs were applied so that any observed increases in costs would not be the result of inflation over that period.

The time to readmission was calculated by subtracting the date of discharge from the date of next admission. Patients were followed after each discharge and were censored at death or last follow-up. The time to readmission variable was recoded into a dichotomous outcome variable with two groups: those readmitted to hospital within 365 days of discharge and those who were not readmitted to hospital within 365 days of discharge.

Continuous variables were analyzed using one-way analysis of variance (ANOVA) or Student's t-test, when appropriate. Normal distributions of continuous variables were described with the mean and standard deviation; other distributions were transformed using logarithmic transformation and presented as medians. When continuous variables were found to be significantly different among the three years, post hoc analyses were conducted to determine which years were significantly different using Tukey's test of significance. All categorical variables were recoded for computer analysis. Categorical variables were compared using cross-tabulations and chi-square statistics to evaluate significance.

… each chart was reviewed extensively to record the following data for each patient for each hospital admission: gender, age, education level attained …

Factors affecting length of stay and readmission

As multiple factors influence LOS and readmission, multivariable modelling techniques were utilized to examine the impact of study year, while taking account of other factors that influence these outcomes. Thus, each chart was reviewed extensively to record the following data for each patient for each hospital admission: gender, age, education level attained, source of income, first psychiatric hospitalization, substance abuse, suicidal ideation, mental status examination findings (thought disorder, perceptual disorder, affect disorder, disordered behaviour), discharge against medical advice (AMA), non-adherence with prescribed pharmacotherapy, number of previous psychiatric admissions, duration of disease, need for electroconvulsive therapy (ECT) and seclusion due to uncontrollable and/or violent behaviour. Other information included

switching from a conventional antipsychotic agent to an atypical antipsychotic during an admission, the class of antipsychotic agent prescribed on discharge and the inpatient medications received. Given the change in access to atypical antipsychotic agents over the course of the study, an interaction term was created to measure the effect on LOS in each year of switching from a conventional antipsychotic to an atypical agent. The interaction term between year of admission and drug class switch was subsequently entered in the multivariable models.

Specifically, multivariable Cox proportional hazards regression analysis using a block entry of variables was employed to determine significant independent predictors of time to discharge (LOS). Only a patient's first admission during the study period was included in the model. Given that the Cox proportional hazards model provides the risk of discharge from hospital, the hazard ratios and 95% confidence intervals were inverted so as to present the results as the risk of an increased LOS.

Multivariable binary logistic regression modelling was then used to determine significant predictors of the probability of being readmitted within one year of discharge relative to not being readmitted within one year. All potential risk factors were entered into the model using a standard method in which all variables are entered at once. All variables were evaluated in relation to the dependent variable through use of partial correlation coefficients. LOS was included as an independent variable in the multivariable analysis for readmission.

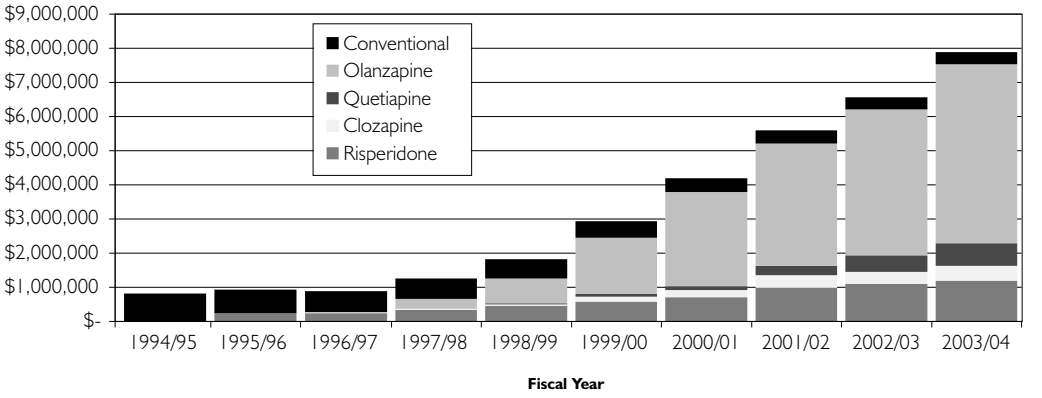
The hospital data were analyzed in the Statistical Package for the Social Sciences (SPSS®) version 9.0 for Windows, and the level of significance was set at 0.05. The data received from the NLPDP on reimbursement for antipsychotic medications were analyzed using Microsoft® Excel spreadsheets.

Results

Antipsychotic medication utilization and expenditure

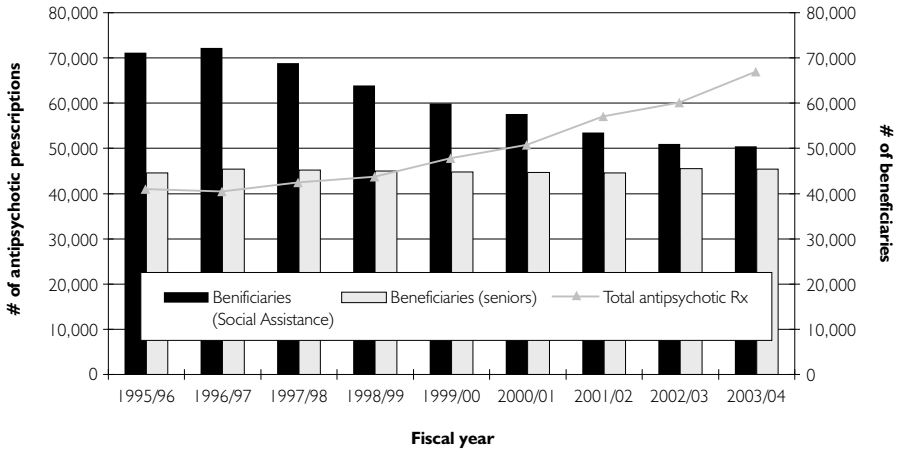
Use of second-generation antipsychotics increased dramatically between 1995/96 and 2000/01. During this time, prescriptions for all antipsychotics reimbursed by the NLPDP grew 24% while expenditures increased by more than 459%. Total government spending on all antipsychotics was approximately $900 thousand in 1995/96; in 2000/01, this therapeutic category exceeded $4.1 million, with the four atypical antipsychotic agents (clozapine, risperidone, olanzapine and quetiapine) accounting for 90.4% of this amount (Figure 1). As of 2003/04, the use of atypical antipsychotic medications was still on the rise: the NLPDP paid for 66,764 prescriptions for antipsychotic medications and spent more than $7.88 million during that fiscal year, with the atypical antipsychotic agents making up 95.5% of this amount (Figure 1).

FIGURE 1. NLPDP expenditures for atypical antipsychotic medications vs. conventional antipsychotic medications, 1994/95–2003/04



Despite this continued increase in the reimbursement for atypical antipsychotic medications, the number of persons eligible for the NLPDP declined by 17.2%. While the number of cardholders in the seniors' program remained constant, the number of cardholders in the social assistance program decreased (Figure 2). At the same time, while the number of prescriptions for antipsychotic medications reimbursed for the seniors' program decreased by 10.9%, the number of prescriptions for the social assistance program increased by 31.3%. Unfortunately, because the provincial drug database contains no patient-specific information (e.g., age, gender, diagnosis), it was not possible to link the data with any other information to determine indication for use or healthcare resource utilization.

FIGURE 2. Number of beneficiaries and total antipsychotic prescriptions reimbursed by NLPDP, 1995/96–2003/04



Hospital utilization

Three hundred and fourteen patients were admitted to hospital for the treatment of schizophrenia in Newfoundland in 1995/96. The number decreased by 8.6% (n=287) in 1998 and 18.2% (n=257) in 2000 compared to 1995/96 (Table 1). The total number of unique patients in the three years of study was 645, where 74.0% (n=477) appeared in one study year, 19.1% (n=123) were admitted to hospital in two of the years and a small proportion (7.0%, n=45) were admitted to hospital in all three years. These 645 patients had 1,625 episodes of care resulting in a total of 47,098 hospital days. The mean number of episodes per patient per year was 1.9 (Table 1).

TABLE 1. Hospital utilization and costs for schizophrenia, Newfoundland and Labrador

	Total	1995/96	1998 (% change from '95/96)	2000 (% change from '95/96)
Number of patients	645 unique patients	314	287 (–8.6%)	257 (–18.2%)
Episodes of care	1,625	586	551 (–6.0%)	488 (–16.7%)
Hospital bed-days	47,098	15,089	16,318 (+8.2%)	15,691 (+4.0%)
Total hospital costs	$20,169,955	$6,474,095	$7,080,065 (+9.4%)	$6,615,795 (+2.2%)
Mean # episodes per patient per year (SD)	1.9 (1.4)	1.9 (1.4)	1.9 (1.5)	1.9 (1.4)
Median LOS per episode (min, max)	18.0 (1, 336)	15.0 (1, 319)	19.0 (1, 336)	22.0*† (1, 296)
Median days per patient (min, max)	36.0 (1, 372)	32.0 (1, 369)	40.0 (1, 336)	40.5†‡ (1, 372)
Total inpatient antipsychotic medication costs	$425,885.45	$37,072	$107,458 (+189.9%)	$281,356 (+658.9%)

* = Significant at P-value < 0.001
† = Based on log transformation
‡ = Significant at P-value < 0.05

The number of episodes of care decreased by 6.0% in 1998 and by 16.7% in 2000 compared to the period when access was restricted (1995/96). However, relative to 1995/96, the number of hospital bed-days increased by 8.2% in 1998 and by 4.0% in 2000. Using an average per diem for each public acute care hospital in the province, these hospitalizations were estimated to cost $2.7 million in 1995/96, $3.0 million in 1998 and $2.5 million in 2000. In addition, provincial psychiatric hospitalizations were estimated to cost $3.8 million, $4.1 million and $4.2 million in 1995/96, 1998 and 2000, respectively.

The LOS per episode of care in 2000 and 1998 was longer than that in 1995/96, and based on the log transformation of LOS, this difference was statistically significant ($P<0.001$). There was a significant difference between the days per patient in each year as well. There were instances where the maximum value of the total number of days per patient per year exceeded 365 days. This finding is explained by the fact that a few patients were admitted to hospital prior to the study year but were discharged in the year of interest.

Of the 314 patients admitted to hospital for the treatment of schizophrenia during the baseline period (1995/96), 62.4% were readmitted within one year of discharge. This proportion was not significantly different from the other two study years (59.2% in 1998 and 58.6% in 2000), although the trend was downward ($P=0.058$) (Table 2). Fifty per cent of the population were readmitted within 215 days in 1995/96, 221 days in 1998 and 223 days in 2000 ($P=0.114$).

TABLE 2. Index admission analysis for readmission to hospital, Newfoundland and Labrador

	1995/96	1998	2000	*P*-value
Median time to readmission (days)	215	221	223	0.114†
Readmitted within 1 year of discharge (%)	62.4	59.2	58.6	0.058

† = Based on log transformation

Patient characteristics

Approximately two-thirds of the study population in each study year were male, about 72% of each group were receiving social assistance and close to half of the population had less than a grade 10 education (Table 3). The percentage of patients who discharged themselves against medical advice was 12.4%, 9.1% and 7.4% in 1995/96, 1998 and 2000, respectively. The proportion of patients recommended for ECT during their hospital admission increased from 5.7% to 9.0% over the study period.

TABLE 3. Characteristics of schizophrenia patients admitted to hospital in Newfoundland and Labrador during each study year [percentages (numerator/denominator) of patients unless otherwise indicated]

Characteristic	1995/96 n=314	1998 n=287	2000 n=257
Sociodemographic			
Male	66.6 (209/314)	69.3 (199/287)	70.8 (182/257)
Median age in years (min, max)	37.0 (17, 85)	39.0 (16, 88)	41.0 (18, 83)
St. John's region	61.8 (194/314)	59.9 (172/287)	62.6 (161/257)
< Grade 10 education	47.9 (146/305)	49.3 (135/274)	47.5 (115/242)
Social assistance	73.6 (226/307)	71.6 (204/285)	72.7 (184/253)
Psychiatric Status			
First psychiatric hospitalization	5.1 (16/314)	5.9 (17/287)	1.6 (4/257)
Substance abuse	32.3 (98/303)	29.6 (85/287)	30.0 (77/257)
Suicidal ideation on admission	30.9 (97/314)	36.9 (106/287)	30.4 (78/257)
Thought disorder	78.0 (245/314)	83.3 (239/287)	79.4 (204/257)
Perceptual disorder	62.7 (197/314)	55.1 (158/287)	68.9 (177/257)
Affect disorder	83.1 (261/314)	86.8 (249/287)	91.4 (235/257)
Disordered behaviour	2.9 (9/314)	4.2 (12/287)	1.2 (3/257)
Clinical Characteristics			
Non-adherent with medication	54.0 (157/291)	49.1 (141/287)	52.8 (131/248)
Median # previous admissions (min, max)	7.0 (1, 85)	8.0 (1, 91)	10.0 (1, 94)

TABLE 3. Continued

Characteristic	1995/96 n=314	1998 n=287	2000 n=257
Median # years of disease suffering (min, max)	12 (0, 52) n=307	13.5 (0, 53) n=284	14.5 (0, 59) n=251
Discharged against medical advice	12.4 (39/314)	9.1 (26/287)	7.4 (19/257)
Level of Care			
Recommended for ECT	5.7 (18/314)	7.7 (22/287)	9.0 (23/257)
Seclusion	12.7 (40/314)	13.2 (38/287)	9.3 (24/257)
Pharmacotherapy			
Atypical prescribed on discharge	16.0 (47/293)	50.8 (136/268)	77.5 (183/236)

The inpatient chart review revealed that about half of patients admitted to hospital were non-adherent with prescribed medications on admission in each year. One-third of the population expressed suicidal ideation, and approximately 30% were substance abusers. Sixteen (5.1%) and seventeen (5.9%) patients experienced their first psychiatric admission to hospital during 1995/96 and 1998 study years. However, the number of first psychotic episodes in 2000 was significantly lower, with only four patients (1.6%).

Forty-seven patients (16.0%) in the baseline population (1995/96) were discharged on an atypical antipsychotic medication following the index admission, compared to 183 (77.5%) in 2000. This increase in atypical use corresponds with both the introduction of two more atypical agents (olanzapine in October 1996 and quetiapine in December 1997) and the initiation of the unrestricted-access policy in December 1998. The number of patients admitted and discharged on an atypical antipsychotic medication increased substantially from baseline to the final study year. At the same time, the median LOS for these patients increased from 13.0 days to 31.0 days, a difference of 18.0 days. In contrast, the number of patients who were switched from a traditional antipsychotic to an atypical antipsychotic medication while in hospital remained relatively small in each study year, indicating that most patients were switched as outpatients. The median time spent in hospital for these 47 patients was 72.5 days, 40.0 days and 29.5 days in 1995/96, 1998 and 2000, respectively.

FACTORS ASSOCIATED WITH LENGTH OF STAY

The multivariable Cox proportional hazards model to determine the independent predictors of LOS included 78.9% (509/645) of the original population, owing to missing information for some variables for the 136 excluded patients. Of the 19 variables that were entered in the model, six were found to significantly influence the amount of time a patient remained in hospital (Table 4).

TABLE 4. Multivariable Cox proportional hazards model of the independent variables predicting an increased LOS by study index admission, for 1995/96, 1998 and 2000 (n=509/645, 78.9%)

Characteristic	Hazard Ratio	95% CI	*P*-value
Sociodemographic			
Male	0.82	0.22–1.02	0.074
Age	1.01	0.99–1.02	0.400
< Grade 10 education	0.90	0.74–1.08	0.258
Year of admission 1995 vs. 2000 1998 vs. 2000	 0.77 0.81	 0.59–1.01 0.61–1.07	 0.056 0.143
Social assistance	1.01	0.81–1.25	0.949
Psychiatric Status			
First psychiatric hospitalization	1.15	0.74–1.78	0.547
Substance abuse	0.99	0.80–1.22	0.918
Suicidal ideation	0.71	0.58–0.87	0.0009*
Thought disorder	1.42	1.11–1.82	0.006*
Perceptual disorder	1.00	0.82–1.22	0.995
Affect disorder	1.16	0.90–1.50	0.260
Disordered behaviour	1.35	0.78–2.34	0.286
Clinical Characteristics			
Non-adherent with medication	1.05	0.86–1.05	0.634
# previous admissions	1.00	0.98–1.01	0.322
# years of disease suffering	1.00	0.99–1.02	0.612
Discharged against medical advice	0.40	0.28–0.56	<0.001*

TABLE 4. Continued

Characteristic	Hazard Ratio	95% CI	*P*-value
Level of Care			
Recommended for ECT	2.58	1.75–3.80	<0.001*
Seclusion	1.93	1.45–2.57	<0.001*
Pharmacotherapy			
Drug switch (conventional to atypical)	1.26	0.74–2.14	0.401
Year of admission* drug switch 1995 vs. 2000 1998 vs. 2000	 2.61 1.62	 1.12–6.11 0.81–3.25	 0.027* 0.170

* = Significant at *P*-value < 0.05

Given the change in access to atypical antipsychotic agents over the course of the study, an interaction term was created to measure the effect on LOS (in each year) of switching from a conventional antipsychotic to an atypical antipsychotic medication. The effect of switching in 1995/96 was shown to significantly increase LOS compared to the effect of switching in 2000 (hazard ratio 2.61, 95% CI = 1.12–6.11; P=0.027). Independent of age and gender, requiring ECT (hazard ratio 2.58, 95% CI = 1.75–3.80; P<0.001), seclusion (hazard ratio 1.93, 95% CI = 1.45–2.57; P<0.001) and having thought disorder (hazard ratio 1.42, 95% CI = 1.11–1.82; P=0.006) significantly increased a patient's time in hospital. Suicidal ideation on admission (hazard ratio 0.71, 95% CI = 0.58–0.87; P=0.0009) and discharging oneself against medical advice (hazard ratio 0.40, 95% CI = 0.28–0.56; P<0.001) were significant predictors of a reduced LOS. Factors that failed to affect LOS included years since first diagnosis, number of previous hospitalizations, first psychiatric hospitalization, substance abuse, perceptual disorder, affect disorder, disordered behaviour, low education, non-adherence with prescribed medication on admission and receiving social assistance.

FACTORS ASSOCIATED WITH READMISSION TO HOSPITAL

A multivariable logistic regression model was used to determine the predictors of re-hospitalization. The model included 81.5% (521/639) of the entire study population and revealed two significant, independent predictors for re-hospitalization within 12 months of discharge: leaving hospital against medical advice (OR = 2.59, 95% CI = 1.12–6.02; P=0.027) and previous hospital admissions. For every additional previous admission there was a 5% increase in the likelihood that the patient would be read-

mitted (OR = 1.05, 95% CI = 1.03–1.08; P=0.002) (Table 5). Contrary to expectation, neither non-adherence with prescribed medications on the previous admission nor receiving a prescription for an atypical antipsychotic medication on last discharge influenced the probability of readmission to hospital within one year of discharge.

TABLE 5. Multivariable logistic regression model for predictors influencing hospitalization within one year of discharge from the index admission 1995/96, 1998 and 2000 (n=521/639, 81.5%)

Characteristic	Odds Ratio	95% CI	*P*-value
Sociodemographic			
Male	0.65	0.42–1.01	0.057
Age in years	0.98	0.96–1.01	0.138
< Grade 10 education	1.32	0.89–1.96	0.169
Year of admission 1995 vs. 2000 1998 vs. 2000	 1.09 0.54	 0.39–3.07 0.18–1.62	 0.875 0.272
Social assistance	1.06	0.69–1.62	0.787
Psychiatric Status			
First psychiatric hospitalization	1.24	0.53–2.89	0.627
Substance abuse	1.53	0.99–2.36	0.058
Suicidal ideation on admission	1.26	0.82–1.93	0.292
Thought disorder	1.01	0.61–1.68	0.962
Perceptual disorder	1.07	0.71–1.60	0.749
Affect disorder	0.77	0.45–1.33	0.346
Disordered behaviour	0.77	0.25–2.40	0.658
Clinical Characteristics			
Non-adherent with medication	1.08	0.72–1.63	0.699
# previous admissions	1.05	1.03–1.08	0.002*
Index length of stay	1.00	0.99–1.00	0.504
# years of disease suffering	1.00	0.98–1.03	0.764
Discharged against medical advice	2.59	1.12–6.02	0.027*

TABLE 5. Continued

Characteristic	Odds Ratio	95% CI	*P*-value
Level of Care			
Recommended for ECT	0.70	0.32–1.53	0.372
Seclusion	0.78	0.43–1.44	0.434
Pharmacotherapy			
Atypical on discharge	1.14	0.38–3.39	0.819
Year of admission* discharge drug class 1995/96 vs. 2000 1998 vs. 2000	 1.10 1.36	 0.30–4.09 0.39–4.80	 0.889 0.631

* = Significant at *P*-value < 0.05

Discussion

This study was designed to test the hypothesis that access to a new technology (i.e., atypical antipsychotic medications) would keep people out of hospital, or permit earlier discharge. The atypical drugs do not themselves have better outcomes in terms of disease improvement but do reduce certain side effects. Such reduction might improve adherence with treatment that may change outcomes and thus create overall system savings. Results of this study demonstrate that unrestricted access to new atypical antipsychotic agents did not coincide with a reduction in total days in hospital or readmission rates for persons suffering from schizophrenia.

The current study has several limitations. Hospital readmission was used as a method of measuring patient outcome influenced by antipsychotic therapy. While objective and not prone to error, readmission may not be the best measure of outcome for schizophrenia from a patient's or caregiver's perspective. Subtle differences in time to subjective improvements in extreme psychotic behaviour or ability to gain employment may have been more relevant indicators of effectiveness. The perspective of the patient receiving the therapy is essential in determining its value; however, such exploration was beyond the scope of this study. If these outcomes had been assessed, differences associated with drug therapy may have been revealed.

Additionally, the risk of readmission was determined by dichotomizing a variable originally measured as a continuous variable. The authors realize that answering the question "When?" may be much more illuminating than answering "Whether?" an event occurred. Splitting the population eliminates potentially meaningful variation in event times by clustering together everyone who gets readmitted before, and after, the chosen cut-off. For example, persons who were readmitted within one month were not distinguished from those readmitted within 11 months. The decision to ask whether

a patient gets readmitted rather than when was primarily based on the fact that the selected cut-off time was significant from a policy perspective. Moreover, a survival analysis of time to readmission in days was less informative because even in the presence of censoring, the median time to readmission was greater than 250 days. As a result, it was felt that no meaningful variation in event times was lost. Cutting the data into numerous categories, however, makes it more difficult to interpret the results, as our goal was to model the probability of having an event.

Another limitation has to do with the predictor variables included in the study. It is possible that the variables themselves were not sensitive enough to detect changes in LOS or readmission risk. For example, the dichotomous variable indicating the presence or absence of thought disorder may not accurately represent the severity of the disorder; there may be a continuum of severity. Even if all relevant clinical information was abstracted from the chart, there are numerous non-clinical factors that can influence the need for admission to hospital and LOS that were not addressed in this study (e.g., physician factors that affect treatment practices). Placement problems, caregiver stress or an unsupportive living environment may result in the need for hospitalization and extend a person's LOS. There is evidence in the literature that a patient's living situation or lack of support are important predictors of LOS and frequent hospitalizations (Creed et al. 1997; Laessle et al. 1988; Gordon et al. 1985; Cyr and Haley 1983; Falloon et al. 1987; Caton et al. 1984). Clinicians may be reluctant to discharge patients who live unsupported in the community.

The newer atypical antipsychotic medications have been linked to improved medication adherence (Glazer and Johnstone 1997; Kane 1999; Lindstrom and Bingefors 2000; Chakos et al. 2001). However, the rate of adherence measured in this study among those patients admitted to hospital was not altered with the increased utilization of atypical antipsychotic medications. Non-adherence measured in this study may, in fact, underestimate the actual rate because of our reliance on written documentation of non-adherence in patients' charts and may partly explain why non-adherence was not found to be a significant predictor of recidivism in the current study.

Even if adherence rates could be accurately measured, the improved adverse effect profiles of atypical antipsychotic medications may be only part of the reason for continuing drug therapy. Literature suggests that there are other powerful predictors contributing to low adherence to schizophrenia treatment: patient-related factors (e.g., substance abuse); family-related factors (e.g., alienation from the patient); disease-related factors (e.g., lack of insight into the disorder); and healthcare system and community support services (e.g., family therapy, community-based services and general help with adherence strategies) may play a role in improving outcomes (Marder 1998; Kampman and Lehtinen 1999; Carpenter and Tamminga 1995; Cuffel et al. 1996; Kemp and David 1996; Agarwal et al. 1998; Dixon et al. 1997). An in-depth review of the community programs offered to persons with schizophrenia in Newfoundland

and Labrador and the effectiveness of these programs on this population was not undertaken in this project but would have helped to interpret some of the findings and thus provided valuable information for policy makers. At the same time, it should be emphasized that the goal of this study was to examine the rationale used in making the decision to replace restricted access with an open-access program: the possibility that increased costs of atypical agents would be offset by decreased hospitalization for schizophrenia.

The unrestricted-access policy was implemented during a period of rapid change in the healthcare system, particularly in the St. John's region. Changes in hospital admission policies, access to housing, bed availability, demands on community resources and physician practice could influence hospital utilization. While total separations decreased, the average LOS for schizophrenia increased by 46.7% between 1995 and 2000 (the overall provincial average LOS for all hospital admissions increased by only 2.6% [CIHI 2003]) and the number of acute care beds in the mental health program in the St. John's region decreased by about 7% from 1995/96 to 1999/2000 (personal communication, Mary Dwyer, Program Director, Mental Health Program, St. John's, June 2006). At the same time, the outpatient services provided by the Community Care Program and accessibility to them remained stable. It is possible that liberalized access to the new medications kept a higher proportion of schizophrenia sufferers out of hospital and thus opened up space for the more severely compromised patients, allowing them to be treated more intensively. This possibility is consistent with some of the changes in clinical characteristics of the patients over the time periods (e.g., an increased proportion requiring ECT). However, because the time to readmission was not significantly different for each of the study periods, the drugs did not affect time spent in the community.

An important contribution this study makes is that it highlights the limitations in the information infrastructure in the province of Newfoundland and Labrador at the time the research was conducted. The study provides an indication of significant findings and would be enhanced if there were better linkage capabilities between actual drug use, healthcare resource utilization and health outcomes. Fortunately, the Newfoundland and Labrador Centre for Health Information has been created whose mandate is to ensure the availability of high-quality health information for healthcare, systemwide planning, research and policy development. The Centre is responsible for the development and management of a provincewide Health Information Network. As a result, future research in the area of drug policy can be conducted more efficiently with better data (e.g., patient-specific drug exposure) (personal communication, Donald MacDonald, Director of Research and Evaluation, Newfoundland and Labrador Centre for Health Information, St. John's, June 2006).

Conclusions

Two findings are worth noting. First, there was no appreciable change in the rate of adherence as measured in this study. Yet, the share of patients receiving atypical agents increased dramatically. Thus, part of the hypothesis fails: access alone does not ensure adherence with therapy. It is acknowledged, however, that adherence was measured only among those patients admitted to hospital, not among all recipients of such medicines. Second, there was a 24% increase in prescriptions filled. While we do not know what that increase means in terms of length of prescription, it might be reasonable to assume that the length for conventional and atypical agents is about the same. Thus, the volume of treatment probably increased by about 24%. This implies that the maximum gain in the "process" of care is 24%. The financial implication of this increase in process is a more than 400% increase in costs. There are very few processes in healthcare or elsewhere in society that will generate a return of almost 20-fold. Thus, the logic of the return on investment argument in support of unrestricted access to atypical antipsychotic medications is arguably a fantasy. This claim is substantiated by the fact that the increase in government expenditure for these drugs did not coincide with a decrease in acute care hospital utilization in the province by patients with schizophrenia. Although a decrease in hospital admissions occurred, any associated cost savings were negated by an increase in LOS.

Despite our not having patient-specific drug exposure data, the results still address the issue of the overall system-level return on investment from spending on this drug category. It is, after all, that return that is often used to justify the very high cost of atypical agents: spend many times more on the newer medicines and the savings will accrue in the hospital sector. In this case, the return on investment motivation appears to have been misguided. Further research may be warranted to examine impacts on the system and patient benefits that were not assessed in this study and to determine whether targeted access may be prudent policy for drug categories of this sort.

A noteworthy impact of the current study is that the results were used by the NLPDP in its review of the atypical antipsychotic class of medications. In the months following the submission of the report, a decision was made to change the policy surrounding the coverage status of these medications. Effective October 1, 2004, the new policy consisted of partial restriction. It was decided that open benefit status was to remain in place for risperidone and quetiapine, thereby allowing first-line atypical coverage for schizophrenia and other approved indications. Olanzapine and clozapine were moved to Special Authorization and are considered for coverage where the former have failed.

Correspondence may be directed to: Daria O'Reilly, Program for Assessment of Technology in Health, 25 Main Street West, Suite 2000, Hamilton, ON L8P 1H1; tel. 905-523-7284 ext. 5277; fax: 905-522-0568; e-mail: oreilld@mcmaster.ca.

ACKNOWLEDGMENTS

Funded by an unrestricted, joint educational grant from AstraZeneca Canada Inc., Eli Lilly Canada Inc., Janssen-Ortho Inc. and Novartis Pharmaceuticals Canada Inc. Dr. Parfrey holds a CIHR-RPP Distinguished Scientist Award. Study design, data collection, analysis and interpretation, and the writing of any reports were the sole responsibility of the authors.

REFERENCES

Agarwal, M.R., V.K. Sharma, K.V. Kishore Kumar and D. Lowe. 1998. "Non-Compliance with Treatment in Patients Suffering from Schizophrenia: A Study to Evaluate Possible Contributing Factors." *International Journal of Social Psychiatry* 44(2): 92–106.

Baldwin, D. and S. Montgomery. 1995. "First Clinical Experience with Olanzapine: Results of an Open-Label Safety and Dose-Ranging Study in Patients with Schizophrenia." *International Clinical Psychopharmacology* 10: 239–44.

Beasley, C.M., M.A. Dellva, R.N. Tamura, H. Morgenstern, W.M. Glazer, K. Ferguson et al. 1999. "Randomised Double-Blind Comparison of the Incidence of Tardive Dyskinesia in Patients with Schizophrenia During Long-Term Treatment with Olanzapine or Haloperidol." *British Journal of Psychiatry* 174: 23–30.

Canadian Institute for Health Information (CIHI). 2003. "Table 4. Average Length of Hospital Stay (in Days) for Canada, Provinces and Territories, 1995/96, 2000/01 and 2001/02." Rate of Hospitalizations Continues to Decline But Average Length of Stay Is Increasing Slightly, Reports CIHI. Retrieved July 10, 2007. <http://secure.cihi.ca/cihiweb/en/media_19nov2003_tab4_e.html>.

Carpenter, W.T. Jr. and C.A. Tamminga. 1995. "Why Neuroleptic Withdrawal in Schizophrenia?" *Archives of General Psychiatry* 52(3): 192–93.

Caton, C.L., J.M. Goldstein, O. Serrano and R. Bender. 1984. "The Impact of Discharge Planning on Chronic Schizophrenic Patients." *Hospital & Community Psychiatry* 35(3): 255–62.

Chakos, M., J. Lieberman, E. Hoffman, D. Bradford and B. Sheitman. 2001. "Effectiveness of Second-Generation Antipsychotics in Patients with Treatment-Resistant Schizophrenia: A Review and Meta-analysis of Randomized Trials." *American Journal of Psychiatry* 158(4): 518–26.

Creed, F., B. Tomenson, P. Anthony and M. Tramner. 1997. "Predicting Length of Stay in Psychiatry." *Psychological Medicine* 27(4): 961–66.

Cuffel, B.J., J. Alford, E.P. Fischer and R.R. Owen. 1996. "Awareness of Illness in Schizophrenia and Outpatient Treatment Adherence." *Journal of Nervous and Mental Disorders* 184(11): 653–59.

Cyr, J.J. and G.A. Haley. 1983. "Use of Demographic and Clinical Characteristics in Predicting Length of Psychiatric Hospital Stay: A Final Evaluation." *Journal of Consulting and Clinical Psychology* 51(4): 637–40.

Dixon, L., P. Weiden, M. Torres and A. Lehman. 1997. "Assertive Community Treatment and Medication Compliance in the Homeless Mentally Ill." *American Journal of Psychiatry* 154(9): 1302–4.

Falloon, I.R., C.W. McGill, J.L. Boyd and J. Pederson. 1987. "Family Management in the Prevention of Morbidity of Schizophrenia: Social Outcome of a Two-Year Longitudinal Study." *Psychological Medicine* 17(1): 59–66.

Glazer, W.M. and B.M. Johnstone. 1997. "Pharmacoeconomic Evaluation of Antipsychotic Therapy for Schizophrenia." *Journal of Clinical Psychiatry* 58 (Suppl. 10): 50–54.

Goeree, R., F. Farahati, N. Burke, G. Blackhouse, D. O'Reilly, J. Pyne et al. 2005. "The Economic Burden of Schizophrenia in Canada in 2004." *Current Medical Research and Opinion* 21(12): 2017–28.

Goeree, R., B.J. O'Brien, P. Goering, G. Blackhouse, K. Agro, A. Rhodes et al. 1999. "The Economic Burden of Schizophrenia in Canada." *Canadian Journal of Psychiatry* 44(5): 464–72.

Gordon, R.E., J. Vijay, S.G. Sloate, R. Burket and K.K. Gordon. 1985. "Aggravating Stress and Functional Level As Predictors of Length of Psychiatric Hospitalization." *Hospital & Community Psychiatry* 36(7): 773–74.

Hafner, H. and W. der Heiden. 1997. "Epidemiology of Schizophrenia." *Canadian Journal of Psychiatry* 42(2): 139–51.

Kampman, O. and K. Lehtinen. 1999. "Compliance in Psychoses." *Acta Psychiatrica Scandinavica* 100(3): 167–75.

Kane, J. 1999. "Olanzapine in the Long-Term Treatment of Schizophrenia." *British Journal of Psychiatry Supplement* 37: 26–29.

Kemp, R. and A. David. 1996. "Psychological Predictors of Insight and Compliance in Psychotic Patients." *British Journal of Psychiatry* 169(4): 444–50.

Laessle, R.G., A. Yassouridis and H. Pfister. 1988. "Sociodemographic Characteristics and Length of Psychiatric Hospital Stay: Application of a Proportional Hazards Model." *Acta Psychiatrica Scandinavica* 77(3): 349–51.

Lieberman, J.A., T.S. Stroup, J.P. McEvoy, M.S. Swartz, R.A. Rosenheck, D.O. Perkins et al. 2005. "Effectiveness of Antipsychotic Drugs in Patients with Chronic Schizophrenia." *New England Journal of Medicine* 353(12): 1209–23.

Lindstrom, E. and K. Bingefors. 2000. "Patient Compliance with Drug Therapy in Schizophrenia. Economic and Clinical Issues." *Pharmacoeconomics* 18(2): 106–24.

Marder, S.R. 1998. "Facilitating Compliance with Antipsychotic Medication." *Journal of Clinical Psychiatry* 59 (Suppl. 3): 21–25.

Oh, P., T. Einarson, M. Iskedjian, A. Addis and K. Lanctot. 1996. *Pharmacoeconomic Evaluation of Schizophrenia: Clozapine in Treatment-Resistant Schizophrenia and Risperidone in Chronic Schizophrenia.* Ottawa: Canadian Coordinating Office for Health Technology Assessment.

Schillevoort, I., A. de Boer, R.M. Herings, R.A. Roos, P.A. Jansen and H.G. Leufkens. 2001. "Risk of Extrapyramidal Syndromes with Haloperidol, Risperidone, or Olanzapine." *Annals of Pharmacotherapy* 35(12): 1517–22.

Tran, P.V., M.A. Dellva, G.D. Tollefson, C.M. Beasley Jr., J.H. Potvin and G.M. Kiesler. 1997. "Extrapyramidal Symptoms and Tolerability of Olanzapine versus Haloperidol in the Acute Treatment of Schizophrenia." *Journal of Clinical Psychiatry* 58(5): 205–11.

World Health Organization (WHO). 1977. *Manual of the International Statistical Classification of Diseases, Injuries and Causes of Death* (9th rev.). Geneva: Author.

RESEARCH PAPER

Turning Vision into Reality: Successful Integration of Primary Healthcare in Taber, Canada

Transformer la vision en réalité : intégration fructueuse des soins de santé primaires à Taber, Canada

by ROBERT WEDEL, MD
Rural Family Physician
Co-Leader, Taber Health Project
Associate Clinical Professor, Faculty of Medicine, University of Calgary
Assistant Clinical Professor, Faculty of Medicine, University of Alberta
Medical Director, Palliative Care, Chinook Health Region
Taber, AB

RUTH GRANT KALISCHUK, RN, PHD
Associate Professor, SEARCH Canada Faculty
School of Health Sciences, University of Lethbridge
Lethbridge, AB

EILEEN PATTERSON, MCE
Coordination Consultant, Chronic Disease Management & Prevention Network
Lethbridge, AB

SHARON BROWN, BSC
Research Assistant, SEARCH Canada
University of Lethbridge
Lethbridge, AB

Abstract

Primary healthcare offers significant benefits to Canadians and to the healthcare system as a whole. The Taber Integrated Primary Healthcare Project (TIPHP) was a three-year primary healthcare renewal initiative involving rural physicians and the Chinook Health Region in Taber, Alberta, Canada. The goal of the project was to improve healthcare services delivery through integration of the services provided by the physician group and the health region in one rural community. Four main enablers emerged as fundamental to the integration process: community assessment and shared planning; evidence-based, interdisciplinary care; an integrated electronic information system; and investment in processes and structures that support change.

The outcome of the project has been the implementation of a new model of healthcare delivery that embraces an integrated collaborative team approach in delivering population-based, primary healthcare. Importantly, the TIPHP has influenced regional healthcare policy related to primary healthcare renewal strategies and partnerships.

Résumé

Les soins de santé primaires offrent des avantages substantiels aux Canadiens et à l'ensemble du système de soins de santé. Le Taber Integrated Primary Healthcare Project (TIPHP) était une initiative triennale de renouvellement des soins de santé primaires à laquelle participaient des médecins travaillant en milieu rural et la Région sanitaire de Chinook à Taber, en Alberta, Canada. Le projet avait pour but d'améliorer la prestation des services de santé par l'intégration des services fournis par le groupe de médecins et la Région sanitaire dans une communauté rurale. Quatre grands facteurs se sont avérés fondamentaux au processus d'intégration : l'évaluation communautaire et la planification partagée; des soins interdisciplinaires fondés sur des preuves; un système d'information électronique intégré et des investissements dans les processus et les structures qui favorisent le changement.

Le projet s'est soldé par la mise en œuvre d'un nouveau modèle de prestation de services de santé en vertu duquel une équipe de collaboration intégrée fournit des soins de santé primaires axés sur la population. Le TIPHP a surtout influencé les politiques de santé régionales ayant trait aux stratégies de renouvellement des soins de santé primaires et aux partenariats connexes.

Introduction

In Canada, primary healthcare has received increasing attention in both political and organizational arenas. Primary healthcare has been described as both "a philosophy and an approach to providing health care resources. Its basic elements are essential health care, socially acceptable and affordable methods and technology, accessibility, public participation, and intersectoral collaboration" (Beddome et al. 1993: 13). Importantly, Starfield and Shi (2002) maintain that countries with weak primary healthcare infrastructures also demonstrate poorer performance on major health indicators. In terms of philosophy, primary healthcare is about "transforming the way the health care system works today – taking away the almost overwhelming focus on hospitals and medical treatments, breaking down the barriers that too frequently exist between health care providers, and putting the focus on consistent efforts to prevent illness and injury, and improve health" (Romanow 2002: 116).

Primary healthcare renewal can best be achieved by restructuring the healthcare system in identifiable ways, including utilizing population health research, integrating healthcare services delivery, creating sustainable collaborative partnerships and practices, improving cost-efficiency within the healthcare system and developing and implementing social and healthcare policy (Alberta Health and Wellness 2002; Romanow 2002). Numerous authors have emphasized the importance of integrating services delivery in primary healthcare reform (Mazankowski et al. 2001; Romanow 2002). These authors suggest that efficient and effective healthcare needs to be provided by qualified healthcare professionals who deliver related services within proximity in a coordinated and timely manner.

Although healthcare professionals are aware of needed improvements and have access to existing models, in practice, integrated primary healthcare is hard to achieve. The Taber Integrated Primary Healthcare Project (TIPHP, hereafter referred to as the Taber Health Project [THP]) provides one example of how an integrated primary healthcare project was implemented in one rural Canadian community to achieve better healthcare services delivery. The purpose of this paper is to describe key elements that facilitated the implementation of the THP. First, relevant literature and background information about the project are provided. Second, four change enablers that facilitated the integration of primary healthcare are discussed and illustrated by specific examples. Finally, concluding remarks are offered highlighting the importance of providing local healthcare leaders with accurate and comprehensive information to inform healthcare policy development.

Relevant Literature

In anticipation of healthcare reform and in response to rising costs, many Canadian healthcare organizations are changing rapidly. The concept of integrated service net-

works has been introduced to address the traditional separation of hospitals, physicians and payers. Indeed, policy makers are now seeking to understand this concept, sometimes referred to as "organized delivery systems." An organized delivery system is "a network of organizations that provides or arranges to provide a coordinated continuum of services to a defined population and that is held clinically and fiscally responsible for the outcomes and the health status of the population served" (Shortell et al. 1993: 447).

Shortell et al. (1994) identify four critical success factors for the development of effective organized delivery systems, including the ability to create a manageable system in terms of size; conduct relevant population-based health status/needs assessments; embrace capitation-based risk for defined populations; and develop new management and governance models. Correspondingly, seven core capabilities are needed to achieve the requisite levels of integration: development of a new management culture, population-based needs assessment, patient care management systems, technology management systems, continuous improvement processes, information linkages and incentive systems (Shortell et al. 1993).

Based on research conducted in the United States, Shortell et al. (1994) identified three policy-relevant barriers to the formation of integrated systems: (1) the neophyte stage of development of most clinical information systems, (2) a predominant focus on the acute care hospital paradigm and (3) the inability to "manage" managed care. The demand for increased accountability that market and legislative reforms place on healthcare systems represents a major challenge. These systems will be challenged to expand their information capabilities to link patients and providers across all healthcare settings involved in the continuum of care. Towards this end, policy makers must have an informed and realistic understanding of what systems of providers will be able to produce in response to legitimate demands for increased accountability. In addition, most systems across the country are moving towards primary healthcare led, population-based delivery systems and away from the hospital-based, acute care focus of the past. Supporting these efforts, public policy needs to encourage efforts to develop a more broadly based, integrated continuum of primary healthcare delivery.

Background

The THP is a community-based collaborative project that set out to integrate primary healthcare services in Taber, Alberta, Canada. At the onset of the project, a partnership between the Chinook Health Region (CHR) and the Associate Medical Centre (AMC) physician group was developed. The Medical Services Branch provided funding for physicians, while Alberta Health and Wellness provided funding for the CHR. Following project completion, sustainability was supported by traditional funding sources.

The partners in this collaboration included the AMC – a partnership of eight physicians and the sole medical clinic in the community – and the Chinook Health Region. CHR's services within this community included a 25-bed acute care hospital (reduced to 17 beds during the initiative), 24-hour emergency room coverage, a 70-bed extended care facility, home care, and public health and rehabilitation services.

Taber refers to a geographic area comprising the town of Taber and the surrounding municipal district located in southeastern Alberta. Taber has approximately 15,000 residents who are younger (mean 29.7 years) than the regional average (35.1 years), with slightly lower education yet higher income than the regional average (CHR 2004). Many employed Taber residents work in the gas and oil industries.

People living in rural areas often experience challenges pertaining to access to and acceptance of healthcare services. Rural residents typically define "health" in terms of having the ability to work (Bushy 1994). Moreover, people in this population describe themselves as self-reliant, possessing a strong work ethic, having strong religious affiliations, preferring to interact with informal support systems and favouring informal negotiated solutions for healthcare concerns. In terms of implementing healthcare, rural communities face several challenges, including shortages of professional staff, limited resources, patient migration and institutional closures (Blumenthal and Kagen 2002). Consequently, community-based healthcare initiatives sensitive to the plight of rural people were integral to the success of this project. Primary healthcare integration in Taber was achieved through the use of four main enablers: (1) community assessment and shared planning; (2) evidence-based, interdisciplinary care; (3) integrated electronic information systems; and (4) investment in change processes and structures.

1. Community Assessment and Shared Planning

The first enabler was community assessment and shared planning. Successful integration of primary healthcare depends on gaining an understanding of individual, family and community healthcare needs as well as creating opportunities for healthcare users and providers to come together and use this information to arrive at a shared vision of optimal healthcare delivery. Given rural people's diverse and complex healthcare needs, a "one size fits all" approach (Grol and Grimshaw 2003) was of little value. The importance of understanding community needs cannot be understated; such information was important in terms of knowing where to begin. Independent of this initiative, a community forum was held in response to a highly publicized high school shooting in Taber. During this forum, community needs were identified that were subsequently used by the THP to inform the team's decision-making.

In assessing the needs of this rural community, multiple strategies were used. The local community integration team developed a community capacity map, held com-

munity focus groups and reviewed service utilization patterns. A community capacity map (McKnight and Kretzmann 1996) was produced using the socio-economic determinants of health (Raphael 2004) as a framework for outlining the resources and supports available in Taber, as well as for providing a profile of the challenges involved in accessing these services. Four community focus groups were held to better understand community members' health-related experiences and their health service priorities. Led by community facilitators, these focus groups used a Focus Conversation Method (Stanfield 2000). Focus group data were subsequently interpreted by an independent consultant. Local healthcare service providers also supplied pertinent service utilization information to the local community integration team. Collectively, this information provided a baseline assessment specific to the healthcare needs of this rural community; this information was used to prioritize and guide the strategies that were utilized during the THP. Not surprisingly, these assessment strategies revealed the following healthcare priorities:

- a need for improved healthcare access and one-stop services;
- a need for professional teamwork to promote seamless healthcare services delivery;
- a need for increased individual healthcare choices;
- a need for health promotion and disease prevention education;
- a need for greater focus on self-care skills;
- the development of expanded roles for nurses working in this area.

One of the most important factors that enabled the THP to achieve evidence-based, integrated care was that changes were made with the specific needs of the community in mind. Utilizing a collaborative approach, those involved in the assessment process accurately communicated their findings to community leaders. Together, these individuals (i.e., healthcare providers, community leaders) formulated relevant, clear goals and objectives that guided the implementation process. Collaborative decision-making greatly facilitated understanding among all partners and, hence, supported needed change. Each group of healthcare providers needed to have clearly defined role expectations that specified appropriate accountability. Providers identified areas where they could share resources and work more effectively with others. Important to the process was that healthcare outcomes needed to be continually negotiated with all stakeholders (e.g., consumers and professionals) as a way of ensuring high-quality healthcare delivery (Korabek et al. 2004).

In Taber, a fundamental step to achieving improvements was that of including physicians in system-level decision-making. Sensing greater control by government, corporations, administrators and even other healthcare professionals, physicians expressed a loss of autonomy with regard to several aspects of their work. This loss of

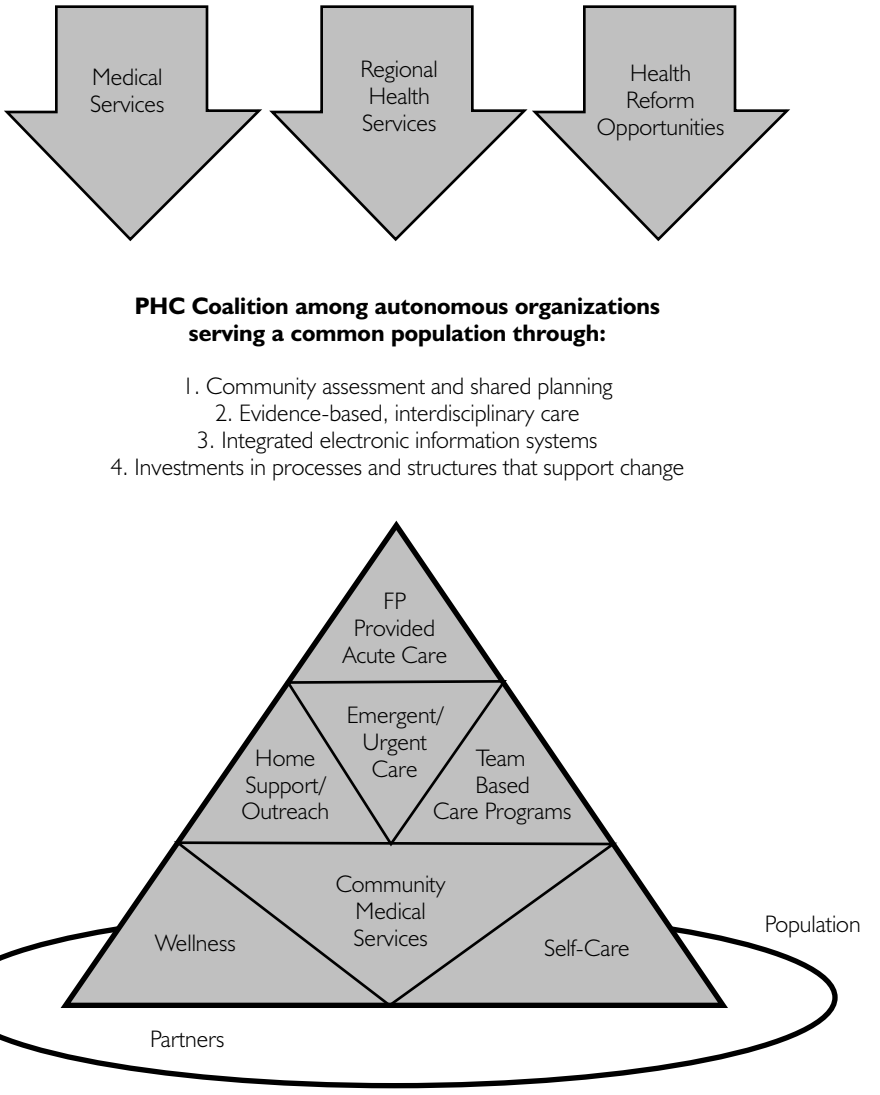
autonomy, along with what physicians described as "treadmill" medicine resulting from "turnstile" volume pressure, led to work-related physician dissatisfaction (Mechanic 2003; Zuger 2004). By implementing a shared planning process, physicians regained their autonomy. Over time, they became actively involved in planning for co-location of services through a Service Agreement with the regional health authority.

Changes within the physician clinic were also fundamental to enhancing communication and team building, both within the clinic and between clinic staff and regional programs. For instance, physicians, nurses and assistants formed a team and coordinated their work efforts in a more efficient manner that included finding ways of effectively working with community and regional health authority resources. When confronted by challenges, team members typically refocused their views and subsequent actions in favour of the best interests of the clients and families they served. This proactive approach, which posed its own set of challenges, enabled healthcare services to be delivered effectively and efficiently by appropriately qualified professionals. Further, it supported medical office assistants in playing a more active role in supporting new clinical integration initiatives. Medical Office Assistants (MOAs) are clinic staff trained to assist physicians in their day to day work, and play a strong role in facilitating the liaison between the operational and clinical functions of the Family Practice teams within the clinic. The THP developed a formal Primary Healthcare Alliance with representation from the CHR and the AMC at both clinical and systems levels. This new, formalized business entity developed local policy in the form of a Service Agreement between the physicians and the regional health authority. The main goal of the coalition was to improve the health status of area residents. Community assessment and shared planning were essential in terms of developing a common purpose aimed at successfully integrating physician healthcare services with those provided by other CHR healthcare professionals.

2. Evidence-Based Interdisciplinary Care

The second enabler involved utilizing local evidence as a basis for shifting to interdisciplinary care. The Operational Model (see Figure 1) recognizes that locally, integration must occur simultaneously within an interdisciplinary healthcare environment including medical assessments, clinical management, health education and population health services. The interconnected elements in Figure 1 show "wellness" and "self-care" integrated with "community medical services"; "home support/outreach" and "team-based care" integrated with "emergent/urgent care"; and all these facets of healthcare delivery supporting the optimal functioning of "acute care services."

FIGURE 1. Primary Health Care Coalition Operational Model



Interdisciplinary team

Once community needs were assessed, those working within the THP used a Collaborative Partnership Model (Korabek et al. 2004) as a basis for forming an interdisciplinary team. This team included physicians, nurses, other front-line healthcare providers and two managers. Using a Program Budget Marginal Analysis (PBMA), supplemented by community assessment information, team members set out to redefine priorities and develop success indicators for health services delivery that would

lead to efficient and effective, client-centred healthcare outcomes. PBMA is an economic, priority-setting framework used in the healthcare sector to aid decision-makers in establishing priorities for health services required within a region in an evidence-based, transparent fashion. PBMA identifies the means for redirecting resources to those areas of greatest priority so as to maximize health outcomes for the population (Halma et al. 2001). For example, Taber healthcare providers used this framework to improve and integrate chronic disease services within a fixed budget. Healthcare providers first reviewed the current chronic disease management programs in Taber; subsequently, they considered alternatives based on program priorities as well as the costs and benefits of potential changes. Towards this end, a mission statement and a set of goals (Figure 2) were developed and implemented by team members.

FIGURE 2. Mission statement and goals of the Taber Integration Team

Mission Statement

The members of the Taber Integration Team will work to achieve optimal health and wellness for the community we serve through visionary leadership, clinical excellence and strong relationships.

Goals

The Taber Integration Team will work together to achieve:

1. Improved communication between care providers and the public
2. Improved awareness of and satisfaction with access and delivery of healthcare services
3. A healthier community through increased health promotion and disease prevention programs.

The work done at the interdisciplinary team level was fundamental in shifting healthcare delivery from a facility-based treatment approach to a community-based wellness approach. Allied healthcare professionals such as nurses, respiratory therapists, dieticians and nurse practitioners provided on-site clinical services and also developed broad-based clinical capacity. Specifically, they organized training related to diagnostic equipment use (e.g., spirometers, blood pressure cuffs) and patient education resources (e.g., inhalers, diabetes management supplies), and they also facilitated linkages with external resources (e.g., exercise groups, new mothers' support groups). Three examples illustrating interdisciplinary teamwork within the local healthcare community are provided: well baby services, chronic disease management programs and a well women clinic.

Well Baby services

The local team used Well Baby (WB) services as a case study to better understand integrated healthcare services delivery. A process of client mapping tracked the typi-

cal WB appointment pattern with physicians and public health nurses, and provided a flow map showing the timing and content of these routine visits. Client mapping of Taber WB services confirmed a duplication of services. Utilizing an incremental approach to increase system efficiency, the team chose to relocate the public health nurse WB clinics to the medical centre so that patients could save time by booking back-to-back appointments with the public health nurse and the family physician. Duplication was eliminated by coordinating the timing of appointments and services. While maintaining high-quality service delivery, this type of integration saved a typical family four visits during an infant's first year.

Although the initial goal was to increase healthcare services' effectiveness and efficiency, broader benefits also occurred, including increased case finding by the nurses and increased time for preventive patient education. Co-location enabled physicians and public health nurses to provide joint WB visits. This simple change in clinical practice decreased the number of appointments for the clients and simultaneously enhanced communication among healthcare professionals. Through a collaborative effort, practice changes that exceeded the project goals were realized.

Chronic disease management programs

The lessons learned from the WB case study were applied to other areas of healthcare services integration. In Taber, past healthcare practices utilized numerous, separate clinical working groups in the management of chronic diseases. It soon became evident that a common approach for treating all types of chronic diseases/conditions (e.g., asthma, diabetes and hypertension) would be more efficient and effective. This common approach added value in that it was user friendly for both staff and patients. It also aligned operational processes and reduced the administrative workload for new programs.

The Taber Asthma Program and the Diabetes Education Program are the best-developed team-based programs within this region. Clinical practice guidelines and evidence of best practices from Alberta and Canadian guidelines formed the cornerstone of the Taber Asthma Program. Team members included physicians and certified asthma educators (i.e., CHR respiratory therapists and the AMC nurse practitioner). The program provided clear roles for team members related to asthma assessments, education and treatments that were framed within an Asthma Action Plan. This structure enabled the effective use of healthcare system resources and supported healthcare professionals in implementing best practices. Initially, the regional Diabetes and Lipids Education Program was located in the Taber Health Unit. Subsequently, as a way of enhancing continuity of care, the program was later moved to the medical clinic.

Well Women clinic

A review of services utilization revealed that the greatest number of residents accessing services outside the Taber community were women seeking full check-ups, including Pap smears. In response, a nurse practitioner developed the Well Women clinic. Based on clinical practice guidelines, the clinic was supported by the nurse practitioner's scope of practice guidelines and regular consultations with physicians.

Another objective of the WW clinic was to remove some of the burden on rural physicians by appropriately utilizing the expertise of other healthcare professionals. For example, a nurse practitioner provided women with holistic and comprehensive healthcare that, in turn, lessened physicians' workloads and improved outreach services to vulnerable populations. Supporting such practice, Litaker et al. (2003) maintain that physician–nurse practitioner teams can be used to improve clinical effectiveness, to enhance patients' perception of care and to minimize healthcare costs.

The nurse practitioner–led WW service has been particularly useful for women who experience more complex personal and social circumstances, and for those who may require specialized services delivery. For example, young women engaged in high-risk activities, or older women with questions related to menopause, might fall within this category. Overall, this program was well received within the Taber community.

3. Integrated Electronic Information System

The third enabler was the utilization of an integrated electronic information system that provided a useful way of achieving high-quality healthcare improvement (Miller and Sim 2004). During this initiative, the CHR was using the Meditech electronic information system. At the beginning of the project, the only electronic information available to physicians was laboratory and hospital admissions data; the AMC was using electronic billing and scheduling as well as paper charting. The regional plan was to roll out the Meditech electronic information systems within all clinical programs in Taber. Similarly, physicians were planning to move to electronic charting.

The outcome was that the Meditech information became available to physicians in both clinic and hospital settings. For example, physician clinic charts were available when patients presented after hours in the Emergency Department. A second example was the move towards "one patient, one chart" as a way of providing effective interdisciplinary care. Even though this goal was not fully realized during this initiative, there were examples of success at specific program levels (e.g., diabetes care). In response to community requests for healthcare access through a single point of entry, a third example included the electronic information system being set up to allow patients to make appointments simultaneously with both the physician and the chronic disease educator. Integrated electronic information systems are now being developed to support interdisciplinary care through linked scheduling and shared access to charting

systems. Once again, shared planning resulted in the integration of two systems. It is anticipated that this infrastructure will ultimately provide one of the most integrated electronic healthcare systems available.

4. Investment in Processes and Structures That Support Change

The fourth enabler involved setting in place processes and structures to support change over the long term. Based on community and research evidence, the management team believed that it was essential to invest time and money in an alternative payment plan for physicians, organizational change and co-location of services.

Alternative Payment Plan

Financial incentives can be an effective way of changing professional behaviour, especially when the incentives are aligned with professional values and priorities (Roland 2004). An Alternative Payment Plan (APP) was implemented for Taber physicians as a way of clarifying terms of payment, defining service expectations and protecting organizational autonomy. The APP was designed to enable physicians to delegate tasks to their teams, allowing physicians to spend additional time with their more complex patients. Examples of delegated tasks include health screening reminders, proactive surveillance of chronic diseases, and patient education in support of self-care.

New payment mechanisms were based on geographic capitation. This type of payment was based on a provincial population cost formula. In this case, healthcare monies were distributed based on the age and gender profile of Taber residents. This fiscal approach helped physicians pay greater attention to community-level initiatives, as well as individual-level healthcare opportunities and concerns. Since Taber physicians also covered the local Emergency Department within their defined scope of practice, they had a vested interest in broad community healthcare interventions. The APP provided a buffer that supported physicians by rewarding them for the quality of care they delivered and giving them opportunities to innovate in matters of access and care – issues that are extremely important to rural residents.

Internal distribution of the APP funding was based on time spent in the clinic, with incentives for on-call care, indirect care, house calls, palliative care visits, obstetric care and team planning. Limited incentives were developed for accomplishing defined quality indicators. The APP was also used to encourage and support physician lifestyle improvements, such as basic vacation time, continuing medical education and quality time with family, all important aspects of self-care that are sometimes overlooked in a demanding work world.

Organizational change

Organizational change strategies were used to address resistance at system and personal levels, as well as to remove barriers at the infrastructure level. The development of the Service Agreement previously discussed set the direction for organizational change and clarified the roles and responsibilities of each partner within the new integrated primary healthcare delivery system. At the system level, the distinct cultures of the regional healthcare program offices and the primary healthcare office were recognized, validated and then aligned using the common focus on patient-centred care. Partnership and collaboration through management team dialogue helped to anticipate and facilitate organizational change. Personal resistance to change was explored, and team-building strategies (e.g., visioning exercises) were used to build trust among team members. Once individuals from a variety of disciplines were able to build a common vision, attention was then turned towards reducing infrastructure barriers. This aspect was addressed through building renovations and new Information System technology that accelerated the pace at which change could be realized.

… the following challenges were identified: ambiguous roles and responsibilities, lack of commitment and lack of strategic alignment.

Co-location

Initially, there were three separate health sites in Taber: the hospital, which includes an extended care wing; the AMC physician clinic; and the health unit, where Public Health, Children's Rehabilitative Services and Home Care were located. The team's vision was to develop two re-designed sites. The first was the physician clinic, selected as the site for integrated wellness and chronic disease management services. The second involved developing rehabilitative and transitional programs at the hospital. Towards this end, Home Care and Palliative Care moved into the hospital and the Diabetes and Lipids Education Program moved into the AMC physician clinic. The respiratory therapist moved from the hospital to the AMC physician clinic, which in turn provided support for the Asthma Education Program. Public Health offered most of its clinic services through the AMC physician clinic during this pilot initiative. In several instances, co-location was beneficial in that it led to a significant improvement in communication among healthcare providers. This aspect of the integrated primary healthcare initiative continues to evolve towards a common practice site.

Public Policy

Undoubtedly, primary healthcare offers significant benefits to Canadians and to the healthcare system as a whole. The THP provides one example of the successful integration of primary healthcare services within a rural community. Within this initiative, most new interventions were linked to community medical and health services and reflected a shift to interdisciplinary care for wellness and chronic disease services. Positive outcomes have been realized in terms of client satisfaction, health provider satisfaction, perceived improvements in quality of care and improved utilization rates. The Taber initiative has contributed to the body of knowledge that has guided primary healthcare renewal initiatives included within a provincial Master Agreement among the AMA, Alberta Health and Wellness and CHR (newly named Chinook Health). In the future, this eight-year agreement includes a new funding scheme for "Primary Care Networks" in Alberta, which facilitates the development of partnerships between physician groups and regional health authorities, and allows for the implementation of new primary care renewal strategies within these Networks. Importantly, the THP has contributed to regional healthcare policy through the development of our own Chinook Primary Care Network, which includes strategies to improve access and enhance team-based care.

Catalysts and Challenges

Although the project, as presented here, seems to have been implemented with ease, this was not the case. It took a great deal of work to ensure that all stakeholders remained committed to it. Without the diligent efforts of some of the physicians, managers and other healthcare staff in promoting this project, it would not have been successful. Key individuals were instrumental in providing support to this initiative as they stepped outside traditionally established boundaries. These people were committed to making a change, had a clear vision of the goals of the project and supported others in creating needed change.

Within this initiative, the following challenges were identified: ambiguous roles and responsibilities, lack of commitment and lack of strategic alignment. Healthcare professionals were sometimes uncertain about their roles and responsibilities. The process of breaking down the silos among healthcare professionals frequently induced fear among those attempting to implement change. In the early stages of the initiative, there was a common perception that the proposed change would result in decreased healthcare provider autonomy and power. Similarly, a lack of major stakeholder buy-in and commitment at the community, provincial and national levels was another challenge. Finally, the lack of strategic alignment by key stakeholders resulting from their inability to converge on a common purpose was identified as a challenge.

Conclusion

The THP demonstrated the effectiveness of one model of primary healthcare that resulted in the successful integration of healthcare services for improved healthcare outcomes. This primary healthcare initiative is sustainable, and in fact continuing to develop through provincial funding supporting Primary Care Networks in Alberta. Chronic disease management will be sustained, and ongoing negotiations are expected to achieve full co-location between the medical and regional healthcare teams.

The THP brings to light the ways in which a team of healthcare professionals endeavoured to integrate primary healthcare within one healthcare region. The catalysts and challenges they encountered are congruent with those cited in the literature (e.g., Halma et al. 2001; Shortell et al. 1993, 1994). Key elements of the model described in this paper, most notably the four enablers, helped healthcare professionals residing in one rural community to turn vision into reality.

Correspondence may be directed to: Robert Wedel, MD, Medical Director, Palliative Care, Chinook Health Region, 5016 – 48 Ave., Taber, AB T1G 1R8; tel.: 403-223-4652; e-mail: rwedel@telusplanet.net.

REFERENCES

Alberta Health and Wellness. 2002. *Alberta: Health First*. Alberta Government Response to the Premier's Advisory Council on Health. Building a Better Public Health Care System Report. Retrieved June 12, 2007. <http://www.health.gov.ab.ca/resources/health_first.htm>.

Beddome, G., H. Clarke and N. Whyte. 1993. "Vision for the Future of Public Health Nursing: A Case for Primary Health Care." *Public Health Nursing* 10: 13–18.

Blumenthal, S. and J. Kagen. 2002. "The Effects of Socioeconomic Status on Health in Rural and Urban America." *Journal of the American Medical Association* 287(1): 109.

Bushy, A. 1994. "When Your Client Lives in a Rural Area, Part 1: Rural Health Care Delivery Issues." *Issues in Mental Health Nursing* 15(3): 253–66.

Chinook Health Region (CHR). 2004 (August). *Community Perspectives* 2: 1. Retrieved June 12, 2007. <http://www.chr.ab.ca/about_chr/2001CNPass.pdf>.

Grol, R. and J. Grimshaw. 2003. "From Best Evidence to Best Practice: Effective Implementation of Change in Patients' Care." *Lancet* 362(9391): 1225–30.

Halma, L., C. Mitton, C. Donaldson and B. West. 2001. "A Case Study on Priority Setting in Rural Southern Alberta: Keeping the House from Blowing In." *Canadian Journal of Rural Medicine* 9(1): 26–36.

Korabek, B., P. Rosenau, C. Slauenwhite and L. Ross. 2004. "Home Care/Physician Partnerships in the Community: A Canadian Model in Development." *Home Health Care Management & Practice* 16(4): 261–68.

Litaker, D., L. Mion, L. Planavsky, C. Kippes, N. Mehta and J. Frolkis. 2003. "Physician–Nurse Practitioner Teams in Chronic Disease Management: The Impact on Costs, Clinical Effectiveness, and Patients' Perception of Care." *Journal of Interprofessional Care* 17(3): 223–37.

Mazankowski, D., M. Abdurahman, L. Bryan, L. Cranston, B.L. Crowley, L. Douglass, J. Evans, J.D. Graham, M.D. Low, K. Nickersen, A. O'Brien and E. Smith. 2001 (December). *A Framework for Reform: Report of the Premier's Advisory Council of Health.* Retrieved June 12, 2007. <http://web.uvic.ca/~schaafsm/Mazankowski_report.pdf>.

McKnight, J.L. and J.P. Kretzmann. 1996. *Mapping Community Capacity.* Evanston, IL: Institute for Policy Research Northwestern University.

Mechanic, D. 2003. "Physician Discontent: Challenges and Opportunities." *Journal of the American Medical Association* 290(7): 941–46.

Miller, R. and I. Sim. 2004. "Physicians' Use of Electronic Medical Records: Barriers and Solutions." *Health Affairs* 23(2): 116.

Raphael, D. 2004. *Social Determinants of Health: Canadian Perspectives.* Toronto: Canadian Scholar's Press.

Roland, M. 2004. "Linking Physicians' Pay to the Quality of Care – A Major Experiment in the United Kingdom." *New England Journal of Medicine* 351(14): 1448–54.

Romanow, R.J. 2002. *Building on Values: The Future of Health Care in Canada. Final Report of the Commission on the Future of Health Care in Canada.* Retrieved June 12, 2007. <http://www.hc-sc.gc.ca/english/pdf/romanow/pdfs/HCC_Final_Report.pdf>.

Shortell, S.M., R.R. Gillies and D. Anderson. 1994. "The New World of Managed Care: Creating Organized Delivery Systems." *Health Affairs Chevy Chase* 13(5): 46–65.

Shortell, S.M., R.R. Gillies, D.A. Anderson, J.B. Mitchell and K.L. Morgan. 1993. "Creating Organized Delivery Systems: The Barriers and Facilitators." *Hospital and Health Services Administration* 38(4): 447–66.

Stanfield, R.B., ed. 2000. "Leading a Focused Conversation: A Summary." *The Art of Focused Conversation: 100 Ways to Access Group Wisdom in the Workplace* (pp. 203–6). Toronto: Canadian Institute for Cultural Affairs.

Starfield, B. and L. Shi. 2002. "Policy Relevant Determinants of Health: An International Perspective." *Health Policy* 60: 201–18.

Zuger, A. 2004. "Dissatisfaction with Medical Practice." *New England Journal of Medicine* 350(1): 69–73.

RESEARCH PAPER

Education Level, Income Level and Mental Health Services Use in Canada: Associations and Policy Implications

Niveau de scolarité, niveau de revenu et utilisation des services de santé mentale au Canada : répercussions sur les associations et les politiques

by LEAH S. STEELE, MD, PHD
Assistant Professor, Department of Family and Community Medicine
University of Toronto and St. Michael's Hospital
Toronto, ON

CAROLYN S. DEWA, MPH, PHD
Health Economist, Health Systems Research & Consulting Unit
Centre for Addiction and Mental Health
Associate Professor, Department of Psychiatry
University of Toronto
Toronto, ON

ELIZABETH LIN, PHD
Assistant Professor, Department of Psychiatry
University of Toronto
Research Scientist, Health Systems Research & Consulting Unit
Centre for Addiction and Mental Health
Toronto, ON

KENNETH L.K. LEE, BSC
Research Assistant, Health Systems Research & Consulting Unit
Centre for Addiction and Mental Health
Toronto, ON

Abstract

Background: Investigations of socio-economic gradients in mental health services use in Canada have used different measures of socio-economic status and have shown conflicting results. We explored the relationships between education level, income level and mental health services use among people with a mental illness using data from the Canadian Community Health Survey: Cycle 1.2.

Methods: We included adults who met the criteria for an anxiety or depressive disorder in the past 12 months (n=3,101). We calculated the likelihood of seeking mental healthcare from a psychiatrist, psychologist, family physician or social worker over a period of 12 months by education level.

Results: For each additional level of education, individuals were 15% more likely to see a psychiatrist, 12% more likely to see a family doctor, 16% more likely to see a psychologist and 16% more likely to see a social worker.

Discussion/Conclusion: We found marked inequity in mental health services use by education level that was consistent across service types. Programs aiming to deliver targeted services to consumers who have not completed high school should be developed and evaluated.

Résumé

Contexte : Les enquêtes sur les gradients socio-économiques dans l'utilisation des services de santé mentale au Canada ont utilisé différentes mesures du statut socio-économique et ont donné des résultats contradictoires. Nous avons exploré les relations entre le niveau de scolarité, le niveau de revenu et l'utilisation des services de santé mentale chez les personnes atteintes d'une maladie mentale en utilisant les données de l'Enquête sur la santé dans les collectivités canadiennes : Cycle 1.2.

Méthodes : Nous avons inclus des adultes qui répondaient aux critères de troubles anxieux ou dépressifs au cours des 12 derniers mois (n=3,101). Nous avons calculé la probabilité de chercher des soins de santé mentale auprès d'un psychiatre, d'un psychologue, d'un médecin de famille ou d'un travailleur social sur une période de douze mois, selon le niveau de scolarité.

Résultats : Pour chaque niveau de scolarité supplémentaire, les répondants étaient 15 % plus susceptibles de consulter un psychiatre, 12 % plus susceptibles de s'adresser à un médecin de famille, 16 % plus susceptibles de faire appel à un psychologue et 16 % plus susceptibles de recourir à un travailleur social.

Discussion/Conclusion : Nous avons constaté d'importantes inégalités dans l'utilisation des services de santé mentale par niveau de scolarité, et ces inégalités étaient constantes dans tout le secteur des services. On devrait élaborer et évaluer des programmes visant à fournir des services ciblés aux consommateurs qui n'ont pas terminé leurs études secondaires.

Background

Mental and behavioural disorders are common, universal and disabling. The economic burden of mental illness places it among the costliest conditions in Canada. Stephens and Joubert (2001) estimated the direct and indirect costs of depression and distress to be over 14 billion dollars. Recent Canadian data have shown that 4.9% of Canadians have met the criteria for an affective disorder in the past 12 months, and 4.7% have met the criteria for an anxiety disorder in the past 12 months (Statistics Canada 2003). Despite the availability of effective treatments, the majority of individuals with mental illness do not receive any mental healthcare. Of those individuals with a mental disorder in the past year, only 32% spoke to a health professional about their symptoms (Statistics Canada 2003). This low rate of symptom disclosure to mental health professionals illuminates an area of significant opportunity to improve the dissemination of effective treatments to those in need.

Mental health is not equally distributed across socio-economic strata. Decades of evidence has consistently shown that the lower one's socio-economic status the greater the likelihood of having a major psychiatric disorder (Dohwenrend 1990). In North America, anxiety and depressive disorders are about twice as common in low-income and low-education groups relative to high-income and high-education groups (Alegria et al. 2000; Wang 2000). If our universal healthcare coverage system were successful in distributing healthcare according to need, we would expect rates of mental healthcare use to be highest in the lowest socio-economic status groups. However, this does not appear to be the case. Data from self-reported community surveys have shown higher rates of specialty mental health services use in individuals with high education levels and no significant differences by income level (Starkes et al. 2005; Valiadis et al. 2005; Alegria et al. 2000; Katz et al. 1997). Administrative data have shown higher rates of use by residents in both higher-education and higher-income neighbourhoods

(Tataryn et al. 1994; Steele et al. 2005, 2006). This evidence supports the claim that the gap between need for mental health services and their use is greatest for individuals who belong to lower socio-economic groups. Moreover, this evidence indicates that income and education differ importantly in their associations with services use, particularly when these variables are measured at the individual level.

Income and education may act differently upon rates of service use by the type of mental health services examined. Across Canada, physician-provided mental healthcare is fully covered by our universal healthcare coverage system. This is not the case for psychologists, social workers or other mental health counsellors. While some psychologists are employed in hospitals or other specialized programs, almost 80% of consultations with psychologists occur within the private rather than the public system (Romanow 2003). On the other hand, social workers are primarily employed by public institutions, with only a minority working in private practice (CASW 2000). It is possible that our current mental health system mitigates income barriers for MD-provided healthcare and care provided by social workers, but not for psychologists. We would not expect universal healthcare coverage to mitigate barriers that are associated with low education levels.

Despite the complex relationship between income, education and service use, many health services studies use income level alone as a proxy for socio-economic status (Krieger et al. 1997). The current study aims to update and explore the question of socio-economic disparities in mental health services use by sector, with particular emphasis on the relationships between individual educational attainment, income level and services use. These relationships have importance for policy makers and program planners who seek to improve equity in mental health services delivery by targeting services to specific high-risk groups.

Methods

Data were drawn from the Canadian Community Health Survey (CCHS) 1.2, a national population-based survey of 33,000 Canadians conducted in 2002 that was designed to gather cross-sectional health data on a representative sample of Canadians (Gravel and Beland 2005). Sampling for the CCHS was based on the standard area probability frame that Statistics Canada employs for the majority of its population surveys. The frame includes the entire country with the exception of the northern territories, individuals living on Indian Reserves or in institutions and full-time Canadian Armed Forces personnel (Gravel and Beland 2005). Provinces and regions within provinces were stratified, and household clusters within strata were identified. Sample selection was based on the random selection of one individual from randomly selected households within these household clusters (Gravel and Beland 2005). The sample we used was composed of CCHS respondents over the age of 17 years. Structured inter-

view modules were drawn from the most recent Composite International Diagnostic Interview (Gravel and Beland 2005). Two broad categories of psychiatric disorders were assessed: anxiety disorders (panic disorder, social phobia and agoraphobia) and affective disorders (manic episode and major depressive episode). In the current analysis, we limited our sample to those 3,101 adult respondents (8.3%) who met the criteria for any anxiety or affective disorder in the past 12 months.

Mental health services use

Our primary dependent variables described whether there was any service use in the past 12 months. Respondents were asked "think of the psychiatrist (a) / family doctor (b) / psychologist (c) /social worker, counsellor or psychotherapist (d) you talked to the most often during the past 12 months. How many times did you see, or talk on the telephone to, this person (about your emotions, mental health or use of alcohol or drugs)?" The dichotomous variables (a–d) were coded "yes" if the response was "1 or more," "no" if the response was "not applicable" and "missing" if the response was "don't know," "refusal" or "not stated." We conducted separate analyses for the following four service sectors: (a) psychiatrists, (b) family doctors, (c) psychologists and (d) counsellors, including social workers and psychotherapists.

Independent variables

We used a 10-level education variable as a proxy for a continuous number of years of education variable. The scale ranged from 1 (grade 8 education or less) to 10 (post-graduate degree or certificate). A score of three or less indicated less than a high school education. We created a continuous income variable that we adjusted for household size using the indirect method of standardization (Kelsey 1996). We included other independent variables based on their potential to confound the relationship between income, education and services use. We created dummy variables for respondents' sex, marital status (married/common-law vs. widowed/separated/divorced/single), immigration status (country of birth other than Canada) and place of residence (rural vs. urban). We used a continuous age variable. A binary employment variable indicated whether the respondent had worked at a job or business at any time in the past year. We used respondents' scores on the Kessler Psychological Distress (K10) scale for a continuous measure of symptom severity ranging from 0 to 40. This scale consists of 10 items related to levels of anxiety or depressive symptoms that an individual may have experienced in the most recent four-week period (Kessler et al. 2003).

Because our initial analyses found that place of residence was not significant for any analysis in any sector, we have excluded that variable from the final analyses.

Analyses

We used logistic regression to determine the relationships between income, education and mental health services use adjusting for age, sex, employment status, marital status, immigration status and distress level. Separate regressions were conducted for service use from each of the four service sectors. To further explore the interrelationships between education level, income level and mental health services use, we added an education-income interaction term to our original analyses.

The confidence intervals (CI) for our estimates were determined using the bootstrap re-sampling program that is employed by Statistics Canada (Statistics Canada 2003). This method involves the repeated selection with replacement of simple random samples from each stratum and the recalculation and post-stratification of weights (to demographic information) for each stratum. The bootstrap variance estimator is the standard deviation of the point estimates calculated for each of 500 samples using the bootstrap weights.

Results

Demographic characteristics are described in Table 1. Compared to the entire Canadian sample of the CCHS 1.2, individuals with an anxiety or affective disorder were less likely to be immigrants and were more likely to be younger, female, lower-income and not partnered than Canadians in general. In the past 12 months, 14.8% of the study sample had visited a psychiatrist, 33.2% had visited a family doctor, 10.1% had visited a psychologist and 11.3% had visited a social worker to discuss a mental health issue.

The results of the logistic regression are shown in Table 2. For each additional level of education, individuals were 15% more likely to see a psychiatrist, 12% more likely to see a family doctor, 16% more likely to see a psychologist and 16% more likely to see a social worker. When we repeated these analyses with an income–education interaction term, the interaction term was not significant for any sector.

Discussion

Among people with a diagnosis of an anxiety or affective disorder during the past year, we have found a marked association between educational status and the likelihood of having sought mental health services. In every service sector, individuals with higher education levels were more likely to receive services than individuals with lower education levels. Household income did not independently predict mental health services use.

The data from this study were derived from the first national Canadian survey to conduct structured diagnostic interviews on a large representative sample of Canadians. The psychiatric measures have been well validated and widely used internationally. One

limitation of the study relates to the accuracy of self-reported mental health services use. Past studies comparing self-reported mental health services use to administrative data have shown that in depressed individuals, higher levels of distress are associated with overreporting of psychiatric services (Rhodes et al. 2004). Since distress levels were highest in the groups that reported the least care, we would expect any recall bias to be towards the null hypothesis. Moreover, overreporting is much more likely to occur in analyses that report the number of visits. We have limited our analyses to a binary outcome (did or did not see a service provider), which is less likely to be inaccurately reported than a continuous measure of visit frequency (Rhodes et al. 2004).

TABLE 1. Demographic characteristics

	Total population of Canadian adults % or mean (95% CI)	Sample of Canadians with an affective or anxiety disorder % or mean (95% CI)
Mean age	45.6 (45.4–45.7)	40.3 (39.6–41.0)
% female	51.0 (50.9–51.1)	62.1 (59.6–64.4)
% married/common-law	65.3 (64.7–65.9)	50.0 (47.4–52.6)
% immigrant	22.8 (22.1–23.5)	15.6 (13.5–17.7)
Mean distress score	5.3 (5.2–5.3)	13.4 (13.0–13.8)
% not employed	23.4 (22.8–24.0)	25.5 (23.3–27.6)
% no high school diploma	21.9 (21.3–22.6)	22.2 (20.1–24.4)
Mean education level (1–10)	5.4 (5.4–5.4)	5.3 (5.2–5.4)
Mean adjusted income ($1,000)	64.1 (63.3–65.0)	56.6 (54.2–59.0)
% had psychiatrist visit	2.0 (1.8–2.2)	14.8 (13.1–16.5)
% had FP/GP mental health visit	5.4 (5.0–5.7)	33.2 (30.6–35.8)
% had psychologist visit	1.9 (1.7–2.1)	10.1 (8.6–11.6)
% had social worker visit	2.1 (1.9–2.4)	11.3 (9.7–12.9)
Affective disorder	5.2 (4.9–5.5)	63.1 (60.5–65.7)
Anxiety disorder	4.6 (4.3–4.9)	57.4 (54.7–60.0)
Either an affective or an anxiety disorder	8.5 (8.1–8.9)	100.00

We limited our analyses to individuals who met criteria for an anxiety or affective disorder. These individuals are different from the general population in that they are

more likely to be female, single, Canadian-born and low-income. Consequently, our results should not be generalized to individuals without an anxiety or affective disorder.

TABLE 2. Logistic regression for mental health services use by individuals with an anxiety or depressive disorder (odds ratio and 95% CIs)

Variables	Psychiatrist	Family doctor	Psychologist	Social worker
High school diploma	**1.15 (1.08–1.23)**	**1.12 (1.06–1.19)**	**1.16 (1.07–1.26)**	**1.16 (1.07–1.26)**
Higher income	1.00 (1.00–1.00)	1.00 (1.00–1.00)	1.00 (1.00–1.00)	1.00 (1.00–1.00)
Female	0.82 (0.58–1.17)	**1.50 (1.16–1.93)**	0.86 (0.57–1.30)	1.40 (0.98–2.00)
Age	1.01 (1.00–1.02)	**1.02 (1.01–1.03)**	1.00 (0.98–1.02)	1.00 (0.991–1.02)
Immigrant	0.75 (0.45–1.23)	0.66 (0.43–1.00)	**0.39 (0.17–0.88)**	0.61 (0.30–1.24)
Distress	**1.09 (1.07–1.12)**	**1.06 (1.05–1.08)**	**1.05 (1.02–1.07)**	**1.03 (1.01–1.05)**
Employed	**0.63 (0.42–0.94)**	1.03 (0.74–1.44)	0.86 (0.52–1.43)	0.97 (0.62–1.53)
Married/ Common-law	**0.80 (0.42–0.94)**	0.84 (0.66–1.08)	**0.61 (0.42–0.88)**	**0.66 (0.46–0.97)**

Bolded results are significant at $p<0.05$.

Our finding that individual income level is not independently associated with mental health services use is consistent with the results of previous Canadian studies that have used community survey data. However, this finding does not replicate the income–use associations that have been seen in studies that have used administrative data. The reason for this difference may be that income level has importance at the neighbourhood level only, or that neighbourhood income is a proxy for another variable that we do not capture with individual-level income, such as social capital. A multi-level approach to the question of income gradients in mental health services use would be a valuable next step.

This study supports the primacy of education among the socio-economic factors that might enable mental healthcare use. From this study, we cannot ascertain whether these gradients are patient-driven, with more highly educated individuals more likely to seek care, or provider-driven, with more highly educated individuals being considered more suitable for mental healthcare. Indeed, the causes of inequity are likely to be multi-faceted and may differ by sector. For example, visits to family physicians are usually patient-initiated, so barriers to mental healthcare service use from this sector might be largely patient-based. In a growing literature on mental health literacy, educa-

tion has been identified as a significant factor associated with insight into symptoms of mental disorders and attitudes towards treatment (Yen et al. 2005). Lower levels of insight into the significance of emotional symptoms may make less well-educated individuals less likely than educated individuals to bring up mental health issues with their family physicians. Initial appointments with mental health specialists often require referrals from family physicians. In the specialty sector, inequitable access to care might be influenced by disparities in rates of referral by family physicians for patients with different levels of educational attainment. Patient factors that might be correlated with low education could affect family physicians' propensity to refer to psychiatric care. For example, family physicians may question the benefit of counselling therapies for patients who lack verbal communication skills or who do not demonstrate a high level of mental health literacy. It might also be the case that family physicians have difficulty finding appropriate psychiatric care for marginalized groups, such as those with low literacy (Craven et al. 1997).

Depressed or anxious individuals without high school diplomas have lower rates of mental health services use than individuals who have finished high school.

In sum, this study provides clear evidence that the Canadian system of universal healthcare coverage for MD-provided mental healthcare and the fragmented system of allied mental health services provision are inadequate for the equitable distribution of mental health services to those in need. Depressed or anxious individuals without high school diplomas have lower rates of mental health services use than individuals who have finished high school. While educational attainment is often adjusted for in evaluations of mental health interventions, variation in the effectiveness of mental health service interventions (such as cognitive behavioural therapy) by education level has not been examined. This is an area that could be of interest to clinicians who seek to expand their delivery of services to lower-education groups. Programs that are meant to improve the delivery of services to marginalized groups should be aware of the importance of clients' education levels in predicting the receipt of mental health services.

Future studies on the appropriateness of mental health treatment and outreach services for low-education groups would be helpful. Similarly, research on the mechanisms through which education level mediates help-seeking and services use might illuminate the best approach for improving the dissemination of effective treatments.

Future research will help reveal whether adaptations to our approach to services delivery for low-education groups should occur in clinical practice, in our outreach and education efforts at the broader health system level or using a multi-level approach.

Correspondence may be directed to: Dr. Leah Steele, Health Systems Research and Consulting Unit, CAMH-ARF site, 33 Russell St., 3rd Floor Tower, Toronto, Ontario, M5S 2S1. Tel: 416-535-8501 X6081. Fax: 416-979-4703. E-mail: leah_steele@camh.net.

ACKNOWLEDGMENTS

For this study, we received approval from the Research Ethics Board of the Centre for Addiction and Mental Health. This study was funded by a grant from the Ontario Mental Health Foundation. Dr. Steele is supported as a research scholar by the Department of Family Medicine at St. Michael's Hospital and the University of Toronto. Drs. Dewa and Steele are supported as career scientists by the Ontario Ministry of Health and Long-Term Care. The opinions, results and conclusions are those of the authors, and no endorsement by the Ministry is intended or should be inferred.

REFERENCES

Alegria, M., R.V. Bijl, E. Lin, E.E. Walters and R.C. Kessler. 2000. "Income Differences in Persons Seeking Outpatient Treatment for Mental Disorders: A Comparison of the United States with Ontario and the Netherlands." *Archives of General Psychiatry* 57(4): 383–91.

Canadian Association of Social Work (CASW). 2000. *In Critical Demand: Social Work in Canada*. Volume 1. Final Report. Ottawa: Author.

Canadian Association of Social Work (CASW). 2002. *In Critical Demand: Social Work in Canada*. Volume 1. Final Report. Ottawa: Author.

Craven, M.A., M. Cohen, D. Campbell, J. William and N. Kates. 1997. "Mental Health Practices of Ontario Family Physicians: A Study Using Qualitative Methodology." *Canadian Journal of Psychiatry* 42(9): 943–49.

Dohrenwend, B.P. 1990. "Socioeconomic Status (SES) and Psychiatric Disorders: Are the Issues Still Compelling?" *Social Psychiatry & Psychiatric Epidemiology* 25(1): 41–47.

Gravel, R. and Y. Beland. 2005. "The Canadian Community Health Survey: Mental Health and Well-Being." *Canadian Journal of Psychiatry* 50(10): 573–79.

Katz, S.J., R.C. Kessler, R.G. Frank, P. Leaf and E. Lin. 1997. "Mental Health Care Use, Morbidity, and Socioeconomic Status in the United States and Ontario." *Inquiry* 34(1): 38–49.

Kelsey, J.L., A.S. Whittemore, A.S. Evans et al. 1996. *Methods in Observational Epidemiology* (2nd ed.). New York: Oxford University Press.

Kessler, R.C., P.R. Barker, L.J. Colpe, J.F. Epstein, J.C. Gfroerer, E. Hiripi, M.J. Howes, S.L. Normand, R.W. Manderscheid, E.E. Walters and A.M. Zaslavsky. 2003. "Screening for Serious Mental Illness in the General Population." *Archives of General Psychiatry* 60(2): 184–89.

Krieger, N., D.R. Williams and N.E. Moss. 1997. "Measuring Social Class in US Public Health Research." *Annual Review of Public Health* 18: 341–78.

Rhodes, A.E. and K. Funk. 2004. "Self-reported Use of Mental Health Services versus Administrative Records: Care to Recall." *International Journal of Methods in Psychiatric Research* 13(3): 165–75.

Romanow, R.J. and G.P. Marchildon. 2003. "Psychological Services and the Future of Health Care in Canada." *Canadian Psychology* 44(4): 283–95.

Starkes, J.M., C.C. Poulin and S.R. Kisely. 2005. "Unmet Need for the Treatment of Depression in Atlantic Canada." *Canadian Journal of Psychiatry* 50(10): 580–90.

Statistics Canada. 2000 (June 12). "Family Income." *The Daily*. Retrieved June 12, 2007. <http://www.statcan.ca/Daily/English/000612/d000612a.htm>.

Statistics Canada. 2003 (September 3). "Canadian Community Mental Health Survey – Mental Health and Wellbeing." *The Daily*. Retrieved June 12, 2007. <http://www.statcan.ca/english/sdds/5015.htm>.

Steele, L.S., R.H. Glazier, E. Lin, P.C. Austin and C.M. Mustard. 2005. "Measuring the Effect of a Large Reduction in Welfare Payments on Mental Health Service Use in Welfare-Dependent Neighborhoods." *Medical Care* 43(9): 885–91.

Steele, L.S., R.H. Glazier and E. Lin. 2006. "Inequity in Mental Health Care under Canadian Universal Health Coverage." *Psychiatric Services* 57(3): 317–24.

Stephens, T. and N. Joubert. 2001. "The Economic Burden of Mental Health Problems in Canada." *Chronic Diseases in Canada* 22(1): 18–23.

Tataryn, D., C.A.Mustard and S. Derksen. 1994. "The Utilization of Medical Services for Mental Health Disorders. Manitoba: 1991–1992." Winnipeg: Manitoba Centre for Health Policy and Evaluation.

Vailiadis, H.M., A. Lesage, C. Adair and R. Boyer. 2005. "Service Use for Mental Health Reasons: Cross-Provincial Differences in Rates, Determinants and Equity of Access." *Canadian Journal of Psychiatry* 50(10): 614–19.

Wang, P.S., P.A. Berglund and R.C. Kessler. 2000. "Recent Care of Common Mental Disorders in the United States: Prevalence and Conformance with Evidence-Based Recommendations." *Journal of General Internal Medicine* 15: 284–92.

Yen, C.F., C.C. Chen, Y. Lee, T.C. Tang, C.H. Ko and J.Y. Yen. 2005. "Insight and Correlates among Outpatients with Depressive Disorders." *Comprehensive Psychiatry* 46(5): 384–89.

Full Text Online

Influencing Drug Prices through Formulary-Based Policies: Lessons from New Zealand

Influencer les prix des médicaments d'ordonnance grâce à des politiques axées sur les formulaires : leçons apprises de la Nouvelle-Zélande

STEVE MORGAN, GILLIAN HANLEY, MEGHAN MCMAHON AND MORRIS BARER

Abstract

A national formulary has been proposed as a priority element of Canada's National Pharmaceuticals Strategy. We review a variety of formulary-based policies that might be used in conjunction with a national formulary, drawing on the policies and practices of the Pharmaceutical Management Agency of New Zealand. We consider the potential price impact of an actively managed national formulary by conducting a Canada–New Zealand price comparison for equivalent products in the four largest drug classes: statins, angiotensin-coverting enzyme (ACE) inhibitors, selective serotonin reuptake inhibitors (SSRIs) and proton pump inhibitors (PPIs). The results suggest that potential price savings for Canada in these drug classes are on the order of 21% to 79%. Such price differences would translate into billions of dollars in annual savings if applied across Canada, potentially offsetting the costs of the expansion of pharmacare coverage necessary to achieve both equity and efficiency goals in this sector.

Résumé

Un formulaire national a été proposé comme élément prioritaire de la Stratégie nationale relative aux produits pharmaceutiques du Canada. Nous examinons une variété de politiques axées sur des formulaires, qui pourraient être utilisées conjointement avec un formulaire national, puisant dans les politiques et les pratiques de la Pharmaceutical Management Agency de Nouvelle-Zélande. Nous examinons l'incidence potentielle, sur les prix, d'un formulaire national géré de façon active en effectuant une comparaison des prix entre le Canada et la Nouvelle-Zélande pour des produits équivalents dans les quatre plus importantes catégories de médicaments : les statines, les inhibiteurs ECA, les inhibiteurs spécifiques du recaptage de la sérotonine et les IPP. Les résultats suggèrent que le Canada pourrait réaliser des économies de l'ordre de 21 à 79 % pour ces catégories de médicaments. De telles différences de prix se traduiraient par des milliards de dollars d'économies annuelles si elles étaient

appliquées à l'échelle du Canada, ce qui suffirait potentiellement à couvrir les coûts d'extension de l'assurance-médicaments nécessaire pour réaliser des gains d'équité et d'efficience dans ce secteur.

To view the full article, please visit
http://www.longwoods.com/product.php?productid=19142&cat=499&page=1

Full Text Online

The Magnitude, Share and Determinants of Private Costs Incurred by Clients (and Their Caregivers) of In-home Publicly Financed Care

Ampleur, proportion et déterminants des coûts privés engagés par les clients (et leurs aidants naturels) recevant des soins à domicile financés par l'État

VIVIAN W. LEONG, DENISE N. GUERRIERE, RUTH CROXFORD AND PETER C. COYTE

Abstract

Home-based health services remain one of the fastest-growing sectors in the Canadian healthcare system. While there have been studies addressing the characteristics of home care users and the determinants of utilization, the costs associated with the use of home care services, particularly private costs, have been largely neglected. To gain a comprehensive appreciation of the financing context in which ambulatory and home-based care is delivered and received, it is imperative to assess costs incurred by clients and their family/friends. Accordingly, this study examined the magnitude and determinants of the share of private costs incurred by Ontarians who received in-home publicly financed services and by their unpaid caregivers. The private share of costs was found to be 75%. Determinants of the private share included participants' gender, martial status, functioning in activities of daily living and the type and length of service received. These findings suggest that recipients of home-based health services in Ontario may bear an economic burden when care is shifted into the home setting.

Résumé

Les services de santé à domicile demeurent un des secteurs du système de soins de santé canadien qui connaît la croissance la plus rapide. Tandis que des études ont été effectuées sur les caractéristiques des prestataires de soins à domicile et les déterminants de l'utilisation, les coûts associés à l'utilisation des services de soins à domicile – en particulier les coûts privés – ont été en grande partie négligés. Afin de mieux

apprécier le contexte de financement dans lequel les soins ambulatoires et les soins à domicile sont fournis et reçus, il est absolument essentiel d'évaluer les coûts défrayés par les clients et leurs aidants naturels (parents et amis). Par conséquent, cette étude a examiné l'ampleur et les déterminants de la proportion des coûts privés engagés par les Ontariens qui ont reçu des soins à domicile financés par l'État et par leurs aidants naturels non rémunérés. On a constaté que la part privée des coûts s'élevait à 75 %. Parmi les déterminants de la part privée, citons le sexe des clients, leur état civil, leur degré de participation aux activités de la vie quotidienne, ainsi que le type et la durée des services reçus. Ces résultats suggèrent que les personnes qui reçoivent des soins de santé à domicile en Ontario pourraient avoir à assumer un fardeau financier lorsque ces soins sont transférés à domicile.

To view the full article, please visit
http://www.longwoods.com/product.php?productid=19143&cat=499&page=1

Full Text Online

Integrating Public Health and Primary Care
Intégrer la santé publique et les soins primaires

MARGO STEVENSON ROWAN, WILLIAM HOGG AND PATRICIA HUSTON

Abstract

Purpose: Improved health and social outcomes would be possible with better coordination and collaboration between public health and primary care. The purpose of this study is to identify linkages between these health sectors with the aim of informing a forward-looking policy approach to integrate public health functions in primary care.

Methods: We searched national and international journals and the grey literature for relevant papers and reports published from January 1999 to December 2003. The final set of documents provided broad coverage of the topic, with emphasis on national and international representation and a special focus on disease surveillance, health promotion, accident and illness prevention and chronic diseases.
Results: Three main findings emerged from this study. First, there is a need to understand and clearly articulate the roles and functions of public health and primary care in Canada. Second, the main areas of overlap between these sectors are health surveillance, health promotion and prevention of disease and injury. Third, based on an international literature search, we identified 10 models that demonstrate how these sectors can be integrated; five of them were developed in Canada.

Conclusions: National and international evidence and a variety of working models support the integration of public health functions in primary care. Canada has been a leader in developing models of integrated health systems that combine individualized approaches to influence personal health behaviour and community approaches to influence the health of the population. These integration models could be further developed through a focus on the common need of primary care and public health to address the health implications of the ever-present risk of emerging infectious diseases in Canada.

Résumé

Objectif : Il y aurait possibilité d'amélioration sur le plan social et de la santé si une meilleure coordination et une plus grande collaboration entre les domaines de la santé publique et des soins primaires existaient. Le but de cette étude est de cerner les liens entre ces secteurs afin de contribuer à l'élaboration d'une approche progressiste d'intégration des pratiques de santé publique dans les soins primaires.

Méthode : Nous avons effectué des recherches dans des revues nationales et internationales et dans la littérature grise pour repérer des articles et des rapports pertinents publiés entre janvier 1999 et décembre 2003. Le groupe de documents retenus offrait une excellente vue d'ensemble du sujet, avec un accent sur la représentation nationale et internationale et une attention particulière à la surveillance des maladies, à la promotion de la santé, à la prévention des accidents et des maladies et aux maladies chroniques.

Résultats : Trois principales conclusions se sont dégagées de cette étude. Tout d'abord, il y a un besoin de comprendre et de définir clairement les rôles et les fonctions dans les domaines de la santé publique et des soins primaires au Canada. Deuxièmement, les principaux points de chevauchement entre ces secteurs sont la surveillance des maladies, la promotion de la santé et la prévention des accidents et des maladies. Troisièmement, à la suite d'une analyse de la documentation internationale, nous avons repéré dix modèles d'intégration de ces secteurs, dont cinq ont été élaborés au Canada.

Conclusions : Des preuves nationales et internationales et une variété de modèles fonctionnels appuient l'intégration des pratiques de santé publique dans les soins primaires. Le Canada a joué un rôle de chef de file dans l'élaboration de modèles de systèmes de santé intégrés qui combinent des approches individualisées visant à influencer les comportements personnels liés à la santé, d'une part, et des approches communautaires axées sur la santé de la population, de l'autre. Il serait possible de développer davantage ces modèles d'intégration en se concentrant sur les besoins

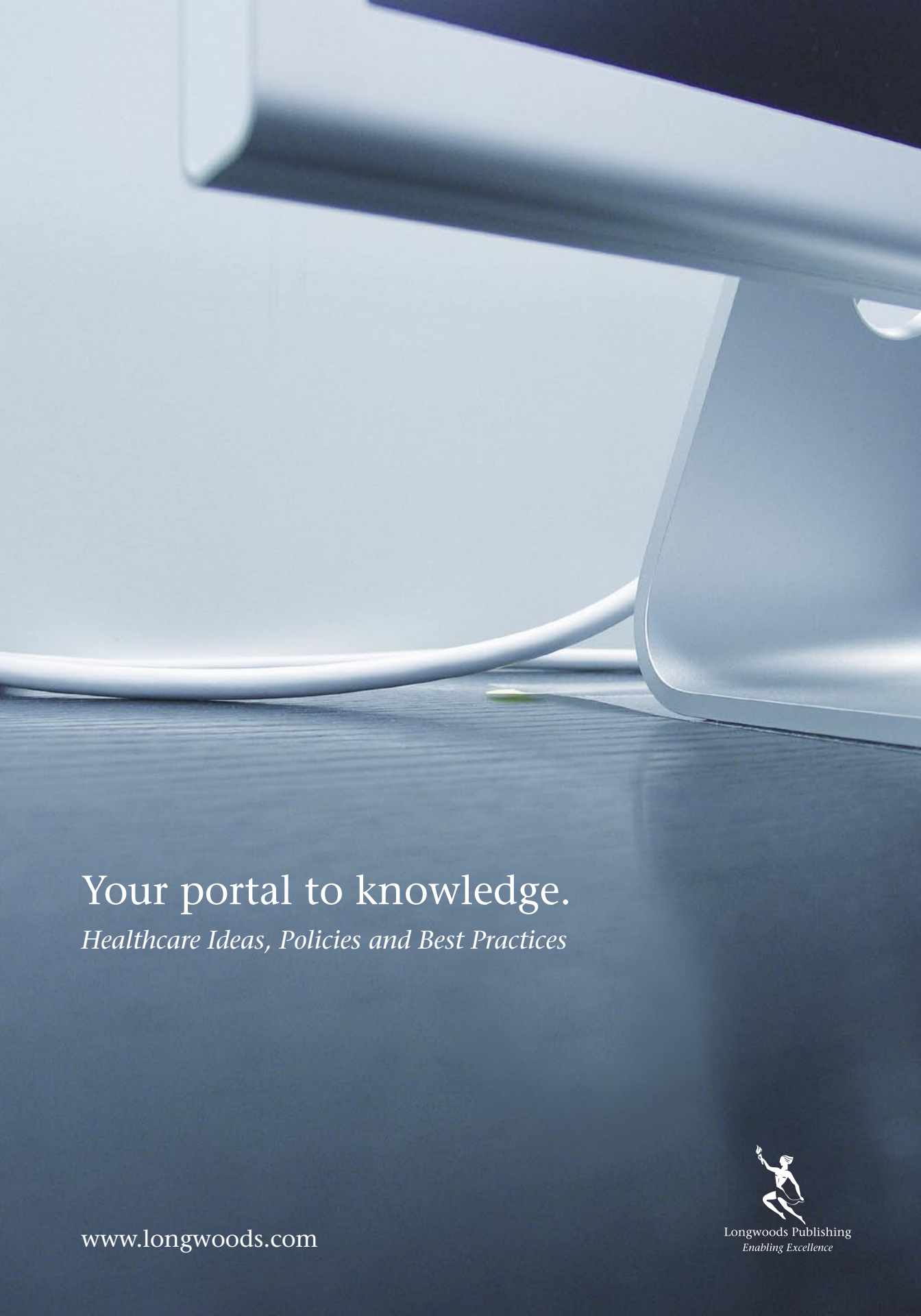
communs des secteurs de la santé publique et des soins primaires, afin de faire conjointement face aux répercussions, pour la santé, du risque toujours présent de l'émergence de nouvelles maladies infectieuses au Canada.

To view the full article, please visit
http://www.longwoods.com/product.php?productid=19144&cat=499&page=1

Sign up to have the table of contents e-mailed to your inbox each time a new issue comes online.

www.longwoods.com/emails

Visit the Healthcare Policy home page and enter your email address.


Your portal to knowledge.
Healthcare Ideas, Policies and Best Practices
www.longwoods.com
Longwoods Publishing
Enabling Excellence

Policy is always in the making. This journal is designed to serve readers from diverse backgrounds including health system managers, practitioners, politicians and their administrators, educators and academics. Our authors come from a broad range of disciplines including social sciences, humanities, ethics, law, management sciences and knowledge translation. They want good policy – a foundation for best practices.

www.healthcarepolicy.net