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Services de santé, gestion et recherche de politique

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Knowledge Translation, Linkage and Exchange

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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.

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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.

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EDITORIAL

High-Performance Healthcare: Access and Quality

Volumes have been written about the importance of access to high-quality healthcare, and hundreds – perhaps thousands – of speeches have been made on the topic. Access is also one of the key drivers of health reform efforts in Canada and around the world, but the term means different things to different people. As the debates currently underway in the United States clearly show, not everyone places the same value on different dimensions of access.

This issue of *Healthcare Policy/Politiques de Santé* features a number of papers that touch on different aspects of access to healthcare. Graham J. Reid and colleagues measure the proportion of people living in southwestern Ontario who do not have a regular family physician, and explore where these people tend to seek care when they need it. For those who do have a family doctor, Michelle Howard and Glen E. Randall examine access to care outside regular office hours – specifically, the instructions that patients receive when they telephone their family physician's practice after hours.

Whether you have a regular family physician or not, socio-cultural, financial and other aspects of access to healthcare are also important. For example, Alice W. Chen and her co-authors identify access to care as one factor that may drive differences in mental health diagnoses between recent Chinese immigrants and others in British Columbia. Likewise, Irfan A. Dhalla and colleagues investigate the potential effects of removing financial barriers to accessing medications after a hospital stay for a myocardial infarction.

Furthermore, the quality of care that you access matters, as several papers in this issue point out. For instance, Elizabeth F. Wenghofer and her colleagues explore the extent to which different factors affect the quality of care provided by family physicians, as measured through peer assessments conducted by their professional regulatory body. They find that the personal and professional characteristics of physicians are associated with quality, as are organizational and systemic factors. Moira Stewart and her co-authors take a different approach. Their paper focuses on the potential to use electronic medical records as a tool for improving practice, policy and research in primary healthcare, as well as the practical realities of establishing this infrastructure. Other papers in the journal profile lessons learned from efforts to promote action on women's health in

Ontario's health sector through performance measurement, public reporting of data on nursing home quality of care in the United States, and a collaborative education initiative related to dementia care and challenging behaviours in nursing homes.

In an odd coincidence of timing, I found myself re-reading the papers in this issue at the same time as I was myself accessing health services in a new way. I will shortly be travelling to Colombia and needed to check on vaccination requirements. Rather than going to my doctor's office, I initiated my first e-consult by sending my doctor information about my upcoming trip and previous vaccinations through a secure electronic portal. The message that I sent Sunday night was answered by 9:30 a.m. on Monday. Change to my current or future health status from the speed of the response: nil. Quality of the patient experience: superb. The fact that I needed no new shots: priceless.

I hope that the papers in this issue whet your appetite for more. Future issues of the journal will feature further insights into opportunities to improve access to care, its appropriateness and effectiveness, the patient experience and other dimensions of a high-performance health system. As in this issue, upcoming papers also explore how best to identify and spread such innovations throughout the health system. As President Obama said in his recent speech to the joint session of Congress, "I still believe we can act even when it's hard."[1] By building the evidence base about what works, why, and how, hopefully we can collectively make the path to change and improvement a little less steep. Watch this space.

JENNIFER ZELMER, BSC, MA, PHD
Editor-in-chief

NOTE

[1] http://www.whitehouse.gov/the_press_office/Remarks-by-the-President-to-a-Joint-Session-of-Congress-on-Health-Care/

Services de santé de rendement supérieur : accès et qualité

L'importance de l'accès à des services de santé de haute qualité a généré une abondante littérature et a inspiré des centaines, voire des milliers, de discours. La question de l'accès est un des moteurs principaux des initiatives de réforme en santé au Canada et dans le monde, mais le terme accès peut prendre un sens différent selon les gens. Tel que le montre le débat présentement en cours aux États-Unis, les divers aspects de l'accès n'ont pas la même valeur pour tous.

Ce numéro de *Politiques de Santé/Healthcare Policy* présente des articles qui portent sur différents aspects de l'accès aux services de santé. Graham J. Reid et ses collègues évaluent la proportion de résidents du sud-ouest ontarien qui n'ont pas accès à un médecin de famille régulier, et tentent de voir où ces gens cherchent à obtenir des services quand ils en ont besoin. Pour ceux qui ont déjà un médecin de famille, Michelle Howard et Glen E. Randall se penchent sur l'accès aux services en dehors des heures normales de travail; ils s'intéressent plus particulièrement aux directives proposées aux patients qui téléphonent leur clinique après les heures normales.

Que vous ayez ou non un médecin de famille habituel, les facteurs socioculturels, financiers ou autres ont aussi de l'importance pour ce qui est de l'accès aux services. Par exemple, Alice W. Chen et ses collègues considèrent l'accès aux services de santé comme un facteur qui peut expliquer les différences de diagnostique en santé mentale entre les immigrants chinois récents et les autres résidents de la Colombie-Britannique. Pour leur part, Irfan A. Dhalla et ses collègues examinent les effets potentiels du retrait des obstacles financiers pour l'accès aux médicaments, après un séjour à l'hôpital suite à un infarctus du myocarde.

La qualité des soins auxquels on accède est également une question importante, comme l'indiquent plusieurs articles de ce numéro. Par exemple, Elizabeth F. Wenghofer et ses collègues évaluent à quel point divers facteurs affectent la qualité des services offerts par les médecins de famille, tel qu'évalué par leur ordre professionnel. Ils ont découvert que les caractéristiques personnelles et professionnelles des médecins sont liées à la qualité, tout comme le sont les facteurs organisationnels et systémiques. Moira Stewart et ses collègues empruntent une démarche différente. Leur article se penche sur l'utilisation des dossiers médicaux informatisés comme outil pour améliorer la pratique, les politiques et la recherche en matière de soins de santé primaires. L'article se penche aussi sur les aspects pratiques liés à l'établissement d'une telle infrastructure. D'autres articles de ce numéro présentent les leçons tirées des initiatives suivantes : les efforts accomplis pour promouvoir la santé des femmes en Ontario grâce à la mesure du rendement; la diffusion publique des données sur la qualité dans les maisons de soins infirmiers aux États-Unis; et une initiative de collaboration pour

la formation liée aux soins pour les troubles de démence et les comportements difficiles dans les maisons de soins infirmiers.

Étrange coïncidence : au moment où je relisais les articles pour ce numéro, je faisais moi-même l'expérience d'une nouvelle forme d'accès aux services de santé. Je devais vérifier la mise à jour de mon carnet de vaccination pour un voyage que je ferai prochainement en Colombie. Au lieu d'aller au cabinet du médecin, j'ai procédé à ma première consultation médicale en ligne en envoyant au médecin les renseignements sur ma destination et mes vaccins antérieurs, au moyen d'un portail sécurisé. La réponse à mon message, envoyé un dimanche soir, est arrivée le lundi matin à 9 h 30. Répercussions de la vitesse de réponse sur mon état de santé actuel : aucune. Qualité de mon expérience en tant que patient : excellente. Savoir que je n'ai besoin d'aucun nouveau vaccin : formidable.

J'espère que les articles de ce numéro sauront aiguiser votre curiosité. Les prochains numéros de la revue présenteront d'autres pistes pour améliorer l'accès aux services ainsi que l'applicabilité, l'efficacité, l'expérience des patients et d'autres aspects liés à un système de santé de haut rendement. Comme dans ce numéro, les articles à venir exploreront également les meilleures façons de déterminer et de diffuser de telles innovations dans le système de santé. Comme l'a récemment affirmé le président Obama dans un discours devant le Congrès, « je demeure convaincu que nous pouvons agir même si cela sera difficile[1] ». En établissant peu à peu un fonds de données qui nous éclaire sur le fonctionnement, le pourquoi et le comment, nous pourrons ensemble dégager la route qui mènera vers le changement et l'amélioration. Restez attentifs.

JENNIFER ZELMER, BSC, MA, PHD
Rédactrice en chef

NOTE

[1] http://www.whitehouse.gov/the_press_office/Remarks-by-the-President-to-a-Joint-Session-of-Congress-on-Health-Care/

There's No Reason for It, It's Just Our Policy

Il n'y pas vraiment de raison, c'est simplement notre politique

by ROBERT G. EVANS

Abstract

On June 1, 2009 the town of McAllen, Texas, rose to brief prominence on the American political stage. With the highest (bar Miami) per-beneficiary costs in the entire US Medicare program, it was featured in an essay in *The New Yorker* by Atul Gawande, then seized upon by President Obama: "This is what we have to fix." Behind the headlines were decades of documentation of clinical practice and analysis of regional variations by John Wennberg, Elliott Fisher and their colleagues, and by Leslie and Noralou Roos and theirs. The implications for health systems were grasped over 30 years ago and have been confirmed by more recent work. Efforts to understand these variations within standard economic theory have, however, had limited success.

Résumé

Le 1er juin 2009, la ville de McAllen, Texas, a fait la manchette sur la scène politique aux États-Unis. Elle présentait les plus hauts coûts par bénéficiaire (mise à part Miami) du régime d'assurance-maladie (Medicare) aux États-Unis. Le cas de McAllen a fait l'objet d'un article écrit par Atul Gawande dans le New Yorker, puis a été repris par le président Obama comme exemple de ce qui « doit être corrigé ». Derrière ces grands titres, il y avait des années de documentation sur la pratique clinique et d'analyses sur les variations régionales effectuées par John Wennberg, Elliott Fisher et leurs collègues et par Leslie et Noralou Roos et leurs collègues.

Les implications pour le système de santé ont été dégagées il y a plus de 30 ans, puis confirmées par des travaux plus récents. Cependant, les tentatives pour comprendre ces variations dans le cadre des théories de l'économie ont connues bien peu de succès.

When my daughter was born in 1966, mother and baby spent five days at the Boston Lying-in Hospital – standard for an uncomplicated delivery. Had I gone, in 1964, to Berkeley instead of Harvard, they would have stayed three days. This east–west differential was well known, and there was no evidence of poorer outcomes in the Bay area. The potential for savings in bed-days and money in the Boston hospital system were obvious – normal deliveries were the largest single category of admissions. But no one in authority seems to have taken any interest. Their priorities were elsewhere: scrambling for the serious federal money beginning to flow from the new Medicare and Medicaid programs.

Forty years on, geographic variations in health services use have a somewhat higher profile in the United States. Atul Gawande (2009), writing in *The New Yorker*, has just provided an example of "knowledge transfer" beyond the wildest dreams of other health services researchers. His essay on the remarkable state of health services in McAllen, Texas, an otherwise ordinary town on the Mexican border, was immediately seized upon by President Obama and put before his staff and leading congressional Democrats: "This is what we've got to fix" (Pear 2009).

McAllen has the second-highest per capita Medicare expenditures of any region in the United States, nearly double the national average and double those in the very similar town of El Paso, farther along the border.[1] It provides an arresting snapshot, from the broader picture, of very large regional variations in use and costs that are unrelated either to patient needs or to health outcomes. Gawande's conversations with local doctors turned up the usual suspects – sicker patients, better-quality care, threats of malpractice litigation; none held water. Finally a surgeon, with refreshing candour, cut in: "Come on… we all know these arguments are bullshit. There's overutilization here, pure and simple."

His interpretation would no doubt be contested by representatives of the local medical community. What is not contestable is the simple fact. Patterns of medical practice, reflected in per capita rates of service use and expenditure, vary widely across different regions, and no satisfactory explanations, in terms of patient needs or health outcomes, have ever been offered. The routine responses by apologists for the status quo are variants on those pungently characterized by the Texas surgeon.

These regional variations have been patiently tracked through a generation of research by John Wennberg and his colleagues at the Dartmouth Medical School. Their increasingly comprehensive data collection, sophisticated analysis and effective

communication have built up an ever more compelling case that such variations reflect inappropriate servicing – simple wasted effort – on a very large scale. That case is increasingly being heard: "the research by Dartmouth experts who have documented wide geographic variations in health spending … has become phenomenally influential on Capitol Hill ..." (Pear 2009).

Peter Orszag, President Obama's budget director and former director of the Congressional Budget Office, has repeatedly pointed out that the greatest threat to the fiscal stability of the United States is posed by rising health services costs (Orszag 2008; Orszag and Ellis 2007). He has highlighted the central fact of very large regional variations in per-enrollee costs. The Gawande essay was not a complete surprise to the president.

Wennberg's professional colleagues have also recognized the significance of the Dartmouth program. In 2007, the leading American health policy journal *Health Affairs* named him the most influential health policy researcher of the past 25 years. In 2008, the Institute of Medicine presented Wennberg with the Gustav O. Lienhard Award "for his leading role in reshaping the US health care system to focus on objective evidence and outcomes rather than physician preference as the basis for treatment decisions …" (Institute of Medicine 2009).

The honours are unquestionably richly deserved. No one could deny the massive impact of the Dartmouth studies on how health services researchers – and increasingly, policy makers – understand the determinants and effects of medical care, not just in the United States but over much of the high-income world. But the Lienhard Award citation is, unfortunately, premature.

McAllen reminds us that Wennberg's impact on medical practice and patient care is much harder to find. The American political response to President Obama's championing of Gawande has been profoundly perverse. Representatives of high-spending states such as Massachusetts and New York have dismissed the Dartmouth data as inconclusive; representatives of low-spending states have welcomed the demonstration that they were being short-changed by Washington and deserved more federal money (Pear 2009).

The usual apologists for American health services have taken up the usual pre-prepared positions and begun a powerful campaign to discredit or at least to confuse and distract from the evidence, and in any case to frustrate any effort to build a rational policy response. Rather than an "outstanding achievement in improving health care services in the United States," the variations research may well sink from sight as Washington moves on to the next burning issue.

This much is the daily news. There are, however, three themes that may not be immediately obvious from the current discussion. First, the principal messages from Gawande's powerful essay have been available for at least 30 years. They have had no impact on health policies for the same reasons that they are likely to be dismissed

now. Second, the efforts by economists to understand clinical variations within the framework of standard or "mainstream" economic theory have been as jejune and as unsuccessful as those by spokesmen for the medical community. And finally, large geographic variations in clinical practice are not a peculiar consequence of the bizarre American financing system. They are found everywhere. In particular, they are found in Canada, where they could provide a powerful counterpoint to the endless claims of "underfunding" and "shortage" – if anyone in authority were paying attention.

A remarkable early finding was the "surgical signature" (Wennberg and Gittelsohn 1973, 1982). Comparisons of surgical rates among small areas showed that they were not uniformly high or low. A region might have a relatively high rate on one procedure, but be low on another. Furthermore, these patterns were associated with particular surgeons; if a surgeon moved from one region to another, the pattern of rates moved with him. Clinicians have different perceptions as to the relative value or effectiveness of particular procedures, independently of the underlying evidence, which may be masked in aggregate comparisons.

… large geographic variations in clinical practice are not a peculiar consequence of the bizarre American financing system. They are found everywhere.

Similar findings emerged from the Manitoba research group led by Leslie and Noralou Roos. Their studies of tonsillectomy identified "believers" and "non-believers" among physicians, as reflected in their rates of performance of the procedure or referral for it (Roos et al. 1977). Other Manitoba studies identified "hospital-prone" physicians, who were on average much more likely to admit patients for a given problem and set of patient characteristics (Roos et al. 1986).

Moreover, when a new surgeon moved into an area, the workloads of established surgeons did not fall. Rather, total surgical rates rose to accommodate the new capacity. But when a surgeon left, the workloads of the remaining surgeons rose to maintain the established population rate. The authors' best explanation for observed population surgical rates was simply physician discretion (Roos 1983).[2]

To return to the Dartmouth data, the BPH (benign hyperplasia of the prostate) studies traced variations in surgical rates to surgeons' differing beliefs about the normal prognosis of the problem. Those who believed that BPH typically proceeds eventually to blockage of the urethra favoured early surgical intervention. Others recommended "watchful waiting," believing that many cases would never require surgery. Early intervention would lead to much unnecessary surgery, with a significant rate of serious side effects.

Of course physicians' patterns of practice depend on their beliefs about the relative benefits and risks of particular interventions. Would one want them to behave other-

wise? But the observed variations in practice indicate that these beliefs are highly variable from one clinician to another, and some of them (at least) are wrong. In principle, and often in practice, empirical evidence can be brought to bear to determine which is which.

In the case of BPH, the evidence turned out to support watchful waiting. Moreover patients, when given information about risks and benefits, tended strongly to favour watchful waiting. But until the question was taken up as a research program by the Dartmouth investigators, the alternative beliefs were never tested. Individual surgeons just went ahead doing what they thought best – like the obstetricians in Boston.

Plus ça change. Berenson and colleagues (2009: 937) have studied the diffusion of (expensive) telemedicine technology in American intensive care units (eICU):

> We explore the reasons hospitals chose to adopt or reject an innovative telemedicine approach … . Hospital clinical leaders hold strong views but have little objective information on which to judge the worthiness of this innovation.

Ignorance is strength?

The BPH and tonsillectomy studies were important because they each provided a response to the standard defensive "yabbut": "Who knows which rate is right?" In these cases, the high rates of surgery were the wrong ones. The general blocking tactic follows one of two arguments. One is to assert that low-use populations are, or may be, underserved. Their access is being limited by shortages of personnel or equipment, or inability to pay – or something. The other is that "everything is beautiful in its own way." Patients' needs differ, so patterns of care vary because knowledgeable and responsible clinicians provide the care appropriate to those differing needs. End of story.

The first argument emerged in the 1950s in response to observations that hospital utilization rates were much lower in pre-paid group practices than in the general fee-for-service community. It largely fell out of favour after controlled trials that randomly assigned patients to pre-paid group practice or community care demonstrated that organizational settings account for the differences in use, and that low users were not underserved.

The second argument in effect denies that variations represent a problem. It places the burden of proof on those who would suggest otherwise (see the remarks of Senator John Kerry as reported by Pear [2009]). This response has worked for decades, but a great deal of progress has been made in the last quarter-century, as reflected in Wennberg's recognition by *Health Affairs*. A remarkable pair of papers by Fisher and colleagues (2003a,b) show very large regional differences in service utilization and expenditures by Medicare beneficiaries (ages > 65) in the United States, after standardizing for measures of patient health status. And high use and cost areas have higher mortality rates, though equivalent levels of patient satisfaction. More is not better; it's worse.[3]

Important information lies behind the aggregates. The researchers have catego-

rized specific services as (1) effective care, (2) preference-sensitive care and (3) supply-sensitive care.

The first are services or procedures supported by clinical evidence as improving the health of patients. No trade-offs are involved – do it! The second are those interventions for which there is a balance of risks and benefits, and patients' values and preferences should govern the choice. The third are those whose utilization is strongly associated with the local availability of resources – personnel, equipment and facilities. One might think of these three categories as medically driven, patient driven and capacity driven.

Interregional variations in use and cost reflect variations in supply-sensitive services – full stop. This is not to say that differences in patients' needs or preferences play no role in influencing utilization. But these factors wash out in aggregate. The large regional variations in average rates of utilization and cost are driven from the supply side, by differences in clinicians' choices, not in patient needs or preferences.

Up pops another standard yabbut – what about "quality of care"? Could more servicing have benefits that are not captured by mortality or patient satisfaction? The Dartmouth investigators have approached this question indirectly, showing large variations in servicing and costs among academic medical centres that are generally acknowledged to provide care of the highest standard. The first study compared Boston and New Haven (Harvard and Yale); more recent papers have expanded the number of centres included.

Boston was, on average, much more expensive than New Haven in caring for Medicare patients. Twenty years later, the Mayo and Cleveland clinics turn out to be much less costly than Johns Hopkins or UCLA. Uwe Reinhardt has quipped that in the United States, "the finest medical care in the world costs twice as much as the finest medical care in the world." There's no reason for it, it's just our policy.

It is tempting to describe these differences as "cost without benefit," but that would be misleading. All costs benefit someone; that is why, when the Gawande story broke, Senator Kerry was so quick to dismiss the regional variations findings (Pear 2009). He showed no obvious competence; his comments would be easily recognized by Gawande's Texas surgeon. But Senator Kerry has a very clear understanding that billions of federal dollars flow into his state as income for its highly developed medical–industrial complex. Serious attention to expenditure variations would threaten those incomes. He is instantly on the attack.

The United States will spend approximately $2.4 trillion on health services this year, and every dollar flows into someone's pocket. Their representatives, political and professional, stand on guard to make sure the money keeps coming – $2.4 trillion pays for some very heavy artillery indeed. "Who ever knew Truth put to the worse, in a free and open encounter?" asked Milton. "Who ever saw a free and open encounter?" replied Satan. We are certainly not seeing one now.

The accounting identity linking total expenditures and total incomes is the most

fundamental contribution that economic analysis makes to the understanding of real-world health systems. It provides the primary explanation for 40 years of political indifference to the variations data. If President Obama can "fix" McAllen, or anywhere else, some incomes will have to be cut. But if not… not.

Beyond that powerful insight, the quality of economic contributions becomes much more uneven. Economists are not, in the main, stupid,[4] but they have said some remarkably stupid things about health. The assumption that all health services utilization follows from the decisions of more or less informed "consumers," for example, implies that clinical variations must result from regional differences in "consumer tastes." The residents of McAllen simply have a particularly intense taste for various forms of health services, just as they might have a particular taste for chocolate ice cream. There is nothing to "fix"; *de gustibus non est disputandum.*

This is an essentially theological position, as impervious to fact or argument as "creation science."[5] It parallels the medical claim that clinical variations simply reflect clinicians' appropriate responses to differing patient needs. Both are circular arguments, positing an inherently unobservable concept – tastes, or needs – whose variations are inferred from observed variations in use and then serve to justify those variations. If direct observations fail to confirm belief, the observations are wrong.

Another distraction is provided by the common economic fascination with trade-offs. This argument emerges in the mindless mantra that no system can simultaneously achieve universal coverage, high-quality care and cost control. Its roots lie in the original fallacy that "more is better" and that cost equals quality. Its political appeal may be that it appears to justify the floundering of American health policy. Clinical variations provide a direct refutation (as, for that matter, does international experience); the mantra is simply false. But economists, even some health economists, have been slow to absorb that message.

Many were quick, however, to absorb the message that patients served by pre-paid group practices, later health maintenance organizations, made systematically less use of hospitals and generated significantly lower costs. These observations could be interpreted in a standard framework of economic motivations and incentives – contrasting capitation with fee-for-service payment. The obvious implication was that a "world of competing HMOs" would curb cost escalation and could offer better-quality care. Roll on the Managed Care Revolution! (How can we get it into Canada?) Economists (including this one) failed to reflect carefully on the implications of clinical variations.

That physicians have powerful economic motives and respond to economic incentives is hardly a debatable proposition. But the variations emerge, then and now, within a relatively homogeneous reimbursement environment. It is true that much of the regional variation is correlated with variations in capacity, personnel and equipment. But much is not, and in any case capacity is not exogenous. It responds to clinicians' views as to what is needed.

The "surgical signature" underlined the importance of physicians' individual preferences for, or confidence in, particular patterns of intervention.[6] The clustering of behaviour also indicates strongly that physicians' preferences are formed within, and respond to, a local culture. In the mid-1960s, when normal deliveries stayed five days in Boston and three in San Francisco, physicians' economic motivations were as irrelevant as patients' needs.

In short, economists' "explanations" of patterns of utilization, and the physician behaviour that drives them, suffered from the characteristic flaws of economic reasoning. The assumptions of the representative agent – *the* physician, analogous to *the* consumer or *the* firm – leads to a focus on aggregates that suppresses the behavioural information in variations data. This, in turn, encourages oversimplification of the objectives postulated for physicians, and the strategies available to them. We impose *a priori* far too narrow a view both of what physicians are trying to do, and of how they go about doing it – not necessarily wrong, but seriously incomplete. The variations literature shows what we have been missing.

In short, economists' "explanations" of patterns of utilization, and the physician behaviour that drives them, suffered from the characteristic flaws of economic reasoning.

Finally, there is a long-standing tradition of such work in Canada as well, notably the early work of Eugene Vayda and colleagues (1976; Stockwell and Vayda 1979) and the continuing work of Leslie and Noralou Roos and theirs (1977, 1983, 1986). More recently, Alter and colleagues (2008: 187) report that in Ontario

> [r]egional per capita cardiologist supply varied more than twofold across regions, but was inversely related to the regional cardiovascular disease burden. … Residents in areas with more cardiologists were more likely to receive some form of cardiac intervention. … However, the intensity of provision of cardiac health services was unrelated to regional cardiovascular disease burden and was not associated with improved survival.

In short, capacity-driven utilization.

The monumental *Canadian Cardiac Atlas* (Tu et al. 2006) includes a study of hospital admission rates for leading cardiac diagnoses (Hall and Tu 2003). The authors found very high interregional variations, with gradients rising strongly from west to east, and from large cities to rural areas. The Canadian average admission rate was just under double the rate in the city of Vancouver, and the discrepancy in patient days was even larger.[7] The authors comment, with some understatement: "There is consid-

erable regional variation in the cardiovascular hospitalization rates across the country that may be amenable to further interventional strategies" (Hall and Tu 2003: 1123).

Yet again, much has been made in the professional and public rhetoric of the inadequacy of CT and MRI capacity in Canada, and very large amounts of money have been allocated to a rapid expansion and modernization of diagnostic imaging facilities. The survey by the Canadian Institute for Health Information, *Medical Imaging in Canada: 2007* (CIHI 2008) documents the corresponding rapid increase in capacity for, utilization of and expenditures on these procedures. But it also documents the wide interprovincial variations in capacity and use and, more importantly, the extraordinary international variations.

These huge international variations in imaging availability are unconnected with any evidence of differences in patient needs or outcomes.

Japan had 92.6 CT scanners and 40.1 MRI machines per million population in 2005; the Netherlands had 5.8 and 5.6 (CIHI 2008, figures 39 and 40). The United States had 45.3 and 26.6; Germany had 15.4 and 7.1. Canada, at 12.1 and 6.1 (in 2006), was just below the medians of 14.7 and 6.9. But there is no "international standard"; country rates are all over the map and averages mean nothing. In these circumstances, to try to "keep up with the rest of the world" is to chase a chimera. There is no "rest of the world" in any meaningful sense.

These huge international variations in imaging availability are unconnected with any evidence of differences in patient needs or outcomes. Yet diagnostic imaging is, along with laboratory testing and pharmaceuticals, one of the primary sources of cost escalation in Canada. A focus on these sectors might be more productive than general blather about "sustainability."

The implications of these Canadian reports, fragmentary as they are, are straightforward. Clinical variations, driven by physician preferences and local medical cultures, not by patient needs and evidence of effectiveness, are a major issue in Canada as well. They have not been as intensively studied as in the United States, but they have been studied, they have been found and they are large. The significance of such variations has finally penetrated the highest political levels in the United States, although that country's bizarre political system may be incapable of reacting sensibly. In Canada, they are not even on the radar.

"Only in America, you say? Pity."

Notes

[1] Miami is higher, but has much higher labour and living costs.

[2] Large regional variations do *not* imply that surgical procedures, or medical services generally, are simply distributed capriciously. Research supports the obvious; care tends to go where it is needed. Health system is mostly used by sick people and sicker people use more care – and women in both Boston and San Francisco were giving birth. But, following Rose's Law, variations in *population* rates are not explained by variations in needs.

[3] The Dartmouth *oeuvre* is now huge, and referencing quickly becomes unwieldy. Key findings are however collected together, with supporting references, in Fisher (2007).

[4] Some are – names not available on request – and a few are simply "on the take".

[5] Persistent nonsense is often rooted in economic interests. The "consumer tastes" fantasy supports various schemes such as Medical Savings Accounts, or "Consumer-Directed Health Care" that would transfer costs from taxpayers to patients – i.e. from the healthy and wealthy to the unhealthy and unwealthy – while improving access for the wealthy and unhealthy. The naked redistributional agenda is obscured by "econofog" (a very thick economist).

[6] Evidence eventually matters; tonsillectomies are rarely done today because the believers have died.

[7] Their data are from the late 1990s, but there is no reason to expect that these differentials have changed.

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Implementing and Maintaining a Researchable Database from Electronic Medical Records: A Perspective from an Academic Family Medicine Department

Mise en place et maintien d'une base de données à partir des dossiers médicaux informatisés : le point de vue d'un service universitaire de médecine familiale

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Implementing and Maintaining a Researchable Database from Electronic Medical Records

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Abstract

Electronic medical records (EMRs) are posited as a tool for improving practice, policy and research in primary healthcare. This paper describes the Deliver Primary Healthcare Information (DELPHI) Project at the Department of Family Medicine at the University of Western Ontario, focusing on its development, current status and research potential in order to share experiences with researchers in similar contexts. The project progressed through four stages: (a) participant recruitment, (b) EMR software modification and implementation, (c) database creation and (d) data quality assessment. Currently, the DELPHI database holds more than two years of high-quality, de-identified data from 10 practices, with 30,000 patients and nearly a quarter of a million encounters.

Résumé

Les dossiers médicaux informatisés (DMI) se veulent un outil pour améliorer la pratique, les politiques et la recherche en matière de soins de santé primaires. Cet article décrit le projet DELPHI (*Deliver Primary Healthcare Information*) du service de médecine familiale à l'Université Western Ontario, en mettant l'accent sur sa mise en place, son statut actuel et son potentiel de recherche, et ce, afin de partager l'expérience avec les chercheurs qui travaillent dans un contexte semblable. Le projet s'est déroulé en quatre étapes : (a) le recrutement des participants, (b) la modifica-

tion et la mise en place du logiciel de DMI, (c) la création de la base de données et (d) l'évaluation de la qualité des données. Actuellement, la base de données du projet DELPHI conserve plus de deux années de données anonymes de grande qualité, qui proviennent de 10 cliniques, comptent 30 000 patients et représentent près d'un quart de million de visites.

There is currently keen interest in electronic medical records (EMRs) as a tool for improving practice, policy and research in family medicine and interdisciplinary primary healthcare (PHC). Evidence from the literature suggests that EMRs can improve practice by providing point-of-care information to assist clinical decision-making (Bates et al. 1999; Garg et al. 2005) and by giving feedback on standards of care leading to improved patient management (Mitchell et al. 2005; Toth-Pal et al. 2004; Vogt et al. 2007). EMRs can help policy making by providing evidence about primary care workload community needs, which are expressed as health services utilization (Okkes et al. 2002).

Unfortunately Canada lags behind other countries in harnessing the full potential of EMRs, both for patient care and research (Protti 2007; Schoen et al. 2006). Data from a recent study show that only 12.3% of Canadian primary care physicians were using electronic charts instead of paper charts in 2007 (College of Family Physicians of Canada et al. 2007). The Centre for Studies in Family Medicine (CSFM) at the Department of Family Medicine, University of Western Ontario (UWO), embarked on the DELPHI Project in 2003 with the aim of creating a researchable database from the EMRs of community family physicians in southwestern Ontario. Our paper describes (a) general issues of definition and research potential worldwide and (b) specific issues of the development, current status and research potential of the DELPHI Database in an effort to share our experiences with researchers in similar contexts.

Background

The terminology used to describe electronic charts and patient records varies depending on the agency and the purpose. In general, the term electronic health record (EHR) has been used to describe patient records that are accessible from many sites or by many different providers. The term electronic medical record (EMR) has more commonly been used to describe electronic patient records that are kept in one location and are accessible on only one provider's site. Iakovidis (1998) described the EMR as a stand-alone system, whereas the EHR is defined as digitally stored healthcare information that accumulates over a person's lifetime to support continuity of care. Likewise, Canada Health Infoway described EHRs as interoperable records that

follow patients as they move through the system, providing complete information to all providers as needed (Booz Allen Hamilton 2005). In this paper, we use the term EMR to describe the clinical records held in electronic form within primary healthcare practices (possibly connected to laboratory and some hospital data) and used in the course of everyday care of patients. These records typically contain such elements as procedures and investigations, immunization lists, referrals, laboratory results, clinical notes, examination results, medications lists and a problem list.

Research uses of EMR data are fairly well established in countries such as the United Kingdom, where large practice-based data collections, such as the General Practice Research Database, exist. More recently, researchers in North America (Gill et al. 2006; Ornstein et al. 2007) have begun to use these data for research. Worldwide, specific research uses of EMR data include helping to improve primary healthcare for patients with chronic conditions such as diabetes (Gill et al. 2006; Ornstein et al. 2007; Kupersmith et al. 2007) and hypertension (Mitchell et al. 2005), as well as to enhance preventive care (Toth-Pal et al. 2004; Vogt et al. 2007), to examine relationships between symptoms and ensuing disease in patients (Jones et al. 2007) and to support family concordance studies (Hippisley-Cox et al. 2002). However, significant challenges remain in using EMR data for research (Lobach and Detmer 2007).

The DELPHI (Deliver Primary Healthcare Information) Project

The DELPHI Project began in 2003 with a Canadian Foundation for Innovation (CFI) grant, which was supplemented by a substantial grant from the Ontario Primary Health Care Transition Fund (PHCTF) in March 2004. The overarching goal was (a) to facilitate the development of an EMR system for interdisciplinary PHC for the purpose of improving information-sharing in an interdisciplinary care setting and (b) to describe, assess and improve the quality of PHC delivery. Although housed at the Department of Family Medicine at UWO, partnerships with the Institute for Clinical Evaluative Sciences (ICES), Healthscreen Solutions (the EMR software company) and the Department of Epidemiology and Biostatistics at UWO were instrumental in several components of the project.

The project progressed through four stages: (a) participant recruitment, (b) EMR software modification and implementation, (c) database creation and (d) data quality assessment. Each of these four stages is briefly described below.

Participant recruitment

Family practices were recruited through a variety of complementary approaches. First, using a strategy similar to that of Borgiel and colleagues (1989), the researchers enlisted key community leaders in family medicine in identifying suitable EMR

software, locating practices that were already using EMR software candidates or that might be interested in its future use. Second, a notice soliciting interest was sent from the Centre for Studies in Family Medicine to all 160 family physicians on the Family Medicine Education and Research Network (FERN) e-mail discussion group. Third, the software company suggested family physicians who had expressed an interest in their product. All family physicians who responded with an expression of interest were personally visited by the principal investigator to discuss project details. Approximately half the group practices that were invited by the principal investigator opted in to the EMR implementation and the research. Those who opted in were (a) very interested in the specific EMR chosen, (b) appreciative of and even excited about the usefulness of the EMR data they would be providing, in comparison to the usual billing data (the only data available in a structured form in Ontario up to that time) and to manual chart audits (the time-consuming, labour-intensive alternative) and (c) content with the degree of interoperability with hospitals and diagnostic tests, which varied from community to community but was a deal-breaker in several instances. The recruitment strategy resulted in a final sample of 25 family physicians in the DELPHI Database, as well as 25 family practice nurses, one nurse practitioner and one chiropodist. These primary care practitioners are located in 10 group practices.

Although the strategy did not result in a strict random sample of family physicians, the project covers a wide geographic area of southwestern Ontario, stretching from near Windsor in the south to Kincardine in the north and Brantford in the east, as well as the London area (Figure 1). The distribution of family physicians is broadly representative by age and gender, although the sample is slightly less urban than Ontario family physicians (Table 1).

FIGURE 1. Locations of DELPHI practice sites in southwestern Ontario

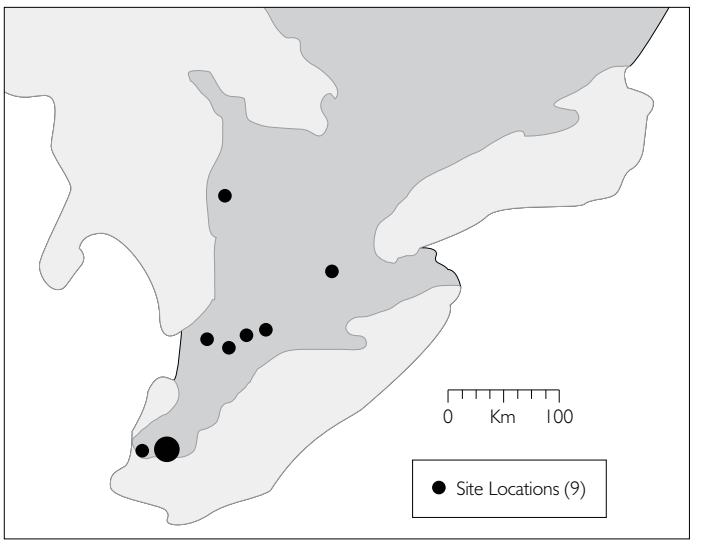


TABLE 1. Comparison of family physician characteristics of the DELPHI sample, southwestern Ontario and Ontario family physicians

	DELPHI* (n=25)	Southwest Ontario family physicians (Changing Face Survey, 2004; n=731)	Ontario family physicians (National Physician Survey, 2007; n=3,571)
Age			
44 years and under	24%	35.3%	29.5%
45–54 years	24%	31.3%	31.7%
55–64 years	36%	22%	26.3%
65+ years	12%	8.6%	11.6%
Unknown	–	2.7%	1%
Sex			
Male	64%	68%	61%
Female	36%	32%	39%
Practice Location			
Inner city	–	6%	12.4%
Urban/suburban	20%	38.4%	58.4%
Small town	48%	24.5%	14.4%
Rural	32%	15.7%	8.3%
Other/no response	–	20%	7.5%

* We do not have data on age of DELPHI physicians. Year of graduation was used as a proxy for age, with the assumption that most graduates would be approximately 28 years old at the time of graduation.

The 25 family physicians originally committed to a three-year period. Currently, at the end of year 2, all 25 continue to be involved in all facets of the project. The views of the participants in the DELPHI Project toward EMR implementation in their practices are described elsewhere (Terry et al. 2009).

EMR modification and implementation

In order for the database to be fully researchable, the EMR software had to accommodate research-oriented data input technologies and data extract possibilities. These two components were absolute requirements for software selection. After spending considerable time and resources, the research team identified Healthscreen as the most suitable software for its purposes. The company was willing (and eager) to develop these modifications, and a close relationship was established and maintained between the researchers and the EMR software company, Healthscreen Solutions Inc.

The two research-oriented data input technologies were the incorporation of the International Classification of Primary Care (Verbeke et al. 2006; Soler et al. 2008; O'Halloran et al. 2004) and a diabetes flow-sheet, which were developed over the course of a year. After successful beta testing, the revised software was installed in all participating practices. In addition, practice-specific hardware was purchased and installed. While remote training was offered by the software vendor, participants were also offered individual intensive training sessions with the DELPHI staff. This included customized site-specific training, and trouble-shooting during the implementation process. The DELPHI team worked to build relationships between local information technology service providers and the family practices, thus helping to maintain a supportive presence throughout the project.

Decisions about the two new data input strategies were based on a number of considerations. First was our choice of the International Classification of Primary Care (ICPC). From the perspective of family medicine and interdisciplinary PHC, the usefulness and feasibility of a detailed dictionary of 300,000 terms such as SNOMED-CT is questionable. In contrast, ICPC has two advantages: (a) it is a hierarchical classification and therefore groups problems into chapters that are relevant to clinical medicine, as does ICD-9 and ICD-10, and (b) its terms include undifferentiated problems (such as back pain), which comprise 50% of a family doctor's workload (Crombie 1963; Blacklock 1977; Jerritt 1981).

Second was our decision to create a diabetes flow-sheet to computerize the common and popular paper-based flow-sheets. This decision was a response to both practitioners' interest and the interest of policy makers who were beginning, in 2004, to become concerned about the high prevalence of diabetes in the population (Ontario Ministry of Health and Long-Term Care 2004).

Overall, the need for these data input strategies existed because of the lack of data on the realities of PHC and to provide data on the types of problems presented to PHC, such as symptoms, psycho-social problems, tentative diagnoses and relevant interventions.

Database creation

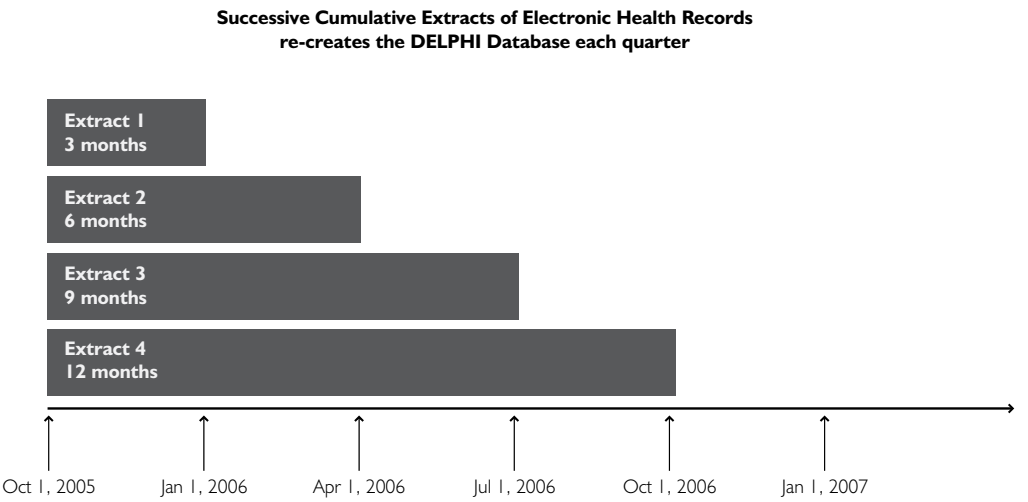
Concurrent with EMR modification, the DELPHI team worked closely with the Office of the Information and Privacy Commissioner of Ontario, the Chief Privacy Officer at ICES and the Ethics Review Board of UWO to formulate a privacy policy. Once signed consent from the physicians was obtained indicating their willingness to participate in the project, the DELPHI team put up posters (which were prominently displayed) in the practices' waiting and examining rooms. Patients who did not wish to participate were able to refuse by informing the named project coordinator or their primary care practitioner directly; their EHR records were not taken during the data

extraction process. To date, several families (not more than 10 individual patients) have opted out through the project coordinator.

Data extraction occurs on a quarterly basis. The data extracted for all patients include the billing code, problem lists, family history, medications, allergies, immunizations, physical examinations, investigations, laboratory tests, interventions and referrals. On the random subset of patients for whom physicians are doing coding in ICPC, additional data elements extracted include (a) up to five reasons for encounter (RFE) per visit (these are recorded in the patient's own words), (b) up to five diagnoses per visit and (c) tracking of the non-chronic diagnoses during episodes of care.

The repeated extracts are conducted in a manner that does not require patients' identification. Each extract contains a longer time period than the previous extract, the longer period including the time of the previous extract as well as the new time period, as Figure 2 shows.

FIGURE 2. Successive cumulative extracts of electronic health records recreates the DELPHI Database each quarter



Each patient record is assigned a unique number for the study. The patient's name, address and telephone number are not taken from the doctor's office. The extracted records are taken to UWO, where they are pooled with information from the other primary care practices. This pooled database is known as the DELPHI Database. Since the database does not contain any identifying data, it is not possible to identify a patient or physician in it. Moreover, the database is accessible only to DELPHI Project staff, who have signed strict confidentiality agreements.

To facilitate comparison between the EMR and health administrative data, it was

necessary to link these data sets. This linkage between DELPHI and the Institute for Clinical Evaluative Sciences (ICES) in Toronto followed a precise process to ensure data security. ICES has been designated a prescribed entity (s. 45 and s. 18 of Reg. 329/04) in the Personal Health Information Protection Act (PHIPA) of 2004, which allows it to receive personal health information from the healthcare practitioners (termed "health information custodians" under PHIPA). This transfer must be for the intention "of analysis or compiling statistical information with respect to the management of, evaluation or monitoring of, the allocation of resources to or planning for all or part of the health system." The purpose of the data transfer for this study fits within this definition.

To link DELPHI data with ICES data, a DELPHI key was created. The key was constructed by the project coordinator during the visit to the physicians' offices. The following pieces of information constituted the key: (a) the patient's unique DELPHI study number, (b) patient's OHIP number, (c) patient's postal code, (d) patient's date of birth, (e) OHIP billing number of the physician providing care to that patient and (f) the physician's unique DELPHI study number. It is important to note that this key did not contain any information about the patient's medical care. It was password protected and encrypted, and the project coordinator transported it directly from the primary care practice to ICES in Toronto. At no time was this key in the same location as the DELPHI Database. At ICES, the DELPHI key was used to link the DELPHI Database with the health administrative databases at ICES. The key was destroyed immediately after this linkage. The linked data sets use only anonymous data for purposes of analysis as per ICES policies. All individuals who were given access to the DELPHI–ICES Linked Databases signed a confidentiality agreement to ensure that they did not disclose individual patient information to any other person, as per ICES privacy policies.

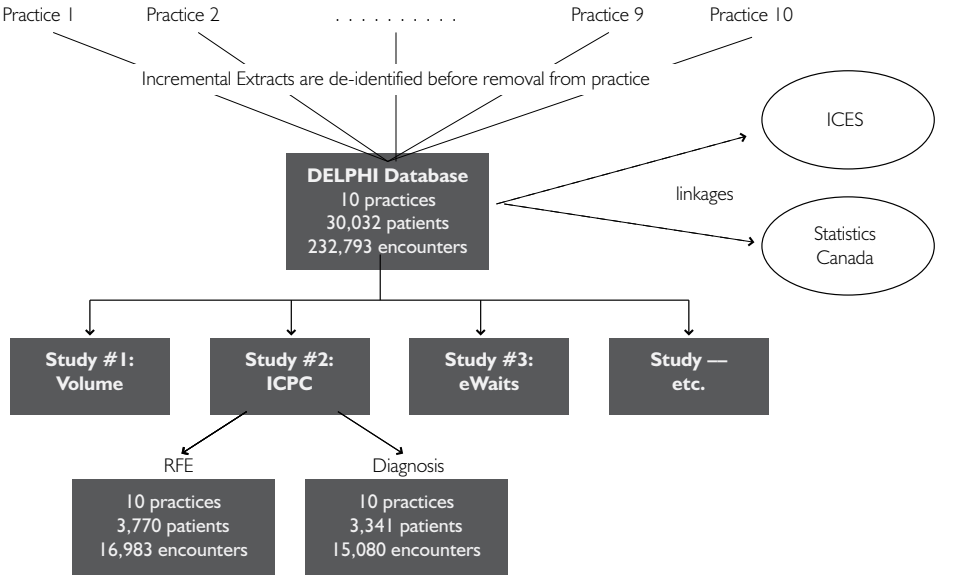
Data quality assessment

As almost half the participants were novice users, the DELPHI team developed a proactive approach to ensure data quality. To assist these users in moving to the advanced level, the team provided a variety of supports, including one-on-one training, continuous trouble-shooting, flexible project timelines and general facilitation of the use of the EMR software by maintaining a supportive presence. Keeping in view that these were extremely busy family practices, the team adopted a user-centred strategy so that the implementation of EMRs could proceed without disrupting the daily patient workflow in the clinics. Once the database was populated with data from the extracts, an ongoing quality monitoring system was put in place to ensure data completeness and standardization across the sites. The DELPHI team provided additional training to the participants and have continually emphasized the importance of consistent data entry.

Current Status of the Database

To date, the DELPHI Database holds more than two years of high-quality, de-identified data from the 10 practices, with 30,000 patients and nearly a quarter of a million encounters. Two key linkages are depicted in Figure 3. A linkage with ICES administrative data has been conducted to create and test patient-level indicators of primary healthcare provision. Using the postal code, the database has been linked to Statistics Canada Census data to provide a wealth of socio-economic data. Figure 3 also depicts the possible studies that are being (or can be) conducted using the researchable database. A sample of work currently underway is described below.

FIGURE 3. Components of the DELPHI Database (March 1, 2006 – February 29, 2008)



Characterizing primary care practice

The DELPHI team conceptualized five indicators of primary care and delineated their domains by conducting an exhaustive literature review and discussions with practitioners. Through an iterative process, indicators related to volume, diagnoses, referral patterns, quality of diabetes care and interdisciplinary care were created. For example, volume was defined as the number of patients per provider per day as well as the number of encounters per provider per day; the indicator of referrals describes the breadth of specialties. The interdisciplinary care measure described the team members' activities in each practice. These indicators are being compared to health administrative data. For example, the DELPHI diabetes indicator has been validated using health administrative data (Hux et al. 2002).

Wait times and equity

Wait times are a major policy issue today, and provincial and federal governments are focusing attention on reducing wait times for cancer surgeries, cataracts, hip and knee replacements and CT/MRI scans. However, there is a paucity of data characterizing wait times in primary care, which is the stage at which the wait times "clock" really begins. A grant from the Canadian Institutes of Health Research (CIHR) has allowed us to use the researchable database to study this component of wait times that has hitherto not been examined in Canada. Using a referral as the unit of analysis, the date of family physician referral and the date of the specialist visit are abstracted, allowing us to construct a detailed picture of such wait times across southwestern Ontario.

Developing algorithms for case ascertainment of patients with chronic disease in EMRs

As EMRs become ubiquitous in the future, accurate identification of patients with a specific condition will become necessary. The DELPHI team is working on developing and testing an algorithm for accurate identification of patients with diabetes, using data elements readily available in an EMR. For example, there could be as many as four options for defining a person as diabetic: (a) if the patient's active medication list includes a plasma glucose-lowering agent, (b) if the patient's problem list contains diabetes mellitus (DM), (c) if the laboratory list contains more than one result for HbA1c, (d) if the patient has an ICPC diagnosis of either T89 or T90 (Type 1 DM or Type 2 DM) or (e) any combination of these. Future work will expand to study other chronic conditions.

Strengths and Limitations

The central limitation of using EMRs for research is that data are collected during patient encounters using a system that is designed for individual patient care, not research. EMRs provide users with many options for entering and storing data. First, users may enter data in free text form or by picking information from a list of structured terms. Second, the same type of information may be stored in multiple places in the EMR. Third, a variety of terms may be used for the same thing. In addition, information that is not important to clinical care may not be found in the record. Finally, digitized reports (which are not readily analyzable) may be stored in the EMR. These EMR features create challenges for researchers trying to extract and analyze the data. For example, to find a particular type of information, all possible locations in an EMR must be searched. Collaboration with information technology professionals is required to create a researchable database. Further, rigorous data quality assessment is also necessary to ensure that the data are suitable for research purposes. These are resource-inten-

sive steps required simply to arrive at the data analysis stage of the research process.

However, EMR data also have several advantages for research in primary healthcare. First, EMR data contain a great many variables on multiple aspects of PHC. This includes both clinical measures such as blood pressure, medications and laboratory test results, as well as health services variables such as referral types and wait times. Second, these data are longitudinal, allowing researchers to explore the natural history of conditions treated in PHC as well as care patterns over time. Third, assuming issues of access to data have been addressed, data may be collected relatively quickly for large numbers of patients. EMRs represent a unique source of data for answering questions about PHC.

Future Prospects and Projects

Projects that are in the conception or early analysis stage include work to improve understanding of clinical inertia in treating diabetics, focusing on time to treatment change and its determinants; characteristics of low back pain patients, their treatment and prognosis; a study of symptom progression to identify symptom clusters in primary care; and the development of metrics to quantify data quality in EMR-derived databases. Future studies will attempt to identify red-flag symptoms of rare and serious diseases, such as colon cancer, through case control and cohort studies.

The DELPHI Canadian experience is similar to the General Practice Research Database in the United Kingdom in that symptoms, diseases and interventions are coded (Jones et al. 2007), albeit using different classifications; however, the DELPHI Database, being regional, contains a smaller number of patients than the larger UK databases. As well, unless and until Canada requires these three types of structured data, they will be available only in smaller, well-resourced, purpose-built research databases. DELPHI's usefulness in monitoring chronic disease management and preventive care is similar to the US studies (Vogt et al. 2007; Ornstein et al. 2007). Somewhat unique to the DELPHI Database are the health services research questions that are being answered, such as workload, wait times and the degree of interdisciplinary care.

In conclusion, EMRs are well suited to study both morbidity and workload of primary care providers in a thorough manner, measures that are not available through surveys (Okkes et al. 2002). In fact, only EMRs can assist researchers in their efforts to better characterize the content and quality of family practice and interdisciplinary primary healthcare. The advantage of EMR data is that they are comprehensive and longitudinal, covering all visits and clinically relevant interventions. The Centre for Studies in Family Medicine is committed to the long-term development of the researchable database, and is actively building an innovative EMR-based program of research.

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DATA MATTERS

Differences in Mental Health Diagnoses between Recent Chinese Immigrants and a Comparison Population in British Columbia

Différences dans les diagnostics en santé mentale entre les immigrants chinois récents et un échantillon comparatif de la population en Colombie-Britannique

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Differences in Mental Health Diagnoses between Recent Chinese Immigrants and a Comparison Population in British Columbia

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Abstract

Linked administrative data indicate that the distributions of mental health diagnoses are different for recent Chinese immigrants in British Columbia compared to a matched group reflecting the general population, as recorded in payments to general practitioners and psychiatrists between 1992 and 2001. Chinese immigrants were much less likely to have consultations for the mental disorders that were most common in the general population. Among those who saw a psychiatrist, psychotic conditions accounted for a larger proportion of visits for Chinese immigrants than those from the general population. The opposite was true for depressive conditions. The findings illuminate nuances in the disparity in mental health service utilization between Chinese immigrants and the general population.

Résumé

L'analyse des données administratives portant sur les paiements versés aux omnipraticiens et aux psychiatres, entre 1992 et 2001, indique une différence dans la distribution des diagnostics en santé mentale entre les immigrants chinois récents et un échantillon représentatif de la population générale en Colombie-Britannique. Les immigrants chinois sont beaucoup moins enclins à demander une consultation pour les troubles mentaux les plus fréquents dans la population générale. De ceux qui ont consulté un psychiatre, une plus grande proportion de leurs visites était pour des états psychotiques comparé à la population générale. L'opposé est vrai pour des états dépressifs ou névrotiques. Ces résultats font voir des nuances dans les disparités entre les immigrants chinois et la population générale pour l'utilisation des services de santé mentale.

Serving the mental health needs of immigrants and minorities is a growing challenge in many immigrant-receiving nations that are becoming more ethnically diverse. The research literature suggests that immigrants, especially Asian immigrants, in several countries are less likely to use mental health services (Abe-Kim et al. 2007; Bebbington et al. 2000; Cheung and Snowden 1990; Harris et al. 2005; Kirmayer et al. 1996; Klimidis et al. 2000; Lai et al. 2003; Leong 1994;

Matsuoka et al. 1997; Roberts and Crockford 1997; Snowden and Cheung 1990). In British Columbia, one-third of the new arrivals in 2006 came from Chinese territories (BC Stats 2007) and 16% of the 2 million residents in the census metropolitan area of Vancouver reported Chinese as their first language (Stats Canada 2007). A previous study in British Columbia also reports that, relative to a comparison group of non-immigrants and longer-term immigrants, recent Chinese immigrants have only 14% to 20% as many mental health visits to general practitioners and 10% to 11% as many psychiatric visits (Chen and Kazanjian 2005). The objective of this study was to investigate the diagnoses associated with the mental health visits and how the patterns of diagnoses may contribute to the disparity in utilization of mental health services.

Methods

Two administrative databases were paired by probabilistic linkage for a Canadian immigrant health research study: (a) the national immigration database from Citizenship and Immigration Canada of all immigrants who landed in British Columbia from 1985 to 2000 and (b) the province's health database, comprising information from health plan registration and physicians' fee-for-service payments (DesMeules et al. 2004). Immigrants who came from China, Taiwan, Hong Kong or Macau and who registered in the provincial health plan at any time from 1992 to 2001 were selected for this study. Each immigrant was matched by sex, year of birth and local health area to a comparison subject who was randomly selected from the BC health plan registration file, excluding those in the immigration database. The final study group consisted of 148,973 pairs of subjects. Observation for each pair began after the immigrant's landing.

All mental health visits to general practitioners and all visits to psychiatrists for the study group during the study period were extracted for analysis. A "visit" was defined to include all inpatient and outpatient services paid to a physician for an individual in one day. Mental health visits to general practitioners were identified by the diagnostic and service information in the records. The diagnostic categories of mental health visits to general practitioners and psychiatrists were tabulated to provide an overview of the reasons for mental health visits and to show differences between immigrants and comparison group members in the patterns of mental health diagnoses recorded. The frequency of each diagnostic category, the percentage of the total number of visits, the number and percentage of individuals involved in each category and the number of visits per diagnosed individual for that diagnostic category were calculated. The precision of the percentage of each diagnostic category is reported using a 95% confidence interval. Differences between immigrant and comparison group can be considered to be statistically significant at the 5% level if the confidence intervals do not overlap, or overlap by no more that 25% (Van Belle 2002,

p.39-40). Statistical analyses were performed using SAS 9.1. To account for multiple visits by each individual, the confidence intervals were calculated using PROC SURVEYFREQ and treating each study ID as a cluster.

Results

The study population consisted of 51% women and 49% men, with mean age being 34. The median landing year for immigrants was 1995, and the average length of observation for both immigrants and comparison subjects was over five years. Over 95% of the Chinese immigrants resided in the Metro Vancouver region. Tables 1 and 2 summarize the top 10 diagnostic categories of all the eligible mental health visits made to general practitioners and psychiatrists between 1992 and 2001 by Chinese immigrants and by the comparison subjects; the number and percentage of visits; the number and percentage of individuals involved in each category; and the mean number of visits per diagnosed individual for each category. The results support previous findings that fewer immigrants consulted physicians for mental health reasons, and that they had far fewer visits than the comparison group. The results also indicate that the frequency of diagnostic categories differed between the two groups. For Chinese immigrants, almost half the mental health visits with general practitioners were for anxiety/depression, a category unique to British Columbia's health plan and which covers a variety of subclinical depressive and anxiety symptoms. A quarter of the comparison group's mental health visits to general practitioners were for drug dependence, a diagnosis that was rare among the immigrants; anxiety/depression and depressive disorder not elsewhere classified (NEC) were the next most frequent categories.

The main categories associated with psychiatric visits for Chinese immigrants were affective psychoses and neurotic disorders, followed by schizophrenic psychoses and depressive disorder NEC. For comparison subjects, the main reasons for psychiatric visits were depressive disorder NEC and neurotic disorders, with affective psychoses being the third most likely reason. Relative to comparison subjects, immigrants who received psychiatric care were more likely to do so for serious mental disorders such as schizophrenic and affective psychoses.

Discussion

While recent Chinese immigrants are much less likely to consult physicians for mental health reasons in general, this study suggests that they also differ in their distribution of diagnostic categories such that the disparity in rate of visits is not uniform across all conditions. For instance, Chinese immigrants were even less likely to consult a general practitioner for drug dependence and depressive disorder NEC – two conditions that account for a sizeable portion of the utilization among comparison subjects.

TABLE 1. Top 10 diagnostic categories of mental health visits to general practitioners by Chinese immigrants and comparison subjects in 1992–2001

Immigrants						
Diagnostic category	**# of subjects[1]**	**% of subjects[2]**	**# of visits**	**Rate of visits[3]**	**% of visits**	**95% CI**
Anxiety/Depression[4]	17,452	11.7%	37,636	2.2	46.0%	(45.1%, 46.9%)
Neurotic Disorders	8,189	5.5%	16,111	2.0	19.7%	(19.1%, 20.3%)
Depressive Disorder NEC	3,648	2.4%	8,655	2.4	10.6%	(10.1%, 11.1%)
Acute Reaction to Stress	4,073	2.7%	7,300	1.8	8.9%	(8.5%, 9.3%)
Special Symptoms or Syndromes NEC	2,439	1.6%	3,747	1.5	4.6%	(4.3%, 4.8%)
Adjustment Reaction	1,147	0.8%	1,747	1.5	2.1%	(2.0%, 2.3%)
Drug Dependence	131	0.1%	1,425	10.9	1.7%	(0.8%, 2.7%)
Schizophrenic Psychoses	285	0.2%	1,217	4.3	1.5%	(1.2%,1.8%)
Sexual Deviations & Disorders	380	0.3%	564	1.5	0.7%	(0.6%, 0.8%)
Personality Disorders	312	0.2%	528	1.7	0.6%	(0.5%, 0.7%)
TOTAL[5]	**30,395**	**20.4%**	**81,774**	**2.7**	100%	
Comparison						
Diagnostic category	**# of subjects[1]**	**% of subjects[2]**	**# of visits**	**Rate of visits[3]**	**% of visits**	**95% CI**
Drug Dependence	2,680	1.8%	102,659	38.3	25.0%	(22.8%, 27.2%)
Anxiety/Depression[4]	28,165	18.9%	90,398	3.2	22.0%	(21.3%, 22.8%)
Depressive Disorder NEC	18,992	12.7%	83,219	4.4	20.3%	(19.5%, 21.0%)
Neurotic Disorders	17,350	11.6%	47,534	2.7	11.6%	(11.1%,12.0%)
Acute Reaction to Stress	11,647	7.8%	26,971	2.3	6.6%	(6.3%, 6.9%)
Adjustment Reaction	5,396	3.6%	13,032	2.4	3.2%	(2.9%, 3.5%)
Special Symptoms or Syndromes NEC	3,575	2.4%	6,913	1.9	1.7%	(1.6%,1.8%)
Alcohol Dependence Syndrome	1,918	1.3%	6,893	3.6	1.7%	(1.5%,1.8%)
Schizophrenic Psychoses	910	0.6%	6,241	6.9	1.5%	(1.3%,1.8%)
Non-dependent Abuse of Drugs	600	0.4%	4,674	7.8	1.1%	(0.6%,1.7%)
TOTAL[5]	**58,508**	**39.3%**	**410,295**	**7.0**	100%	

[1] Individual subjects may be treated for more than one diagnosis

[2] Percentage of the 148,973 subjects who received the diagnostic category

[3] Number of visits per person diagnosed

[4] BC diagnostic category; all the others are based on ICD-9

[5] The total number and percentage include all diagnostic categories

TABLE 2. Top 10 diagnostic categories of mental health visits to psychiatrists by Chinese immigrants and comparison subjects in 1992–2001

Immigrants						
Diagnostic category	**# of subjects[1]**	**% of subjects[2]**	**# of visits**	**Rate of visits[3]**	**% of visits**	**95% CI**
Affective Psychoses	690	0.5%	6,336	9.2	24.7%	(22.0%, 27.4%)
Neurotic Disorders	704	0.5%	5,222	7.4	20.3%	(17.2%, 23.5%)
Schizophrenic Psychoses	217	0.1%	3,719	17.1	14.5%	(11.7%, 17.2%)
Depressive Disorder NEC	404	0.3%	3,679	9.1	14.3%	(11.7%, 17.0%)
Adjustment Reaction	425	0.3%	1,611	3.8	6.3%	(5.1%, 7.4%)
Other Non-organic Psychoses	114	0.1%	1,109	9.7	4.3%	(2.7%, 5.9%)
Hyperkinetic Syndrome of Childhood	72	<0.05%	741	10.3	2.9%	(1.9%, 3.8%)
Disturbance of Emotions–Childhood and Adolescence	97	0.1%	592	6.1	2.3%	(1.5%, 3.1%)
Transient Organic Psychotic Conditions	70	<0.05%	490	7.0	1.9%	(1.1%, 2.7%)
Other Diagnoses[4]	72	<0.05%	404	5.6	1.6%	(0.7%, 2.4%)
TOTAL[5]	**2,266**	**1.5%**	**25,672**	**11.3**	100%	
Comparison						
Diagnostic category	**# of subjects[1]**	**% of subjects[2]**	**# of visits**	**Rate of visits[3]**	**% of visits**	**95% CI**
Depressive Disorder NEC	3,756	2.5%	45,489	12.1	23.7%	(22.1%, 25.2%)
Neurotic Disorders	3,430	2.3%	44,447	13.0	23.1%	(21.5%, 24.8%)
Affective Psychoses	2,262	1.5%	26,657	11.8	13.9%	(12.7%,15.0%)
Adjustment Reaction	2,199	1.5%	17,922	8.2	9.3%	(8.4%, 10.3%)
Schizophrenic Psychoses	837	0.6%	13,761	16.4	7.2%	(6.3%, 8.0%)
Anxiety/Depression	682	0.5%	8,920	13.1	4.6%	(3.7%, 5.6%)
Personality Disorders	589	0.4%	5,700	9.7	3.0%	(2.4%, 3.6%)
Disturbance of Emotions–Childhood and Adolescence	487	0.3%	4,152	8.5	2.2%	(1.8%, 2.6%)
Special Symptoms or Syndromes NEC	409	0.3%	3,945	9.6	2.1%	(1.4%, 2.7%)
Other Diagnoses[4]	664	0.4%	3,942	5.9	2.0%	(1.6%, 2.5%)
TOTAL[5]	**11,388**	**7.6%**	**192,304**	**16.9**	100%	

[1] Individual subjects may be treated for more than one diagnosis

[2] Percentage of the 148,973 subjects who received the diagnostic category

[3] Number of visits per person diagnosed

[4] Consists of non-psychiatric diagnoses such as developmental delays, psychic factors associated with other diseases, mental retardation, other conditions of brain and the nervous system, general symptoms, other family circumstances

[5] The total number and percentage include all diagnostic categories

As a result, whereas Chinese immigrants had 20% as many mental health visits to general practitioners as the comparison group overall, the relative rates for drug dependence and depressive disorder NEC were 1% and 10%, respectively. In psychiatry, the immigrants were relatively more likely to visit for psychotic conditions and less likely to visit for depressive conditions. While the immigrants had 13% as many psychiatric visits overall as the comparison group, the percentages for affective psychoses and schizophrenic psychoses were higher at 24% and 27%, respectively, and the percentages for depressive disorder NEC and adjustment reaction were lower at 8% and 9%, respectively. That is, the disparities between immigrants and comparison subjects are relatively smaller for the serious but rare disorders of affective psychoses and schizophrenic psychoses but relatively larger for the less serious depressive conditions. Because the less serious depressive conditions comprise a large proportion of visits to psychiatrists, the disparity in psychiatric service utilization between immigrants and comparison subjects is more complex than the overall numbers would suggest.

Canada's immigration policy favours immigrants with greater educational attainment, financial assets and employability – all social determinants of health. Therefore, it is plausible to infer that immigrants would have better mental health status and lower overall rates of mental health service utilization. There is evidence from several studies of the Canadian Community Health Survey (CCHS) that the prevalence of mental disorders is lower among immigrants in general and Chinese immigrants in particular. These studies report that Asian immigrants in Canada and Chinese immigrants in British Columbia have lower risks for major depressive episode (Ali 2002; Chen 2006). Recent immigrants in Canada are also less likely to rate their mental health as poor (Lou and Beaujot 2005). However, the CCHS study of Chinese immigrants in British Columbia found that, even after controlling for depressive symptoms, Chinese immigrants were still much less likely to seek mental health consultation (Chen 2006). There is currently no evidence that difference in prevalence of mental disorders between the immigrant and the native-born population varies by type of disorder. Considering the selective nature of Canada's immigration policy, one would expect that the prevalence of chronic and serious disorders would be even lower among immigrants, contrary to the pattern of relative distribution of visits observed in our study. Hence, the differential distribution in the treated mental conditions in this study suggests that use of healthcare services is not uniform for all mental health conditions.

Several caveats should be kept in mind in interpreting the findings of this study. One concerns the composition of the comparison group. The group consisted of individuals who were matched by sex and age to the immigrant population; therefore, they represent a population that is somewhat younger than the general non-immigrant population in the province. The group is also likely to include a small percentage of longer-term immigrants who arrived before 1985.

A second caveat concerns the limitations inherent in the data sources. The physi-

cian payments file contains only information on fee-for-service payments and excludes services delivered under alternative billing schemes. An estimate of the coverage of the fee-for-service payments for the fiscal year 1996/97 is 96.0% for general practitioners and 67.5% for psychiatrists (Kazanjian et al. 2000). Thus, the payments file covers most of the general practitioner services and a smaller percentage of psychiatric services. Most of the remaining psychiatric service is delivered through the mental health service system. The rate ratio between Chinese immigrants and the comparison group of utilization of fee-for-service psychiatrists (0.14) and of the mental health system (0.13) is similar (Chen 2006), although the distribution of diagnostic categories in the mental health system is not known. Since the mental health system tends to treat serious and chronic disorders, the omission of those data may skew the distribution of diagnostic categories reported in this study towards the less serious disorders.

Another issue associated with the data sources is that the validity of the diagnostic codes in the health database is not verified and only one code is required for each payment claim. Hence, co-morbid mental health diagnoses may not have been identified. There may be cultural bias in coding such that certain diagnoses are systematically over- or underreported in the Chinese immigrant or the comparison group members. However, to the extent that the diagnostic code reflects intervention delivered, the discrepancies observed in the diagnostic codes still raise the concern that some diagnoses may be undertreated among members of the group. A related issue with regard to the health database is that it contains only information on individuals who have come into contact with the medical system. Hence, this study sheds light only on differences in utilization of medical care between the populations studied. Questions about access to care are contingent upon knowledge of both the prevalence rates of different types of mental disorders and the intervention received after seeking care.

The Chinese immigrant population is not a homogeneous group. A previous study has shown that various individual characteristics – such as years since landing, general use of primary care, age, place of origin, educational level, marital status, English skills – influence the rate of mental health consultation (Chen et al. 2008). It is reasonable to assume that the distribution of diagnostic categories relative to the comparison group also varies among the subpopulations. Future studies will have to explore the complexities of the disparities observed in this study.

This study demonstrates that secondary analysis of linked administrative databases can be a useful tool in understanding utilization by immigrant and ethnic minority groups. The comprehensive information in the databases quantifies the magnitude of disparities and illuminates some of the nuances. Lower rates of consultation for mental disorders that are most common in the general population, such as depressive disorder NEC and drug dependence, account for a large portion of the disparity in utilization frequently reported for the immigrant population. Even though recent immigrants may face various barriers in accessing healthcare for all types of mental

disorders, a larger gap exists in the utilization of specialist services for the most common, though less recognizable, mental disorders.

The findings of this study can inform efforts to improve access to mental health services for newcomers and reduce the gap in utilization. While public attention usually focuses on severe forms of mental disorder, the more pervasive though milder conditions underlie much of the discrepancy in utilization. Chinese immigrants may be less disposed culturally to recognize subtle symptoms such as depression (Leong and Lau 2001). Even when they recognize mental health problems, Asians may be reluctant to discuss them because of shame and stigma (Leong and Lau 2001; Li et al. 1999). Hence, only when the symptoms become severe do these patients come to medical attention. For immigrants to use the same amount of professional and self-help mental health resources as the Canadian-born, they would have to perceive their mental health as much poorer than the Canadian-born (Lou and Beaujot 2005). However, even when these mild mental and emotional disturbances are not acknowledged as such, they may manifest as somatic complaints and may impair social and vocational functioning. The prevalence of these unrecognized or untreated disorders translates into high social, economic and healthcare costs, as well as large discrepancies in indicators of service utilization (Eaton et al. 2008; Stephens and Joubert 2001). Interventions directed at the most severe and chronic forms of mental disorder (i.e., a strategic focus on relatively few, severely affected individuals) may have great benefits to personal lives and outcomes, but breaking down the barriers for the less serious and less recognizable conditions (i.e., treating a broader segment of moderately affected individuals) will have greater impact on health status at a population level (WHO 2008). Targeting these common conditions will also enable the health system to achieve greater strides towards the goal of equity in utilization.

True equity in access to services is a more elusive goal, in terms of demonstrating its achievement. Several components are involved in the assessment of access: the need for services, the types of services needed and the outcomes of service use. Cutting through each component is the cultural dimension. Whether existing diagnostic codes and criteria are appropriate for cultural minority groups is still an outstanding debate. The effect of mental disorders on an individual's life may also vary culturally, leading to different needs for services and different types of services that may be of benefit. The acceptability of a service and its form of delivery will also have to be considered. The yardstick to measure equity in access must ultimately address health status outcomes, of which there can also be different interpretations. Future research will have to focus on defining and measuring the need for and outcomes of mental health services in the culturally diverse population that characterizes Canada. Cultural diversity, as much as increasing longevity and changing lifestyle, should be one of the factors that drive health policy decisions.

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RESEARCH PAPER

The Value of Performance Measurement in Promoting Improvements in Women's Health

Importance de la mesure du rendement dans la promotion de l'amélioration de la santé des femmes

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Abstract

Objectives: To determine the factors associated with the use and impact of performance data relevant to women's health.
Methods: We developed a survey on six levels of information use based on Knott and Wildavsky's (1980) policy utilization framework and used this survey to determine Ontario hospital administrators' use of women's health report indicators. We related responses to this survey to six potentially relevant organizational factors, such as women's health as a written hospital priority, a women's health program and hospital budget size, using correlation and multiple-regression analysis.
Results: Only women's health in a written hospital priority (p=0.01) and hospital budget (p=0.02, log transformed) were significantly associated with the highest level of use when all organizational factors were considered.
Conclusion: These findings suggest that the use of women's health performance indicators is strongly related to the size of the hospital budget and to organizational commitment to women's health.

Résumé

Objectifs : Déterminer les facteurs associés à l'utilisation et à l'impact des données sur le rendement pertinentes à la santé des femmes.
Méthodologie : Nous avons mis au point un sondage portant sur six niveaux d'utilisation de l'information, fondé sur le cadre d'utilisation de Knott et Wildavsky (1980). À l'aide de ce sondage, nous avons déterminé l'utilisation des indicateurs sur la santé des femmes par les administrateurs des hôpitaux ontariens. Au moyen de corrélations et d'analyses de régression multiple, nous avons établi le lien entre les réponses au questionnaire et six facteurs organisationnels potentiellement pertinents, tels que la santé des femmes inscrite comme priorité de l'hôpital, un programme pour la santé des femmes et la taille du budget de l'hôpital.
Résultats : Après avoir considéré tous les facteurs organisationnels, seuls la santé des femmes inscrite comme priorité de l'hôpital (p=0,01) et le budget de l'hôpital (p=0,02, transformation logarithmique) ont un lien significatif avec de hauts taux d'utilisation.
Conclusion : Ces résultats laissent croire que l'utilisation des indicateurs du rendement pour la santé des femmes est étroitement liée à la taille du budget et aux engagements de l'hôpital envers la santé des femmes.

Performance measures can be disseminated in the form of public reports for healthcare users and providers to assess available care, or as private reports for internal access by providers only (Hibbard et al. 2003). Different reports target different stakeholders and have different objectives that range from informing consumer choice, ensuring accountability in healthcare, supporting quality improvement in healthcare delivery and increasing efficiency of health services (Morris and Zelmer 2005). The publication of reports on healthcare to inform consumer choice is more prevalent in the United States, while Canadian efforts tend to promote accountability or improve performance in healthcare (Morris and Zelmer 2005).

A performance report can be utilized by healthcare providers (hospitals or individuals) to identify their level of performance and stimulate improvements in their quality of care (Hibbard et al. 2003; Brown et al. 2005); however, studies tend to show that performance reports have limited uptake and mixed effects on performance (Marshall et al. 2000). It is important for organizations to learn "how to link the performance measurement results to actions [for performance improvement], rather than having the performance measurement system simply keep records" (Adair et al. 2006: 67). In Canada, a study evaluating the usefulness of performance measures in the first acute myocardial infarction report card stated that 54% of responding hospitals made one or more changes as a result of the report (Tu and Cameron 2003). A systematic review of 11 studies found that public reporting of performance measures stimulated quality improvement activity, but there was mixed evidence for outcome improvement (Fung et al. 2008).

The current performance measurement literature focuses predominantly on public performance reporting, and thus research on the use of private performance reports is lacking. Canadian researchers studying effective knowledge transfer indicate that individualized feedback may help research organizations, such as the Hospital Report Research Collaborative (HRRC), improve their research dissemination and knowledge transfer activities (Lavis, Robertson et al. 2003). This paper assesses the use of a private report by hospitals that received Hospital Report 2003: Acute Care – Women's Health Private Report (WHPR). We hope to gain more insight into the factors that influence the use of privately reported performance measures so that we can facilitate performance improvement in women's health.

The report was published by the HRRC and provides hospital-specific results on women's health performance based on sex-specific (women only) and sex-sensitive (ratios of men vs. women) indicators of patient satisfaction, clinical outcomes and measures of management behaviour related to women's health. The WHPR was distributed to 96 Ontario acute care hospitals (80% of acute care hospitals) that voluntarily participated in the Hospital Report project; the methods underlying the project are described elsewhere (Magistretti et al. 2002; HRRC 2003).

Performance reports in women's health are more common now than they were a

decade ago. However, there is relatively little evidence on the use of women's health performance reports by hospitals or individual providers. Nevertheless, there have been evaluations of hospital performance reports that may include components of women's health. A study by Hibbard and colleagues (2003) found that public disclosure of performance information for obstetrics care stimulated significantly more quality improvement activities in areas of low performance than private reports; but there was no significant difference for cardiac care. Providers may use broad, comparative public reports to stimulate improved performance if the policy context supports performance reporting and improvement (Brown et al. 2005), but will similar results be seen with private reports specific to women's health? There are many reasons why performance reports focusing on women's health may not have this effect, including, but not limited to, historic marginalization of women's health, the absence of a focus on women's health issues at a hospital and debate over what constitutes good performance in women's health.

Recent evidence indicates that organizational contextual issues are a factor in the effective use of performance measurement within the complex health system environment (Adair et al. 2006), and organizational characteristics have been associated with the perceived usefulness of performance measures in hospitals (Ginsburg 2003). This paper will describe the different levels of information use associated with the release of the WHPR and some of the organizational factors associated with its increasingly intensive use. Certain organizational factors have been associated with the uptake of innovations (Moch and Morse 1977; Kimberly and Evanisko 1981; Romano et al. 1999). For example, larger organizational size is positively related to the use of innovation in hospitals (Moch and Morse 1977; Kimberly and Evanisko 1981; Romano et al. 1999) potentially because larger size provides additional resources to support adoption activities (Moch and Morse 1977). Likewise, smaller hospital budgets may have fewer resources for research utilization and performance improvement. We anticipate that setting women's health as an organizational priority, providing women's health programs, or both strategies may also increase the use of the WHPR within hospitals because they suggest a focus on women's health in the "perceived improvement culture," defined as "the extent to which a respondent feels his or her hospital values performance data and supports using the data to bring about improvement" (Ginsburg 2003: 269). A study by Tung and Yang (2009) examined the factors that would improve performance in the Taiwan Healthcare Indicator Series and reported that the most important factors in performance improvement were senior management support, which signals a priority, and activities to apply the performance information effectively, such as benchmarking among hospitals.

Our study assessed the relationships between the intensity of information use of the WHPR and six organizational (independent) factors based on a literature review and consultation with researchers involved in studying quality improvement

at Ontario hospitals. The following factors were either associated with an increased probability of improvement capacity or a focus on women's health:

- The size of the hospital budget was studied because it represents the available financial resources that could be dedicated to performance management, and is more granular than a categorical label of organizational size (Moch and Morse 1977; Kimberly and Evanisko 1981; Romano et al. 1999).
- The presence of a women's health champion among senior management was studied because women's health champions have been designated at hospitals to promote and facilitate women's health initiatives. Thus, women's health champions who are senior managers may strive to improve women's health performance measures by dedicating more resources to the area. In addition, the leadership and commitment of senior decision-makers may have an important "agenda-setting" role in an organizational response to performance data (Huberman 1994; Ginsburg 2003; Adair et al. 2006).
- Hospital prioritization of women's health in a written statement is an explicit commitment to women's health that may steer performance improvement towards women's health (Huberman 1994; Ginsburg 2003; Brown et al. 2005).
- Presence of a women's health program in a hospital was included as a factor because hospitals with such a program may perceive greater relevance in the women's health data, which could enhance data use for performance improvement (Huberman 1994; Ginsburg 2003). It was also expected that larger hospitals or hospitals with larger budgets have more programs and resources and therefore would be more likely to have a women's health program or be more interested in the report.
- Benchmark ranking of a hospital was also examined. This ranking is based on hospitals' achieving (and sustaining) good performance across several indicators to identify whether information use of the WHPR is associated with good performance (CIHI and HRRC 2005). Benchmark ranking was studied because hospitals with higher rankings may be more responsive to performance information in order to achieve and maintain good performance in areas that may include women's health.
- The hospital peer group (community, teaching or small hospital) was studied to identify a relationship between hospital type and information use of the WHPR because small hospitals have fewer financial, technological and human resources than the other types of hospitals (Joint Policy and Planning Committee 1997). Thus, we hypothesized that they would be less responsive to the WHPR.

In this study, we adapted Knott and Wildavsky's (1980) framework for seven stages of utilization to describe the intensity of use of the WHPR in Ontario hospi-

tals. Table 1 shows our operationalization of Knott and Wildavsky's framework. The framework was originally designed to assess the uptake of information by decision-makers in terms of conceptual and instrumental use. Conceptual use was defined as the use that occurs when information influences one's perception of issues in general, and instrumental use occurs when a decision or action follows in part from the information (Rossi and Freeman 1985; Lavis, Ross et al. 2003). The seven stages of information use form a continuum from the least (reception level) to the most intensive use of information (impact level). One level builds on the previous level in a progressive manner such that each level must be completed before progressing to the next (Knott and Wildavsky 1980; Landry et al. 2001). The framework does not identify any independent factors that are associated with the achieved level of information use, but it has been used extensively to study the use of information by practitioners, professionals and decision-makers (Landry et al. 2001, 2003).

TABLE 1. Definitions and survey questions corresponding to the levels of information use

Levels of information use	Definition of level	Survey question
Reception	Utilization begins when the relevant information is received ("in-basket").	Did you receive a copy of the women's health private report from *Hospital Report 2003: Acute Care*?
Cognition	After receiving the information, the target audience reads, digests and understands the information.	Have you read through the report? Based on what you have read, how much of the information in the report did you understand?
Reference	After understanding the information, there is a change in the way the target audience sees the world in general, his/her preferences, understanding and/or frame of reference.	This level examining the reference change in utilization (third level) was excluded because a pre-test survey was not conducted prior to the release of the WHPR.
Effort	After a change in reference, a real effort must be made to adopt the information, even if there are no concrete results.	Since receiving the women's health private report from *Hospital Report 2003*, have you attempted to use (i.e., apply or present) the information in the report to influence (affirm or change) any decisions related to women's health issues within your organization? [Note: An effort made to use the report may *not* have resulted in action or measurable outcomes.]
Influence (originally called "adoption," but renamed to more accurately represent the events in this level)	After an effort is made, the information influences a decision (or decisions).	Did the information in the women's health private report from the *Hospital Report 2003* influence (affirm or change) decisions in women's health-related issues within your organization?

TABLE 1. Continued

Implementation	The decision based on the information leads to action.	Have one or more of the selected decisions from question 7 been implemented by action taken within your organization?
Impact	Utilization occurs in this level when information-based implementations (actions) yield tangible and relative benefits to the citizens. However, this final level was operationalized as the "perceived" impact of the information and defined as the perceived benefits/improvements in a hospital's women's health policies and/or programs that resulted from action initiated by the WHPR.	In your opinion, did your hospital's women's health-related policies and/or programs benefit or improve as a result of the action(s) stimulated by the women's health private report from the *Hospital Report 2003*?

Methods

Questionnaire development

We constructed a survey to capture six of the seven levels of the conceptual framework as described in Table 1 and three hospital characteristics that could not be captured in routinely collected data: a hospital's prioritization of women's health in its written statements, presence of women's health programs and presence of a women's health champion among senior leadership: (1) "Is women's health explicitly articulated as a focus in any of your hospital's vision statements, business plans or other written statements of mission or support?" (2) "Does your hospital currently have at least one women's health program?" (Any hospital program in which the provision of care and/or services and/or research related to women and/or sex and/or gender is a central component, i.e., may or may not be designated or formally named "women's health" program.) (3) "Are you currently in a senior management position at the hospital? (i.e., vice-president, chief of staff, chief of finance or other senior executive)." The entire questionnaire is available from the authors (ADB) on request. We pilot-tested the draft questionnaire with three individuals and modified questions slightly afterwards to ensure the tool had face validity with hospital employees.

Questionnaire administration and other data collection

We sent the survey to three individuals within each hospital: chief executive officers (CEOs), women's health champions and Hospital Report Research Collaborative contacts from hospitals who participated in the Hospital Report project. CEOs were selected because only the CEO of each hospital participating in the *Hospital Report 2003: Acute Care* series directly received the WHPR. Thus, any dissemination of the report in a hospital would have started from the CEO, and his or her use of it would provide crucial information on the report's initial propagation within the hospital.

Women's health champions were chosen because they were the CEO-nominated liaison for the hospital on women's health issues and identified as championing women's health activities in their organization. These champions range in their positions and titles from director of quality to vice-president of clinical services to chief financial officer. Hospital Report contacts were selected because they were the designated liaison between their hospital and the HRRC on any report card–related activities. All participants had a unique identifier code on their survey.

Hospitals were excluded if they stated that they did not want to participate in the study or had more than two turnovers in the year preceding the survey in two of the three positions studied; the latter exclusion maximizes accurate recall and avoids burdening any single remaining participant from a hospital. CEOs hired after December 2003 were also excluded because they did not directly receive the report. Individuals who held two or more of the positions under study were sent only one survey with one identifier code. A CEO was always coded as a CEO in order to examine the process of dissemination in the hospital. A person with the roles of both a women's health champion and HRRC contact was identified as a women's health champion. The effect of these exclusions is likely to bias results upwards in favour of greater utilization.

Ninety-six acute care hospitals in Ontario participated in *Hospital Report 2003: Acute Care – Women's Health Private Report*; however, only 80 hospitals were eligible for the study after the exclusion criteria were applied (discussed above). In November 2004, a total of 216 surveys were sent to the 80 hospitals eligible for the study (total: 70 CEOs, 78 women's health champions and 68 HRRC contact persons). Reminders were sent to non-respondents via e-mail or fax approximately two weeks after the deadline date, with the final deadline for response three weeks later (February 2005).

The data on hospital peer group, Hospital Report benchmark ranking and hospital budget (total operating revenue for fiscal year 2003/2004) were extracted from existing HRRC data sets designated for research activities. The study was approved by the ethics review boards at both the University of Waterloo and the University of Toronto.

Analysis

The unit of analysis consisted of two levels: individual and organizational. The questions in Table 1 were used to generate a score to determine the level of information use achieved by individuals. SAS 8.2 (Cary, North Carolina) was used to calculate the scores and to conduct the statistical analyses. Each achieved level from reception to impact was assigned a value of 1, where reception had to be reached before cognition was coded, cognition before effort, and so on for a maximum total score of 6. The highest organizational level of information use was based on the highest score from the individual responses for each hospital. Fisher's exact test was used to analyze the frequencies for peer group, women's health programs, women's health as a written

hospital priority and women's health champions among senior management. A generalized linear model (GLM) approach was used to analyze the levels of organizational information use and their relationship with the organizational factors and interactions between them to control for potentially confounding factors. In addition, the generalized model framework handles continuous and categorical factors in a natural fashion. Collinearity, if present, was assessed through correlational analysis, examining the effect of omitting each variable in turn from the model and noting the change in the parameter estimates left in the model (data available on request).

A sensitivity analysis was conducted for two organizational characteristics because of inconsistencies in responses from respondents within organizations: the presence of women's health programs and women's health as a written hospital priority. The two separate assumptions were based on whether one or two of the respondents responded positively on an organizational characteristic. There were no differences in the results based on the sensitivity analysis.

Results

Fifty-eight of 80 hospitals responded with at least one survey (72.5%), and 18 responded with two or more surveys (22.5%). There was no statistically significant difference (p=0.61) in response rates between the three groups of individuals: 35.7% (25/70) of CEOs, 41.2% (28/68) of HRRC contacts and 33.3% (26/78) of women's health champions. However, there was a significant difference (p=0.0004) in response rates across hospital peer groups: 76.3% (45/59) of community, 100% (10/10) of teaching and 27.3% (3/11) of small hospitals responded. Table 2 shows that there was a significant difference (p=.0004) across the peer groups in respondents and non-respondents; respondents were more likely to be a community or teaching hospital, and had a mean hospital budget more than twice the size of non-respondent hospitals (p=0.0007).

TABLE 2. Number and rate of organizational respondents and non-respondents by hospital peer group and budget

Organizational factor	Non-respondent hospitals (N=22)		Respondent hospitals (N=58)		Composition of total respondents (N=58)	*p* value
	Number	%	Number	%	%	
Peer group						0.0004
Small (n=11)	8	72.73	3	27.27	5.17	
Community (n=59)	14	19.18	45	80.82	77.59	
Teaching (n=10)	0	0.0	10	100.0	17.24	
Hospital budget Mean (std)	$59,187,363 (76,274,665)		$165,326,305 (166,386,987)			0.0007

Table 3 shows that the majority of respondents reported receiving and understanding the report (cognition level), but the use of the WHPR declined with subsequent levels of use for both units of analyses, with a greater drop-off from the cognition to effort level. Only 19.0% of individuals and 20.7% of hospitals reported reaching the impact level. Interestingly, every organization that implemented actions stimulated by the WHPR also reported a beneficial impact on its policies, programs or both; thus, impact was the most intense level of information use. For the survey respondents who did not use the WHPR (26.6% individuals; 20.7% organizations), HRRC contacts made up the greatest proportion (47.6%), despite their role in managing information coming from the HRRC. Among those who reported using the WHPR, there was no significant difference identified in the highest level of use among the three groups (p=0.1574).

TABLE 3. Levels of information use achieved and the highest level achieved by respondents

Level of information use	Percentage of respondents who achieved the level of information use		Percentage of respondents who achieved the level of information use as their highest level	
	Individual	Organizational	Individual	Organizational
No use	26.6	20.7	26.6	20.7
Reception	73.4	79.3	5.1	6.9
Cognition	68.4	72.4	25.3	24.1
Effort	43.0	48.3	17.7	20.7
Influence	25.3	27.6	6.3	6.9
Implementation	19.0	20.7	0.0	0.0
Impact	19.0	20.7	19.0	20.7

Among responding hospitals, 86.2% (50/58) currently provide a women's health program, and 17.2% (10/58) have women's health as a written priority. Table 4 provides results from a univariate GLM analysis of relationship between the highest levels of information and each of the organizational factors of interest. In the single-factor model, only peer group, budget and women's health as a written hospital priority were significantly associated with the highest level of information use (p=0.03; p=0.0020; p=0.001, respectively). However, Table 5 shows that in the multivariate model, only the written hospital priority factor and hospital budget (log transformed) were significant, with p-values of 0.01 and 0.02, respectively.

TABLE 4. Results from linear regression models for each of the organizational factors on highest level of information use

Organizational factors	Estimate	Standard error	Confidence interval	*p*-value
Peer group (baseline = teaching hospitals)	–1.54	0.70	(–2.95,–	0.03
Budget	0.75	0.23	0.13)	0.002
Hospital ranking	–0.72	1.03	(0.29,1.22)	0.49
Presence of women's health as a written priority (baseline = absence)	2.27	0.69	(–2.80,1.36) (0.93,3.61)	0.001
Presence of women's health programs (baseline = absence)	0.23	0.40	(–0.57,1.04)	0.54

TABLE 5. Relationships with the highest level of information use and organizational factors (GLM)

Organizational factors	Estimate	Standard error	Confidence interval	*p*-value
Intercept	–7.75	4.31	(–16.40,0.89)	0.07
Budget	0.55	0.24	(0.08,1.03)	0.02
Presence of women's health as a written priority	1.73	0.68	(0.36,3.10)	0.01
R-squared	0.25	—	—	—

Discussion

This study is the first to examine the use of a women's health private performance report among hospitals. Overall, the findings from this study show that reporting on women's health performance may help support improvement in women's health and that mainstreaming women's health into quality improvement in hospitals is possible by making this issue a documented priority for the organization. The findings also emphasize the importance of a strategic focus on women's health that may compensate for some of the historical and social disadvantages that have prevented women and girls from achieving equity with men and boys in health and healthcare (Health Canada 2000). "Equity" and "equality" may be used interchangeably in some organizational strategies. Although they do not mean the same thing, hospitals may apply them in a clinical context to the same ends. The decision to focus on women's health within the hospital may also reflect a more general business strategy to offer such services or programs.

The use of the WHPR was low, and the results suggest problems in sharing data. The WHPR successfully reached 79.3% of the hospitals that responded but only 36.6% of all the individual CEOs, women's health champions and HRRC contacts surveyed. This low level of dissemination among relevant individuals may be the result of poor communication between chief executives and managers or a low priority accorded to women's health. The use of the WHPR declined after reception for subsequent levels of use. The greatest drop-off in information use appears to be between the cognition and effort levels, thus identifying an area where greater efforts are need-

ed to encourage and enable receivers of performance reports to adapt the information for decision-making. The low numbers of those who implemented change as a result of the WHPR (implementation level) is consistent with a study on the California Health Outcomes Project (CHOP) that found that two-thirds of respondents did not take specific actions or make an in-hospital response to the AMI mortality data in the CHOP report (Rainwater et al. 1998). As in that study, the low number of hospitals that acted on the WHPR may be due to a lack of relevant data in the report. Other factors may also account for the low information use, such as the awareness and understanding of the report, human or financial resources, leadership support and limited organizational focus on quality improvement. Hospitals and individuals who reported completing the implementation level of information use also reported experiencing a beneficial impact. This suggests that the WHPR has a part in stimulating action and producing at least some perceived benefits or improvements, a finding that is consistent with other studies on performance report data (Dziuban et al. 1994; Rainwater et al. 1998; Davies 2001; Fung et al. 2008).

Women's health as a written hospital priority is strongly correlated with the hospital budget and an increased use of the WHPR. The observed relationship suggests that larger budgets are associated with more resources for hospitals to express, focus and act explicitly on their formal priorities, and may allow priorities to be devoted to specific areas such as women's health. However, Brownell and colleagues (2001) provided evidence that healthcare reform as a result of budget reductions may result in more efficient healthcare services while maintaining equity.

It is important to note that the reported correlations do not, on their own, indicate causation. In fact, there may still be other, unexplored factors, such as organizational commitment to quality improvement, that could explain the observed relationship. Given the limits on our sample size – the number of hospitals in Ontario – further work may usefully pursue case studies or other qualitative techniques to draw out reasons for the association. Similarly, the association with peer group may mean that hospitals with highly educated teaching clinicians may be more likely to develop or implement women's health programs.

Interestingly, over 86% of responding hospitals had a women's health program, but it was not an influencing factor in the use of the WHPR. This finding implies that simply having a designated women's health program is not enough to drive the use of women's health performance data in hospitals when attempting to improve women's health. This finding also reinforces the fact that women's health as a program is not always the same as women's health as a priority. A program, particularly one with typical foci on gynaecology and obstetrics, does not necessarily mainstream women's health in the organization. In order to increase the use of women's health performance information to improve women's health, future work may usefully focus on assisting organizations in the development and integration of women's health as a formal cor-

porate priority. However, it should be noted that sex-specific and sex-sensitive data may result in different patterns of use, depending on the presence of a women's health program in a hospital, but the study design did not reflect this. Additionally, hospital priorities are the purview of the board of directors, but there was no contact with this group of decision-makers to confirm women's health as a priority in each hospital.

Limitations

There were several limitations to this study. The voluntary nature of study participation has the potential for self-report bias among the 58 hospitals and 79 individuals who responded to the survey. The results of this study are also likely to overstate the findings for hospitals, meaning that we may have overstated the uptake of information. The low response rate may be attributed to the following factors: candidate respondents with competing priorities, survey timing (i.e., surveyed close to and during Christmas holidays), survey burden (i.e., hospital managers in Ontario responded to a large volume of surveys in 2004), and non-traditional survey method as surveys were only e-mailed (or faxed) to potential participants. As well, the request for completing the survey by multiple survey recipients in one organization required further clarification for some respondents. The multiple-respondent survey method may have lowered the response rate as a result of the misunderstanding that only one response was necessary when responses were expected from all survey recipients. All biases in the study are likely to inflate the results on intensity of information use, but these biases are unlikely to affect the observed associations between information use and organizational characteristics. The findings on the intensity of information use and on the associated organizational characteristics suggest that women's health performance data can be introduced or mainstreamed into typical corporate improvement initiatives, but that much effort is required to make women's health a typical corporate priority.

Conclusion

Of course, simply taking the steps described in this paper is not enough to increase the use of performance reports and improve outcomes. Research organizations that want to improve performance – such as those that publish performance reports in Canada – should collaborate with hospitals to provide relevant performance measurements and guide hospitals in the interpretation and use of the information to facilitate improvement in priority areas (Morris and Zelmer 2005). A study on cancer care indicator preferences in Ontario reported that different stakeholders had different preferences and that the "strategies for maximizing the relevance of performance reports might include technical process indicators, selection by multi-stakeholder deliberation, information that facilitates information application and customizable

report interfaces" (Gagliardi et al. 2008: 175). A combination of strategies should be further examined and considered to promote the uptake of future performance reports. Actions to ensure that performance reports bring about awareness and change are important as we promote improvements in women's health.

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RESEARCH PAPER

Costs and Benefits of Free Medications after Myocardial Infarction

Coûts et avantages de la médication gratuite après un infarctus du myocarde

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Abstract

Background: Although combination pharmacotherapy after myocardial infarction dramatically reduces morbidity and mortality, the full benefits of secondary prevention medications remain unrealized owing to medication non-adherence. Because financial barriers are a major determinant of non-adherence, we examined the costs and benefits of providing free medications to myocardial infarction patients who do not have private insurance and are ineligible for substantial public coverage.
Methods: An economic evaluation combining decision analysis and Markov modelling was conducted to compare full public coverage of secondary prevention medications with the status quo. Costs and benefits were estimated using Canadian data wherever possible. The main outcome was the incremental cost-effectiveness ratio measured in cost per quality-adjusted life-year (QALY) gained.
Results: From the perspective of the publicly funded healthcare system, full coverage resulted in greater quality-adjusted survival than the status quo (7.02 vs. 6.13 QALYs) but at increased cost ($20,423 vs. $17,173). The incremental cost-effectiveness ratio (ICER) for full coverage compared to the status quo was $3,663/QALY. This result was robust to a wide range of sensitivity analyses. In a secondary analysis from the perspective of government, the ICER for full coverage compared to the status quo was $12,350/QALY. In this analysis, the ICER was sensitive to changes in price elasticity, but remained below $50,000/QALY as long as the elasticity remained below –0.035.
Interpretation: Public payers in Canada should consider providing secondary prevention medications to myocardial infarction patients without private insurance free of charge. Full public coverage is cost-effective compared to the status quo.

Résumé

Contexte : Bien que la pharmacothérapie multiple suite à un infarctus du myocarde réduise sensiblement les taux de morbidité et de mortalité, on ne profite pas toujours des avantages de la médication secondaire préventive, en raison de la non adhésion au traitement. Étant donné que les obstacles financiers sont un des principaux déterminants de la non adhésion, nous avons examiné les coûts et les avantages liés à l'offre de médicaments gratuits aux patients qui ont subi un infarctus du myocarde, qui n'ont pas d'assurance privée et qui sont inadmissibles à une couverture publique suffisante.
Méthodologie : Une évaluation économique réunissant l'analyse décisionnelle au modèle de Markov a permis de comparer la couverture publique intégrale pour le traitement de prévention secondaire par rapport au statu quo. Les données canadiennes ont été employées pour estimer les coûts et les avantages, là où il était possible de le faire. Le principal résultat a trait au rapport coût efficacité différentiel mesuré selon le coût par années-personnes sans invalidité (APSI).
Résultats : Pour le système public de santé, la couverture intégrale se traduit par une

plus grande survie ajustée pour la qualité de vie comparé au statu quo (7,02 par rapport à 6,13 APSI), mais à un coût plus élevé (20 423 $ par rapport à 17 173 $). Comparé au statu quo, le rapport coût efficacité différentiel (RCED) pour la couverture intégrale est de 3663 $/APSI. Ce résultat demeure concluant en fonction des nombreuses analyses de sensibilité effectuées. Selon une analyse secondaire effectuée du point de vue du gouvernement, le RCED pour la couverture intégrale par rapport au statu quo indique un résultat de 12 350 $/APSI. Dans cette analyse, le RCED était sensible aux changements liés à l'élasticité-prix, mais demeurait sous la barre des 50 000 $/APSI si celle-ci avait une valeur plus faible que -0,035.
Interprétation : Au Canada, les contribuables devraient envisager l'offre gratuite de traitement de prévention secondaire aux patients qui ont subit un infarctus du myocarde et qui ne possèdent pas d'assurance privée. La couverture intégrale est économiquement rentable par rapport au statu quo.

Between 1980 and 2000, mortality from cardiovascular disease in Canada decreased by approximately 50%. A major contributor to this reduction in mortality has been the increased availability and usage of medications for secondary prevention after myocardial infarction (Ford et al. 2007). Clinical practice guidelines recommend that most myocardial infarction patients be prescribed a beta blocker, ASA, an ACE inhibitor and a statin indefinitely, and clopidogrel for one year (Smith et al. 2006). It has been estimated that the first four of these medications reduces mortality after myocardial infarction by 75% to 80% (Hippisley-Cox and Coupland 2005; Wald and Law 2003). The addition of clopidogrel for the first year after myocardial infarction further reduces the risk of cardiovascular death, reinfarction and stroke (Clopidogrel in Unstable Angina to Prevent Recurrent Events Trial Investigators 2001; Chen et al. 2005). Nevertheless, despite advances in the prevention and treatment of myocardial infarction, cardiovascular disease remains responsible for over 30% of deaths in Canada (Statistics Canada 2007).

Many patients do not benefit from secondary prevention medications because of suboptimal adherence (Rasmussen et al. 2007). Although the reasons for poor adherence are varied, increasing evidence suggests that deductibles and co-payments are a major contributor (Goldman et al. 2007). Because the Canada Health Act covers only physician and hospital services, public coverage of pharmaceuticals in Canada is neither universal nor uniform. For example, seniors in Ontario pay only a nominal dispensing fee; an elderly couple in Manitoba with a combined annual income of $30,000 would be required to pay the full cost of an annual $1,100 medication bill; and a 55-year-old man living alone in Saskatchewan would be ineligible for any public drug coverage whatsoever (Demers et al. 2008). Although 58% of Canadians have private

drug insurance, co-payments in these plans can be substantial. Moreover, approximately 11% of Canadians have only catastrophic public coverage, and 4% have no coverage at all (Kapur and Basu 2005).

Given that lower patient charges are associated with improved adherence, and better adherence produces improved health outcomes, it is logical to consider providing effective medications to patients free of charge. Providing secondary prevention medications to myocardial infarction patients in the United States appears to be cost-effective and may even be cost-saving (Choudhry et al. 2007; Choudhry, Patrick et al. 2008). Our objective in this study was to examine the cost-effectiveness of providing free secondary prevention medications to myocardial infarction patients in Canada.

Methods

We performed a cost-utility analysis comparing two policy options, a full-coverage strategy and a status quo strategy. In the full-coverage strategy, the government would pay the full cost of five recommended medications (clopidogrel for one year, and a statin, beta blocker, ACE inhibitor and ASA indefinitely) to patients discharged alive after myocardial infarction. In the status quo strategy, the patient would pay the full medication cost out of pocket – the current situation for patients who do not have private pharmaceutical insurance and are ineligible for substantial public coverage.

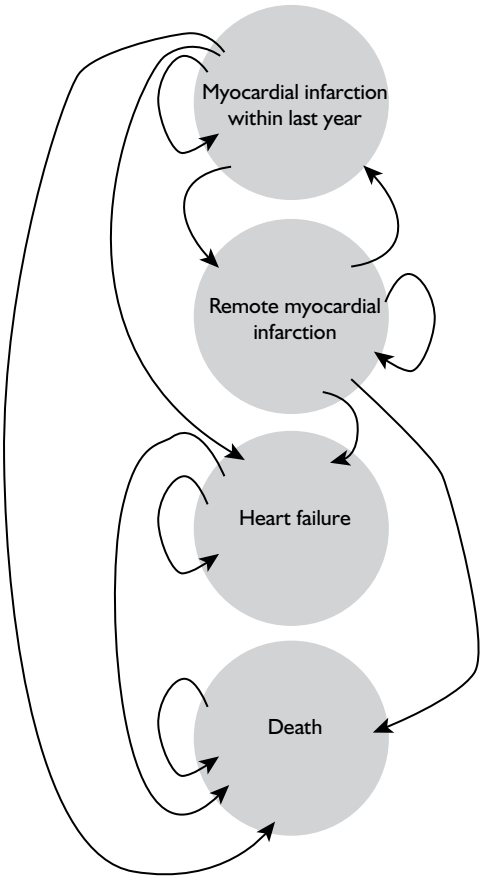
We followed guidelines for economic evaluation produced by the Canadian Agency for Drugs and Technologies in Health. We used a generic outcome measure, the quality-adjusted life-year (QALY), so that our results would be comparable across a variety of interventions and diseases. The QALY incorporates both quality and quantity of life and is the most widely used outcome measure in economic evaluations of health interventions. To be conservative, where assumptions were necessary we made them in a way that would favour the status quo. In addition to the description provided below, additional methodological details are provided in the Appendix to this paper.

Analytic model

We combined decision analysis with Markov modelling, simulating a cohort of patients discharged alive after myocardial infarction. In decision analysis, the expected benefits and cost of two or more options available to a decision-maker are formally compared by calculating the probability and utility of each of the various possible outcomes. Markov models are often used in economic evaluations of health interventions when an individual could transition between different health states in a stochastic manner. Our Markov model had four states: myocardial infarction within the last year, myocardial infarction more than one year ago, heart failure and death. Individuals

could transition through these states each year, as shown in Figure 1. A patient could be hospitalized once per cycle, and we ran the model for 50 years. The model was built following good practice guidelines (Briggs et al. 2006) and analyzed using the TreeAge Pro 2007 software package. As per Canadian guidelines, we used the perspective of the publicly funded healthcare system in our reference case. Medications paid for by patients are included as a cost in this analysis; costs due to lost productivity are not. Because of its relevance to public policy, we also considered the governmental perspective in a secondary analysis. In this analysis, medications paid for by patients are not included as a cost.

FIGURE 1. Model structure. Circles represent states and arrows represent possible transitions. A patient may be hospitalized, if alive, once during any cycle.



Model inputs

We used Canadian data for model inputs where possible and discounted costs and health outcomes at 5% per year in accordance with Canadian guidelines. Model inputs are summarized in Table 1; further details are provided in the Appendix.

TABLE 1. Model inputs

Parameter	Estimate for reference case	Range used for one-way sensitivity analysis	Source(s) for reference case estimate
Adherence			
Percentage of patients with optimal adherence under status quo	47.0%	30%–70%	Yan et al. 2007
Price elasticity	–0.16	–0.30 to –0.02	Contoyannis et al. 2005
Costs			
Cost of hospitalization	$9,363.45	50% to 200% of reference case estimate	Ontario Ministry of Health and Long-Term Care 2007; Bank of Canada 2008; Ontario Ministry of Health and Long-Term Care 2008b
Cost of medications in first year	$2,304.75		Ontario Ministry of Health and Long-Term Care 2008a
Cost of medications in subsequent years	$1,284.44		Ontario Ministry of Health and Long-Term Care 2008a
Percentage of drug costs incurred by optimally adherent patients	100%	—	N/A
Percentage of drug costs incurred by suboptimally adherent patients	0%	0%–100%	N/A
Percentage of drug costs paid by patient in full coverage strategy	0%	0%–100%	N/A
One-year event rates for untreated patients who have recently had a myocardial infarction			
Hospitalization	20.8%	50% to 200% of reference case estimate	Yan et al. 2004
Death	16.0%		Yan et al. 2004
Heart failure	13.3%		Tu et al. 2003
Reinfarction	13.6%		Tu et al. 2003
Risk reduction if treated	75%	40%–90%	Hippisley-Cox et al. 2005
One-year event rates for untreated patients who have heart failure			
Hospitalization	27.5%	50% to 200% of reference case estimate	Ko et al. 2008
Death	22.3%		Ko et al. 2008

TABLE 1. Continued

Risk reduction if treated	36%	20%–50%	Hippisley-Cox et al. 2005
Health state utilities			
Recent myocardial infarction	0.685	0.53–0.84	Clarke et al. 2002
Remote myocardial infarction	0.736	0.59–0.89	Clarke et al. 2002
Heart failure	0.663	0.51–0.81	Clarke et al. 2002
Death	0	—	N/A
Other parameters			
Ratio of events for patients in remote myocardial infarction state compared to recent myocardial infarction state	0.585	0.3–0.9	Capewell et al. 2000
Discount rate	5%	0-5%	Canadian Agency for Drugs and Technologies in Health 2006

ADHERENCE

We modelled adherence dichotomously, with patients being either optimally or suboptimally adherent (Choudhry et al. 2007). We estimated optimal adherence at 47.0% under the status quo strategy (Yan et al. 2007) and used a conservative estimate for demand price elasticity of –0.16 (Contoyannis et al. 2005), meaning that for every 1% increase in price there would be a 0.16% decrease in adherence. In the base case, optimally adherent patients were assumed to derive the full benefit of treatment and suboptimally adherent patients none of the benefit. In sensitivity analyses, we varied the relative benefit of combination pharmacotherapy extensively, recognizing that suboptimally adherent patients may in fact consume a significant proportion of their prescribed medications.

COSTS

We used recent guidelines to determine which medications should be taken by myocardial infarction patients (Smith et al. 2006). Within a drug class, we chose medications and dosages based on assumptions that are consistent with current practice – enteric-coated ASA 81 milligrams daily, metoprolol 50 milligrams twice daily, ramipril 10 milligrams daily and atorvastatin 80 milligrams daily indefinitely, and clopidogrel 75 milligrams daily for one year. We used the Ontario Drug Benefit formulary to obtain prescription drug costs (Ontario Ministry of Health and Long-Term Care 2008a) and visited a commonly used pharmacy chain to estimate the cost of ASA. For

the prescription medications, we also added pharmacy mark-up and dispensing fees consistent with legislation and current pharmacy practices.

We used 2006 data from the Ontario Case Costing Initiative (Ontario Ministry of Health and Long-Term Care 2007) to estimate the cost of a hospitalization for the most frequent complications that occur after myocardial infarction: heart failure, unstable angina and reinfarction. Because the variation in costs between these diagnoses was relatively small, we calculated a weighted average and used this as the estimate for all hospitalizations. We adjusted for inflation using the Canadian Consumer Price Index (Bank of Canada 2008). Because the data from the Ontario Case Costing Initiative do not include physician costs, we used the Ontario Health Insurance Plan fee schedule to estimate physician charges (Ontario Ministry of Health and Long-Term Care 2008b).

In accordance with Canadian guidelines, we did not include costs due to lost productivity or costs due to ongoing medical care. We also excluded time costs to patients and their families because these costs are difficult to estimate and overestimating them would have biased our study in favour of the full-coverage strategy.

OUTCOMES

Owing to the sequential introduction of secondary prevention medications into clinical practice, there are no randomized controlled trials comparing all five recommended medications with none. Accordingly, we used observational data to estimate relative risk and event rates. We estimated that combination pharmacotherapy would reduce adverse outcomes for individuals in the recent myocardial infarction or remote myocardial infarction states by 75%, using data from a published case-control analysis (Hippisley-Cox and Coupland 2005). We conservatively assumed that patients in the heart failure state would benefit only from beta blockers and ACE inhibitors and therefore estimated that treatment would reduce the risk of death by only 36% (Hippisley-Cox and Coupland 2005). This is likely a conservative assumption given that meta-analyses of beta blockers alone suggest a risk reduction of 38% (Fauchier et al. 2007). Because of the central importance of these parameters in our model, we varied them extensively in sensitivity analyses.

We used Canadian registry data and population-based observational studies to estimate the current rates of complications after myocardial infarction (Ko et al. 2008; Tu et al. 2003; Yan et al. 2004; Lee et al. 2004) and the proportion of patients currently receiving combination pharmacotherapy (Cox et al. 2005; Ko et al. 2008; Jackevicius et al. 2003).

Because complication rates are higher in the first year after a myocardial infarction than they are subsequently, we used long-term outcomes data from a population-based

study (Capewell et al. 2000) to estimate the ratio between outcomes after one year to outcomes in the first year. This ratio is consistent with estimates from long-term trial data (Law et al. 2002). Failing to make this estimation would have resulted in our model's inappropriately favouring the full-coverage strategy.

UTILITIES

We used EQ-5D survey data collected from patients enrolled in the United Kingdom Prospective Diabetes Study (UKPDS) to estimate health state utilities (Clarke et al. 2002). (The health state utility is a number corresponding to the desirability of a particular state of health. Perfect health has a value of one, and death has a value of zero.) Although most myocardial infarction patients do not have diabetes, we were unable to find a similarly relevant and rigorous study conducted in a non-diabetic population. The UKPDS study provided utility estimates for myocardial infarction within the previous year, myocardial infarction prior to the previous year, heart failure in the previous year and heart failure prior to the previous year. We averaged the two heart failure utility values to calculate the heart failure utility estimate for our model. According to convention, the utility of death was assumed to be zero.

> The results from our study suggest that providing free medications to myocardial infarction patients would result in significantly improved outcomes at relatively low cost …

Sensitivity analyses

In the reference case, we performed one-way sensitivity analysis on all parameters for which it was logical, as shown in Table 1. Because data to suggest upper and lower limits for each parameter are generally unavailable, and because probability sensitivity analysis was unfeasible owing to an absence of the necessary data required to estimate probability distributions, we chose very wide ranges to account for uncertainty associated with model inputs. We also altered the medication regimen in two clinically relevant ways: we substituted valsartan 160 milligrams twice daily (Pfeffer et al. 2003) for ramipril to consider patients who are intolerant of ACE inhibitors, and we extended the duration of treatment with clopidogrel indefinitely to consider patients with drug-eluting stents.

We performed a similar series of sensitivity analyses for the secondary analysis from the governmental perspective. In the secondary analysis we also varied the degree

of cost-sharing, because the degree of cost-sharing would be expected to have a significant impact on both adherence and government costs (further details in the Appendix).

Results

Reference case

The model predicted that implementing the full-coverage strategy would result in average survival of 7.02 QALYs after myocardial infarction at an average cost of $20,423 per patient. The status quo strategy resulted in average survival of 6.13 QALYs at an average cost of $17,173 per patient. The model predicted an average incremental improvement in health, with the full-coverage strategy of 0.89 QALYs at a cost of $3,250 per patient, for an incremental cost-effectiveness ratio (ICER) of $3,663/QALY (Table 2). The $314 difference in hospitalization costs between the two strategies was small compared to the $2,936 difference in medication costs. Before adjusting for quality of life, the model predicted an average increase in survival with the full-coverage strategy of 1.2 years.

TABLE 2. Costs and benefits in the reference case

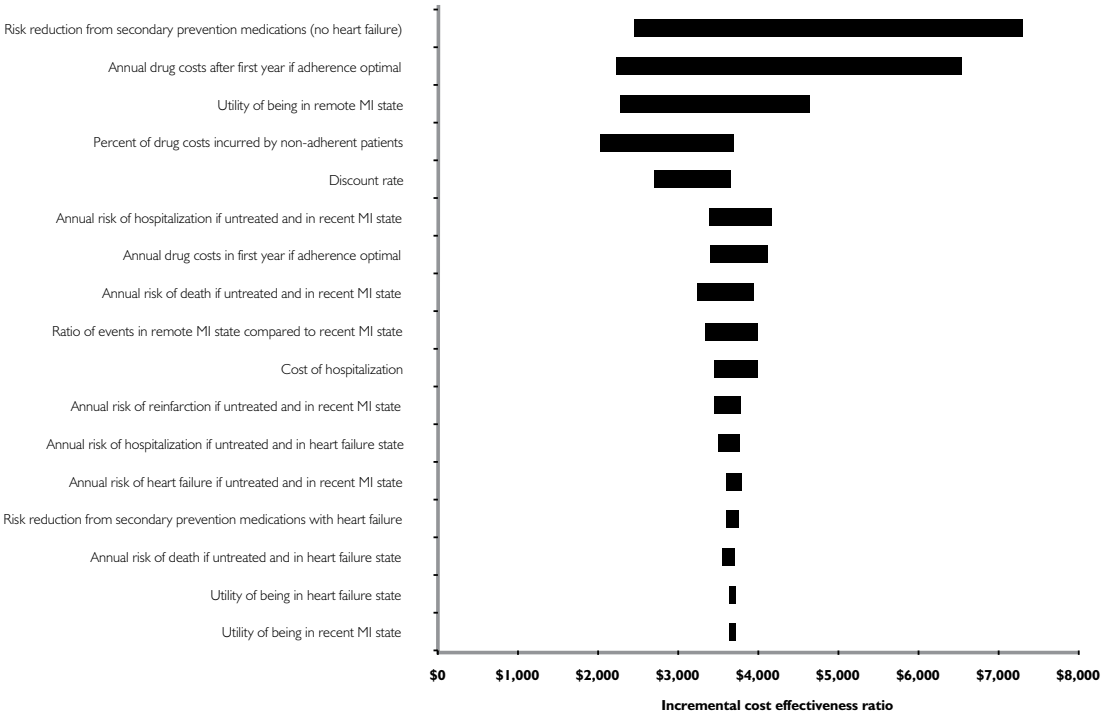
	Status quo	Full coverage	Difference
Costs ($)			
Prescription drugs	7,707	10,643	2,936
Hospitalizations	9,466	9,780	314
Total	17,173	20,423	3,250
Effectiveness (QALYs)	6.13	7.02	0.89
Incremental cost-effectiveness ratio ($/QALY)			3,663

Sensitivity analyses

The reference case results were robust to wide variations in all model inputs (Figure 2). The ICER was most sensitive to medication costs and the risk reduction conferred by combination pharmacotherapy. The model predicted that if medication costs after the first year could be lowered by 50%, the ICER would fall to $2,241/QALY, and that if the true risk reduction from secondary prevention medications were only 40%, the ICER would be $7,272/QALY.

Substituting valsartan for ramipril increased the ICER to $5,523/QALY, and extending the duration of treatment with clopidogrel indefinitely increased the ICER to $5,923/QALY.

FIGURE 2. Tornado plot showing one-way sensitivity analyses in the reference case



Analysis from a governmental perspective

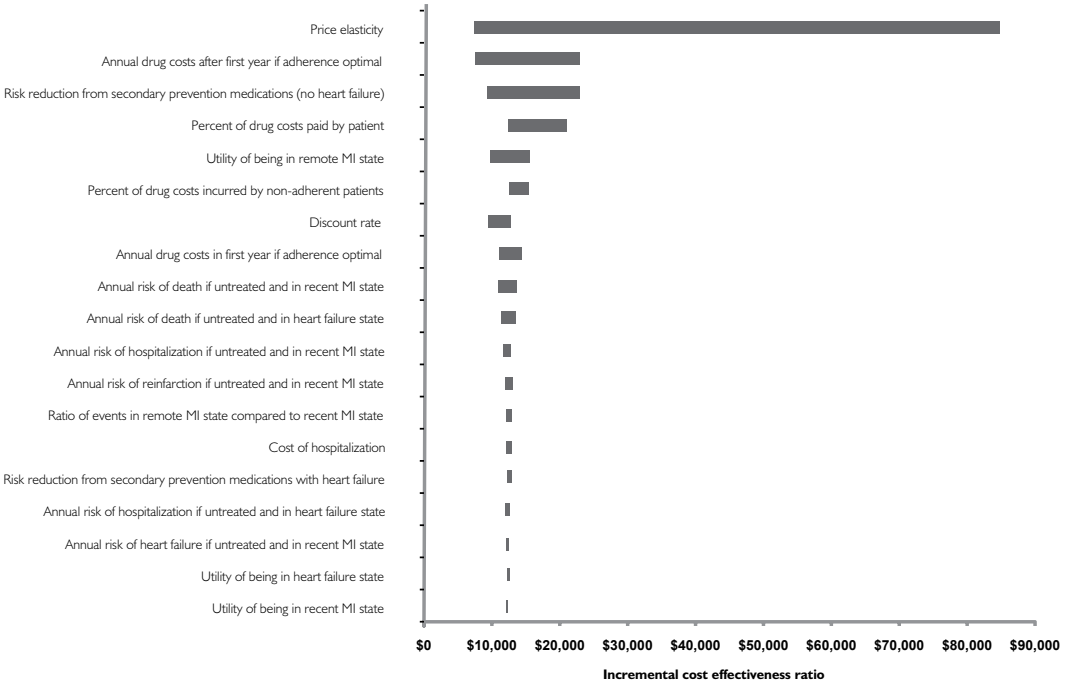
Because the governmental perspective model differed from the reference case only in its assignment of prescription drug costs, the average quality-adjusted survival in each arm and the cost in the full-coverage arm was the same as for the reference case. However, the cost in the status quo arm was much lower, as prescription drug costs in this arm are borne privately (Table 3). Comparing full coverage with the status quo, the model predicted an ICER of $12,350/QALY.

TABLE 3. Costs and benefits in the secondary analysis

	Status quo	Full coverage	Difference
Costs ($)			
Prescription drugs	0	10,643	10,643
Hospitalizations	9,466	9,780	314
Total	9,466	20,423	10,957
Effectiveness (QALYs)	6.13	7.02	0.89
Incremental cost-effectiveness ratio ($/QALY)			12,350

The results of the secondary analysis were most sensitive to changes in elasticity (Figure 3). A threshold analysis showed that the elasticity would have to approach perfect inelasticity (elasticity closer to zero than –0.035) for the ICER to exceed $50,000/QALY. Varying the degree of cost-sharing in the status quo arm had a relatively small effect.

FIGURE 3. Tornado plot showing one-way sensitivity analyses in the secondary analysis



Discussion

Complications after myocardial infarction are common and result in significant morbidity and mortality. Adherence to medications proven to reduce these complications is suboptimal, and a major reason for poor adherence is cost. The results from our study suggest that providing free medications to myocardial infarction patients would result in significantly improved outcomes at relatively low cost; the incremental cost-effectiveness ratios of $3,663/QALY from the perspective of the publicly funded healthcare system and the ICER of $12,350/QALY from the governmental perspective are both significantly below widely used thresholds used to decide whether novel health technologies should be eligible for public funding (Culyer et al. 2007; Laupacis et al. 1992).

Strengths and limitations

Our study has several strengths. First, we used population-based observational data for hospitalization costs, event rates and risk reductions. The findings from these studies are likely to be more representative of patients in clinical practice than data from randomized controlled trials (Avorn 2007). Second, despite conservative assumptions, our results were robust to very wide variations in model inputs. Finally, we discuss an intervention that is feasible and represents an innovative approach to improving health outcomes.

Several studies have examined the impact of cost-sharing on prescription drug adherence within government-funded pharmaceutical programs in Canada (Tamblyn et al. 2001; Li et al. 2007; Anis et al. 2005; Wang et al. 2008; Schneeweiss et al. 2007a,b), and at least one study has examined the impact of cost-sharing for patients who have private drug insurance (Ungar et al. 2008). Even with relatively small co-payments, all these studies have found that cost-sharing significantly reduces adherence even after myocardial infarction (Schneeweiss et al. 2007a,b). We are unaware of any Canadian studies comparing adherence between public drug plan beneficiaries and those without any drug coverage, but a study making this comparison in the American setting documented markedly reduced statin use among those without coverage (Federman et al. 2001).

Two studies have examined the cost-effectiveness of free medications after myocardial infarction in the United States, one in the context of a private insurance plan and one in the context of the government-funded Medicare program (Choudhry et al. 2007; Choudhry, Patrick et al. 2008). The US Medicare study found that free medications would likely be cost-saving from a societal perspective. In contrast, we found that free medications would result in health improvements but at increased cost – the typical circumstance associated with improvements in healthcare (Ginsburg 2004).

We may have underestimated the cost-effectiveness of providing secondary prevention medications for several reasons. First, we did not include stroke in our model because the available data were not as robust as for other outcomes, and we wished to be conservative rather than risk overestimating the cost-effectiveness of the full-coverage strategy. Medications used to reduce cardiovascular risk after myocardial infarction also reduce the risk of stroke (Fletcher et al. 2007), an outcome with both significant morbidity and cost. Second, we excluded outpatient costs, which would be higher for those who suffer post-MI complications. Third, we chose a medication regimen that is more expensive than that used in other studies (Choudhry et al. 2007; Choudhry, Patrick et al. 2008). Medication costs are also likely to decrease as patents expire, so the cost-effectiveness of full coverage would improve over time. Fourth, our risk reduction estimate may be overly conservative because it was calculated using data from patients who were treated before clopidogrel was used for secondary prevention.

Our study also has two noteworthy limitations. First, the dichotomization of

adherence in our model is an oversimplification. In clinical practice, patients may take anywhere from 0% to 100% of their recommended medication doses. However, simplification is obligatory in modelling, and one advantage of dichotomizing adherence is that it improves comprehension. To address this limitation we extensively varied the percentage of adherent patients, the drug costs of suboptimally adherent patients and the relative risk reductions in sensitivity analyses. Furthermore, in the analysis considering the governmental perspective, we performed a threshold analysis on elasticity, and determined that the elasticity would need to be very close to zero for the ICER to rise to $50,000/QALY. Second, we used data from the United Kingdom Prospective Diabetes Study to estimate health state utilities (Clarke et al. 2002) because similar data from a population of individuals without diabetes were unavailable. Because quality of life is reduced by the complications of diabetes more so than diabetes itself, we believe the usage of utilities from the UKPDS is reasonable. Moreover, because individuals with diabetes generally have worse health than individuals without diabetes, any potential bias introduced by using utilities from patients with diabetes would lead to our model's favouring the status quo strategy. This assertion is supported by the finding that health state utilities in the UKPDS study (Clarke et al. 2002) were lower than in a study of myocardial infarction patients (Tsevat et al. 1993).

Policy implications

The best evidence of the impact of providing free medications would come from a randomized controlled trial; such a trial is being undertaken within a private insurance plan in the United States, and results are expected in 2010 (Choudhry, Brennan et al. 2008). Whether a similar trial would be acceptable to policy makers in a publicly funded healthcare system like Canada's is uncertain (Maclure et al. 2007). Results from a trial conducted in a population of individuals with private insurance may also not be generalizable to Canadians with neither public nor private insurance. In the absence of trial data, policy makers may need to rely on modelling to assess the potential impact of new policies; these policies should then be rigorously evaluated as they are implemented.

The findings of our study suggest that policy makers should consider providing medications free of charge to myocardial infarction patients who do not have private insurance and are ineligible for substantial public coverage. Compared to drugs recently recommended for listing on provincial formularies in Canada, the full-coverage strategy described in our study has a highly favourable incremental cost-effectiveness ratio. For example, compared with standard care, adalimumab in Crohn's disease has an incremental cost-effectiveness ratio of over $100,000 per QALY (Canadian Agency for Drugs and Technologies in Health 2007).

Although it would likely be feasible from a technical standpoint to provide free medications only to patients who have suffered a myocardial infarction, it is unclear

whether this would be good policy. Policy makers may wish instead to consider providing medications free of charge to all patients with chronic illnesses where specific drug treatments are known to be both highly cost-effective and associated with poor adherence. Prospective natural experiments confirm that policies that affect out-of-pocket pharmaceutical expenditures also affect adherence (Chernew et al. 2008; Doshi et al. 2009). Furthermore, formal economic evaluations demonstrate that eliminating out-of-pocket payments would likely be a cost-effective use of resources not only for secondary prevention after myocardial infarction but also for the prevention of kidney and cardiovascular disease in patients with diabetes (Rosen et al. 2005). Examples of other diseases where medications are highly effective yet associated with poor adherence include asthma, epilepsy, heart failure, hypertension, hyperlipidemia and osteoporosis. Economic evaluations might also demonstrate the cost-effectiveness of providing medications free for patients with these and other conditions. Obviously, the budget impact of providing medications for free would vary considerably by province, given the different structure of existing provincial insurance plans and the varying rates of private insurance coverage.

Such a change in Canadian pharmaceutical policy would be broadly consistent with what is called "value-based insurance" in the United States (Chernew et al. 2007). Value-based insurance designs impose significant cost-sharing on "low value" interventions and little or no cost-sharing on "high value" interventions. Taking the principles of value-based insurance to their logical end would result in a system of financing similar to Canada's coverage of physician and hospital care, where cost-effective interventions are generally provided free of charge and cost-ineffective interventions are not covered at all (Dhalla and Kiran 2008). Although the financing of physician and hospital care in the United States and Canada differs substantially, pharmaceutical financing in the two countries is more similar than the casual observer might suspect. In both countries, private insurance is the predominant source of financing for prescription drugs, public funding covers some of the population, and many individuals have no coverage at all. Providing medications free of charge where they are likely to have the most value is one way for policy makers in both countries to allocate limited public resources more efficiently than is currently the case.

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To view the appendix, please visit
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RESEARCH PAPER

Public Reporting of Nursing Home Quality of Care: Lessons from the United States Experience for Canadian Policy Discussion

Diffusion publique d'information au sujet de la qualité des services dans les maisons de soins infirmiers : leçons à tirer de l'expérience aux États-Unis pour éclairer la discussion politique au Canada

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Abstract

While the demand for continuing care services in Canada grows, the quality of such services has come under increasing scrutiny. Consideration has been given to the use of public reporting of quality data as a mechanism to stimulate quality improvement and promote public accountability for and transparency in service quality. The recent adoption of the Resident Assessment Instrument (RAI) throughout a number of Canadian jurisdictions means that standardized quality data are available for comparisons among facilities across regions, provinces and nationally. In this paper, we explore current knowledge on public reporting in nursing homes in the United States to identify what lessons may inform policy discussion regarding potential use of public reporting in Canada. Based on these findings, we make recommendations regarding how public reporting should be progressed and managed if Canadian jurisdictions were to implement this strategy.

Résumé

Alors qu'au Canada, la demande pour les services de soins de longue durée connaît une augmentation, la qualité de tels services est de plus en plus examinée en profondeur. L'emploi de la diffusion publique des données sur la qualité a été proposé comme moyen de stimuler l'amélioration de la qualité et de favoriser la transparence et l'obligation publique de rendre des comptes en matière de qualité des services. L'adoption récente de l'instrument d'évaluation du pensionnaire (IEP) par de nombreuses administrations canadiennes implique l'existence de données normalisées sur la qualité, qui peuvent permettre d'effectuer des comparaisons entre établissements aux niveaux régional, provincial et national. Dans cet article, nous examinons les connaissances actuelles sur la diffusion publique d'information des maisons de soins infirmiers aux États-Unis et nous dégageons les leçons qui peuvent éclairer la discussion politique quant à l'utilisation éventuelle d'une telle diffusion au Canada. À partir de ces résultats, nous proposons des recommandations quant au développement et à la gestion de la diffusion publique d'information pour les administrations canadiennes qui souhaitent mettre en place une telle stratégie.

Concern about the quality of care in Ontario's long-term care facilities has received wide news coverage across Canada, and a recent national report documents substandard quality of care (National Advisory Council on Aging 2005). In Alberta, reports of inferior-quality care (Health Quality Council of Alberta 2008; Auditor General Alberta 2005) and a series of tragic injuries and deaths in long-term care facilities have led to the promulgation of new standards by

government agencies. In the United States, long-standing concerns about abysmal conditions in long-term care facilities led to sweeping reforms in the late 1980s and since, including mandatory standardized resident assessment and reporting to the federal government on resident care.

The need for continuing care services in Canada is steadily increasing (Statistics Canada 2005). In 2006, the age of 13.7% of Canadians was 65 or greater (Statistics Canada 2006); by 2011 this figure is projected to rise to 14.4% and by 2031, 23.4% of the population is expected to be 65 years or over (Statistics Canada 2005). In Canada, the term "continuing care" refers to the full continuum of chronic care services (known in the United States as the long-term care continuum). Long-term care facilities are nursing homes, although they can also include auxiliary hospitals that function as residential chronic care facilities. Between 2001 and 2011, an estimated 370,849 Canadian seniors will spend some time in a continuing care setting (Statistics Canada 2001). While the need for these services is increasing, the sector is currently facing numerous staffing and resource challenges. For example, 70% of the continuing care workforce has little or no formal education (Auditor General Alberta 2005), although the complexity of care required by residents continues to increase. While attempting to address these challenges, continuing care providers also need to begin exploring new mechanisms to stimulate and encourage continuous quality improvement within facilities to ensure that residents receive the highest quality of care possible.

In Canada, public reporting of quality indicator data is currently being explored as a method of stimulating quality improvement in the healthcare sector. The United States has adopted public reporting in some sectors, including hospitals through the Joint Commission, to help provide accountability, stimulate quality improvement and encourage consumer choice (Mukamel et al. 2007; Marshall et al. 2000). This strategy is based on the assumption that public reporting will promote transparency by informing consumers about the quality of care provided in individual facilities, thereby allowing them to be more involved in their healthcare decisions and at the same time increase accountability and improve performance in the healthcare system (Schauffler and Mordavsky 2001; Marshall et al. 2000). With a largely private healthcare system in the United States, there is also the assumption that public reporting will contribute to competition among healthcare facilities, forcing them to compete on quality in order to attract the largest number of consumers (Stevenson 2006; Mor 2005).

All US nursing homes that accept Medicare and Medicaid funding must publicly report their data through the Nursing Home Compare (NHC) website (http://www.medicare.gov/NHCompare). This website contains information on nursing home characteristics, quality measures and inspection results and makes information accessible to providers so that they can identify potential quality concerns and improve care processes (Harris and Clauser 2002). The NHC website was developed through a series of events related to the *Omnibus Budget Reconciliation Act* (OBRA) of 1987.

This Act mandated the implementation of the Resident Assessment Instrument (RAI) Minimum Data Set (MDS), a standardized assessment tool developed by interRAI, an international research collaborative, to capture essential information about the health, cognitive, sensory, functional and physical status of nursing home residents. The MDS was initially intended for use as a care planning tool but has since been adopted as the basis for a prospective payment system and a research and policy development tool, and is the foundation for the development of quality indicators (Harris and Clauser 2002). In 1998, the Centres for Medicare and Medicaid Services (CMS) launched the NHC website. At that time, the website posted deficiency citations and later expanded to include information on resident characteristics, nursing staff levels and complaint investigation data. The website has since evolved to include information on 14 long-stay and five short-stay quality measures derived using the MDS data.

Despite recent efforts to improve quality of care, quality concerns remain prevalent in the continuing care sector in both Canada and the United States.

In addition to NHC, some US states have designed and maintained state nursing home websites. The websites vary in the type and amount of information that is included, with most sites including a link to the NHC website. Some sites include additional information, such as the name of the administrator at each facility, while other states need to invest more resources into their sites to ensure comprehensive and accurate information is reported (Harrington et al. 2003).

Despite recent efforts to improve quality of care, quality concerns remain prevalent in the continuing care sector in both Canada and the United States. Supporters of public reporting believe that issuing public report cards for continuing care facilities will help improve the overall quality of care. However, nursing homes may defy the standard assumption that public reporting will stimulate competition, and that a reported decrease in quality will result in a decrease in business (Grabowski and Castle 2004). This assumption holds only if supply and demand are balanced, or there is an excess supply of nursing home beds, and if consumers have the option of exercising choice about which nursing home they enter. Later in this paper, we will discuss ways in which this model may fail.

In Canada, transparency in publicly funded healthcare and a growing demand for greater public accountability are two motivating factors supporting public reporting (CHSRF 2007). The Romanow report stated that transparency in provision of care is an important expectation of healthcare organizations (Health Quality Council 2006). Some public reporting is currently being conducted by the provincial and federal governments, advocacy groups, independent agencies and arms-length agencies estab-

lished by governments (CHSRF 2007). In Ontario, the Ministry of Health and Long-Term Care (2009) publicly reports information on Ontario's long-term care facilities. The ministry's website allows consumers to compare up to four facilities while looking at the number of citations and unmet standards at each facility, as well as the provincial averages. Although the information is not kept up to date, relevant dates appear on the website. There are also agencies in Canada, such as the Health Quality Council of Saskatchewan and of Alberta, that are independent organizations with legislated mandates to report publicly on quality of care (Health Quality Council 2006). Although forms of public reporting do exist for healthcare in Canada, currently there is no legislation mandating reporting of continuing care quality information.

The discussion and consideration of publicly reporting continuing care data are related to the wealth of data that will soon be available in Canada. The country has recently begun adopting the RAI tools in continuing care facilities throughout multiple jurisdictions. Several provinces have mandated the implementation of the tools, creating a standardized set of variables that could be used to compare facilities across regions, provinces and nationally. This paper explores what is currently known about the use of public reporting in healthcare and nursing homes in the United States to determine what lessons can be learned when implementing a public reporting system.

Methods

In May 2008, we conducted a comprehensive search to retrieve all literature relevant to the public reporting of nursing home quality of care in the United States and Canada (see Figure 1 for a detailed summary of the search strategy). The following search terms were used in CINAHL Plus with full text (1937 to present), Pubmed (1950 to present) and Web of Science: Minimum Data Set, MDS, Resident Assessment Instrument, RAI, long-term care, LTC, nursing home, care home, continuing care, facility living, institutional care, home for the aged, quality of healthcare, quality of care, quality outcome, quality improvement, quality indicator, quality measure, report, public report, report card, nursing home compare. A research assistant (KD) scanned all abstracts and retrieved relevant papers. Reference lists of relevant papers were scanned for additional papers. We included papers that reported empirical findings from studies of the use of public reporting systems in long-term care, and papers that reported empirical results of surveys about public reporting in nursing homes and long-term care. Descriptive and observational study designs to evaluate public reporting in long-term care were included. Studies conducted to evaluate public reporting in the long-term care setting (n=6) are reported in Table 1. In addition, a number of opinion-based articles (n=16) and select studies conducted to evaluate public reporting in other health sectors (n=4) were retrieved to inform our review.

FIGURE 1. Flow chart of search and article selection strategy

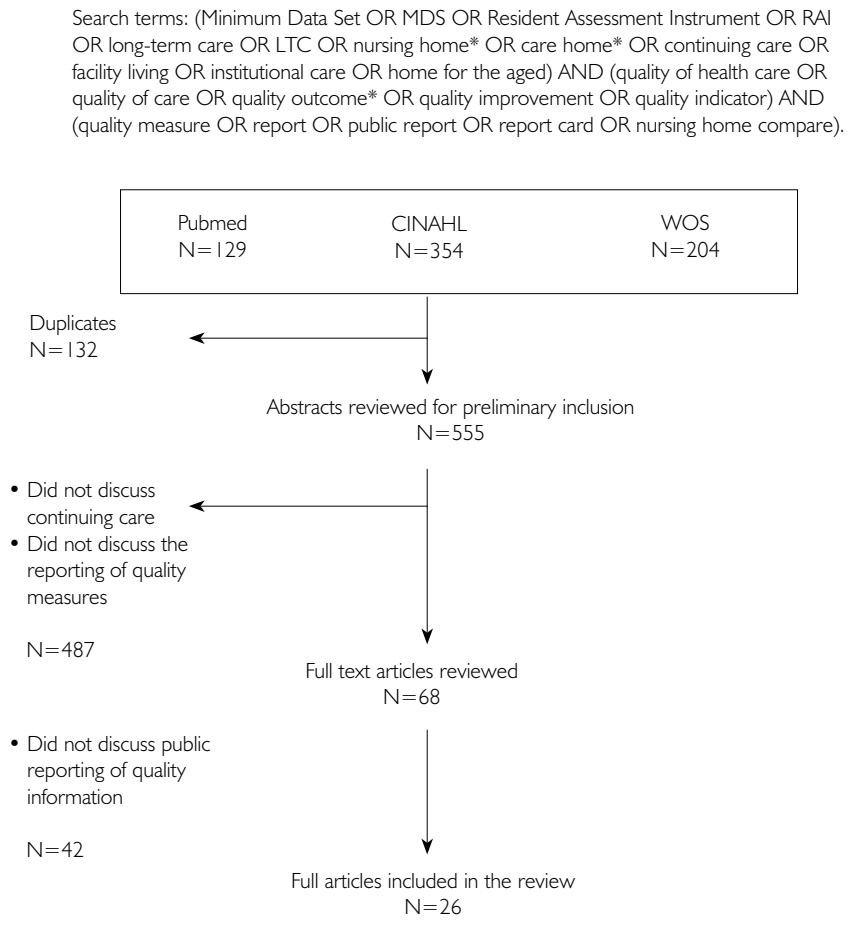

TABLE 1. Studies evaluating public reporting in the nursing home sector

Reference	Aims	Design and sample characteristics	Main findings	Methodological strengths or shortcomings
Castle, N. 2005	To examine administrators' opinions of the Nursing Home Compare (NHC) website initiative and its influence on quality improvement	Design: Cross-sectional survey Sample size: n=324 Subjects: Nursing home administrators Setting: Four states Country: USA Response rate: 68%	90% had viewed the NHC website. 51% said they would, in the future, use the information for quality improvement purposes. 33% said they were currently using the information for quality improvement purposes.	Potential for response bias Restricted to four states of USA Administrators' opinions were used as a proxy for those of consumers.

TABLE 1. Continued

Reference	Aims	Design and sample characteristics	Main findings	Methodological strengths or shortcomings
Castle, N. and T. Lowe 2005	To identify which states produce nursing home report cards To compare information contained in the report cards To identify sources of information used in the report cards To examine factors identified as being associated with the usefulness of the report cards	Design: Exploratory descriptive study Sample size: n=19 states Setting: Nursing home Country: USA	19 states were identified as having nursing home report cards. Although the data sources did not vary considerably, the information included in the nursing home report cards varied significantly. Across states, there was substantial variation in the method of presentation of the information. Sources of information used in the report cards included annual licensure and recertification inspection reports, MDS data and primary data such as satisfaction survey data. Factors identified to be associated with the utility of report cards included a user-friendly structure, explanatory information and navigation aids, layering information for a diverse audience, using a stepwise approach to minimize complexity in decision-making, explanation about how and why to use quality information in decision-making, large font size and ample white space.	The researchers undertook evaluations of the utility of the report cards. Thus, the opinions of consumers were not sought in this study.
Castle, N., J. Engberg and D. Liu 2007	To examine changes in quality measure scores over one year To assess whether competition and/or demand have influenced changes in the scores	Design: Cross-sectional data collected at two time points, a year apart Data sources: The NHC website and the On-line Survey Certification and Recording (OSCAR) system Setting: Nursing home Country: USA	An average decrease in scores occurred for eight quality measures, while there was an average increase in scores for six quality measures. An average of less than 1% change in the quality measures was reported. An association was found between (a) competition and improved quality measure scores and (b) lower occupancy and improved quality measure scores.	Changes in quality observed are not necessarily the result of the report card availability. RAI-MDS reporting by facilities may have changed during the year.
Grando, T., M. Rantz and M. Maas 2007	To elicit the opinions of nursing home staff on a quality performance feedback quality improvement intervention	Design: Qualitative exploratory descriptive study Sample size: n=9 nursing homes (six of which had received the intervention) Subjects: Facility staff directly involved in a prior QI Feedback Intervention trial Setting: Nursing homes in one state Country: USA	Of the six nursing homes that received the feedback intervention, all found the QI Feedback reports useful. The reports helped identify potential quality problems and enabled tracking of the potential problems over time. Accuracy of the QI reports was questioned; this prompted critique of the RAI-MDS assessments undertaken by staff. Willingness of administrators to change practice based on the feedback reports varied.	This study was conducted in a small number of facilities in one state in the USA. Therefore, generalizing the findings beyond this setting is difficult.

TABLE 1. Continued

Reference	Aims	Design and sample characteristics	Main findings	Methodological strengths or shortcomings
Mukamel, D., W. Spector, J. Zinn, L. Huang, D. Weimer and A. Dozier 2007	To examine nursing home administrators' responses to public reporting through Nursing Home Compare	Design: Cross-sectional survey Sample size: n=724 Subjects: Chief administrators Setting: Nursing homes nationally Country: USA Response rate: 48%	82% of administrations had viewed their scores on at least one occasion. 69% of respondents reported having viewed their scores for the first and subsequent publications. 60% of respondents believed that quality of care (among other factors) influenced the quality measures. Less than 1% of respondents believed the report card data (quality measures and deficiency citations) were the most important factor in consumer decision-making. In response to publication of quality measures, 63% of respondents reported having investigated their scores, 42% reported having re-prioritized their quality improvement program, and 20% initiated a new quality improvement program and sought assistance from their Quality Improvement Organization (contracted by Centers for Medicare and Medicaid Services).	National sample Potential for self-report bias
Stevenson, D. 2006	To determine whether findings of public reporting in the acute care setting can provide insights for public reporting in the nursing home sector To evaluate the effects of public reporting of nursing home data to date	Design: Longitudinal observational study, including OSCAR data from pre- and post-release of Nursing Home Compare Data sources: The NHC website and the On-line Survey Certification and Recording (OSCAR) system Setting: Nursing home Country: USA	Reports of quality data appear to have a very small influence on nursing home occupancy rate.	Absence of a control group Occupancy rate, as a dependent variable, is limited by the capacity for occupancy to change in response to quality.

Framework used to analyze the literature

We did not find existing frameworks to guide our analysis of this literature, but two dominant themes emerged in the review: issues related to accountability for quality, and issues related to consumer choice. We used these two themes to guide our analysis and to frame the presentation of findings and discussion.

Results

A large proportion of the literature on public reporting discusses the healthcare sector

in general, particularly reporting on acute care hospitals. A small proportion is specific to long-term care, and we largely restricted our analysis to this literature, including discussion about public reporting in other healthcare sectors only as background. All the research conducted to examine the influence of public reporting in long-term care that we located has been undertaken in the United States. The overall findings related to use and impact of public reporting are inconclusive. Although Nursing Home Compare receives over 100,000 hits per month, there is no mechanism to identify who is accessing the data or to determine how the information is being used (Stevenson 2006; Mor 2005).

The effect of public reporting on the quality of care

Recent studies show mixed results with respect to the effect of public reporting of long-term care facility performance data on quality improvement and consumer choice (Mukamel et al. 2007). One study reported that a considerable number of facilities have shown an increase in their quality measure scores (high scores signify potential quality problems) since the launch of NHC (Castle et al. 2007). There is evidence to suggest, however, that the use of facility feedback reports can lead to improved quality of care. Grando and colleagues (2007) found that the use of feedback reports with nursing home staff helped with benchmarking and tracking. They also found that additional support in the form of consultation with advanced practice nurses helped the staff to learn and implement best practices based on the information in the report. These results suggest that there is potential for public reporting to eventually translate into increased quality of care, provided that the staff are accessing the reports and have access to a consultant to assist with the establishment and implementation of best practices.

The effect of public reporting on accountability

Two studies surveying nursing home administrators following the launch of NHC found a small impact of public reporting on accountability (Mukamel et al. 2007; Castle 2005). In a survey conducted by Mukamel and colleagues (2007), 69% of the surveyed facilities reported consistently checking their scores on the NHC website. Forty-two per cent of facilities indicated that they had changed their priorities or existing quality assurance programs based on the data that they had seen, and 20% were more motivated to start new quality programs. In a survey conducted by Castle (2005), 33% of surveyed administrators were using information posted on the NHC website, and 51% planned to use the information to assist with their quality improvement plans in the future.

Reaction to public reporting by providers

When data are reported publicly, providers appear to be more concerned about certain aspects of the information, particularly the quality of data used in reporting. Several concerns have been expressed regarding the NHC website. Mukamel and colleagues (2007) found that nursing home administrators were undecided about whether the data reported on the NHC website were a valid measure of the quality of care provided in their respective facilities. Other concerns have been expressed regarding the validity of the data being used to calculate the measures (Mukamel et al. 2007; Castle 2005). However, 60% of the administrators believed the quality indicators were influenced, at least in part, by the quality of care provided. Administrators responding to Castle's (2005) survey were critical of the risk adjustment methods used, but the majority of their concerns related to a lack of understanding of how the risk adjustment was conducted. They were also averse to posting of the deficiency citations on the website.

Use of publicly reported information for consumer choice

The evidence regarding the use of publicly reported data by long-term care consumers is scant. Castle's (2005) study of nursing home administrators found that although administrators reported that the information on NHC was very helpful for their purposes, they did not believe it would be as relevant to or beneficial for consumers. They were also concerned about the ease of use, understandability and interpretability of the information for consumers. The administrators were not confident that the NHC information would have utility for consumers choosing a facility. Moreover, they were skeptical about whether NHC information had been used by potential residents of their facilities and even more skeptical about whether such information had discouraged potential residents. Similar to the findings of Castle, Mukamel and colleagues (2007) found that administrators perceived the quality report card information to have minimal influence on consumer choice, and 74% of administrators reported that they had never received an inquiry about the quality scores of their facility.

Stevenson (2006) evaluated the effect of public reporting on nursing home choice by consumers. To do so, he compared occupancy rates of nursing homes prior to and following public reporting of information on NHC. He hypothesized that differences in occupancy rate trends between nursing homes with relatively better or worse quality scores would be observed if consumers were using the publicly reported data. Overall, Stevenson found that public reporting of quality information had a minor effect on nursing home occupancy rates.

Castle and colleagues (2007) undertook a study to examine whether nursing home quality scores were influenced by competition or excess supply over a one-year period. While changes in the scores, overall, reflected improvement in quality, the improvement was relatively small. Associations were found between improved scores and high

competition, low occupancy and interaction among competition and occupancy rates. Thus, market pressures appeared to influence nursing home quality scores.

Issues related to the method of public reporting

Following their evaluation of the content of nursing home report cards across 19 US states, Castle and Lowe (2005) identified a number of characteristics associated with the utility of such reports. They recommended against the provision of ratings only for individually selected facilities, an approach that requires the consumer to undertake time-consuming retrieval of information from a number of facilities in order to make comparisons. They argued for the provision of benchmark data to enable consumers to make comparisons according to relative quality. They also recommended the inclusion of explanatory information, navigation aids and tools to facilitate comparisons among nursing homes and according to region and state averages. Explanation about how and why to use quality information in decision-making, along with links or reference to additional resources that can assist in choosing a nursing home, was considered useful to some consumers. Layering of information for a range of audiences and use of a stepwise approach to information retrieval was suggested in order to minimize complexity in decision-making. Reporting excessive amounts of information was discouraged. Finally, Castle and Lowe (2005) recommended the report be presented in a user-friendly manner, divided into concise sections, and that a large font size and judicious use of white space be employed.

Limitations of the research

When positive results have been observed, it has often been difficult to attribute the changes to public reporting. It is possible that these changes are occurring independently of the NHC website and are the result of internal quality improvement initiatives (Castle et al. 2007). Another possibility is that scores improve because staff become more proficient at completing RAI-MDS assessments. While it is very difficult to find appropriate comparison groups for nationally implemented policy, one general criticism of most of the public reporting studies is that they fail to include a control group, making it difficult to credit public reporting with the change (Schneider and Lieberman 2001).

Discussion

In our review of the use of public reporting of quality indicators in long-term care facilities, we found that there were two primary reasons for public reporting: first, accountability, in holding facilities publicly accountable for the quality of care they

provide; and second, consumer choice, providing information to consumers to assist them in choosing a facility for care. The evidence on the effectiveness of public reporting in long-term care for either purpose is still unclear. We address these issues as they could apply to consideration of public reporting in Canada. We also draw on evidence on public reporting of quality information in other healthcare sectors, highlighting areas where they may inform public reporting in the long-term care sector.

Consumer choice

Although the apparent primary motivation behind Nursing Home Compare is to provide information to help consumers choose a nursing home, there is little evidence that it achieves its aim. Further, the quality measures were developed to identify potential quality problems and have not undergone consumer testing for their utility in a public report card (Castle and Lowe 2005). Similar findings to those from long-term care have emerged from research conducted in other healthcare settings. Early studies from the 1980s and 1990s found that public reporting of acute care hospital performance data had little impact on quality improvement and consumer choice (Laschober et al. 2007). Some studies concluded that the impact of public reporting has been assumed but has yet to be demonstrated (Werner and Asch 2005), while others have concluded that public reporting has had a positive impact (Werner and Asch 2005; Laschober et al. 2007). Several concerns have been reported in studies in other healthcare settings relating to the interpretation of the quality measures and the fear that consumers will use them as direct indicators of quality of care instead of their intended use as indicators for potential quality problems (Mor et al. 2003; Marshall et al. 2000).

Consistent with findings from research in long-term care, some studies in other settings suggest that when data are available, consumers are not using publicly reported information to make healthcare decisions. One study of health plan insurers, purchasers and consumers found that when health plan information was made public, consumers did not use the information to select their health plans (Schauffler and Mordavsky 2001). Other studies have demonstrated that the public tends to rely on alternative sources such as trusted professionals, friends and family when making important health-related decisions (Schneider and Lieberman 2001; Marshall et al. 2000). Schneider and Lieberman (2001) concluded that public reporting has had minimal impact on consumer choice, but has potential to stimulate quality improvement.

Overall, public reporting in healthcare in the United States may have resulted in some quality improvements, but it has not generated the "consumer choice" response that was expected (Schneider and Lieberman 2001). In order for public reporting to work, consumers have to believe that quality varies across facilities and that they have a choice in their care provider (Mor et al. 2003). However, the process of selecting a hospital or nursing home is usually not characterized by free consumer choice. This

factor may decrease the role of publicly reported information in the facility selection process (Stevenson 2006).

In the ideal as constructed through microeconomic theory, free markets are characterized by fully informed consumers exercising free and independent choice under minimal constraints. Most nursing home markets in the United States and Canada are not competitive. Most consumers of nursing home beds come from a hospitalization immediately prior to entering a nursing home. In this case, the consumer and his or her family members or proxies generally exercise little or no choice. Hospitals are usually under extreme pressure to move long-term care patients out of hospital beds. In the United States, this situation is related both to excess demand for hospital beds and also to the prospective payment system used by Medicare and many insurers, in which a hospital is paid a fixed sum based on the Diagnosis Related Group into which the patient falls. There is enormous economic incentive for hospitals to discharge patients. As a result, consumers – patients and their families – find that they have little choice about accepting a nursing home bed in order to be discharged from acute care (Mukamel and Spector 2003). The fact that most nursing home care is not paid for through the same funding mechanism as acute care in the United States creates a significant disconnection between the payment incentives facing hospitals and those facing long-term care facilities. Most US consumers entering long-term care from acute care may have their initial stay in a nursing home paid for by Medicare, the funding system for Americans over 65 years of age. However, this payment typically lasts for at most 100 days, often much less, and is dependent on restorative or rehabilitation potential. For consumers whose needs cannot be met by relatively quick rehabilitation, a long-term care stay transitions through private payment into the Medicaid system, which is a joint federal–state system of funding, at much lower levels than Medicare or private pay. As a result, for most new residents of long-term care, issues of choice become largely subjugated to issues of necessity.

In Canada, the issue is less the payment system and more the reality of excess demand for hospital and long-term care beds. In most Canadian jurisdictions, there is a severe shortage of acute hospital beds. As a result, when an acute care patient is deemed no longer in need of acute care, there is considerable pressure to discharge them from acute care as quickly as possible. For many older Canadians, this requires long-term care placement. Most jurisdictions in Canada also have an acute shortage of long-term care beds, and as a result, consumers being discharged into long-term care are forced to take the first available bed, rather than exercise choice in selecting a long-term care facility. While there may be opportunities to transfer among facilities after entering long-term care, in practice, this is seldom an option, as most long-term care facilities are under constant pressure for their beds.

Given that the decision to be placed in a continuing care facility is rarely one of free will, a key group that needs to be targeted in this process is hospital discharge

planners. It is often the hospital discharge planner who plays the largest role in determining which facility best suits the resident. It is important that this group be aware of the publicly reported information and that they share it with residents and their families (Angelelli et al. 2006). That said, in order for discharge planners to start relying on this information, they will need to be assured that data posted on the website is current and accurate. This means that the website would need to be updated as soon as changes occur in a facility (e.g., number of vacancies).

Accountability and quality improvement

If public reporting is to influence quality of care, the information has to be readily available, consumers have to be using the information in choosing facilities, and facilities need to be rewarded for high-quality performance (Galvin and McGlynn 2003). Decision-makers and facility leadership also have to be aware of the information, be able to trust its validity, and be able to access, understand and take action based on it (Stevenson 2006). Studies in long-term care and hospital settings have shown that public reporting has helped initiate change in attention to quality, quality improvement programs, documentation and staff involvement in quality improvement and quality scores (Laschober et al. 2007; Castle 2005). However, it seems unlikely that all these improvements can be attributed to public reporting. In a study of hospital quality improvement directors, 56% indicated that public reporting is at the very least partially responsible for their improvements, but 47% indicated that the changes would have taken place regardless of the public reporting. Seventy-five per cent of the quality improvement directors did credit public reporting for the improved documentation observed at the sites (Laschober et al. 2007).

In a study of the impact of public reporting on quality improvement in hospitals in Wisconsin, researchers found that when data are publicly reported, hospital staff exhibit greater concern for the validity of the data than when the report is being distributed only internally (Hibbard et al. 2003). In the same study, respondents from hospitals for which data were publicly reported perceived that the reports affected the public image of their hospital and reported being involved in a higher number of quality improvement activities (Hibbard et al. 2003). Concerns were also voiced about the quality and consistency of coding and the lack of transparency of the risk adjustment methods in relation to public reporting (Hibbard et al. 2003). NHC does risk-adjust some of their quality measures in an attempt to address this concern, but many providers question or do not understand the risk-adjustment methods.

Potential negative consequences of public reporting

Once the data have been made public, it is likely that providers will respond to the

reports in one of three ways: (a) denial, (b) taking actions that lead to dysfunctional or unintended consequences or (c) adoption of worthwhile quality improvement activities (Marshall et al. 2004). There has been little research exploring the potential negative consequences of public reporting, and at this point, it is difficult to determine whether the potential benefits outweigh the potential negative consequences. There is also apprehension related to accurate capture of the case mix of clients and being subject to penalties for admitting residents with higher care needs. One concern is that facilities will begin exhibiting biased selection of residents or "cherry-picking," meaning that facilities become selective of the residents admitted to ensure that their quality measure scores remain low (Mor et al. 2003; Stevenson 2006). There is also a concern that facilities will be penalized for accurate documentation and assessment of their clients (Mor et al. 2003). For example, a facility that is reporting high pain levels may have staff that are skilled in pain assessment and may be providing optimal care to residents experiencing pain. Therefore, their scores on a pain quality measure would be appropriately high. Other possible negative consequences include adverse impacts on staff morale and a tendency for the media to focus on the negative information that is reported. On a positive note, the survey of nursing home administrators conducted by Mukamel and colleagues (2007) suggests that dysfunctional and unintended consequences are not prominent.

Recommendations

Releasing information publicly has shown some improvement in some areas, but not consistently across all measures. Until more consistent results are observed, public reporting should not be used at the policy level as the only mechanism for quality improvement. Overall, the results on public reporting in the United States are inconclusive and inconsistent; however, some lessons can be drawn from the US experience.

If Canadian jurisdictions were to implement public reporting systems, reporting should probably begin internally at the facility level prior to public release of the information, a conclusion we draw from the findings of Hibbard and colleagues (2003). This approach would allow the facilities and staff a period of time to adjust to the reporting and address concerns that may arise during the process. These authors also recommend that preliminary reports be shared with facilities prior to releasing the information publicly, and that all stakeholders collaborate during the report development process. Once the report is released publicly, it is important that potential users, including consumers and the media, be educated on how to interpret the report and to ensure that there is a mutual understanding of what is meant by quality and of the measures being used (CHSRF 2007; Mor et al. 2003; Laschober et al. 2007). Indeed, the work of Arling and colleagues (2005) on nursing home quality indicators led them to conclude that consumers and providers may have different needs in regard to the

type of information included in the reports. Therefore, it may be necessary to develop separate reports targeted towards specific audiences.

When the report has been developed and is being shared with the public, it should be available to a broad audience and should be released on a consistent basis (Hibbard et al. 2003). The information must be accurate and timely, and users should be aware that the report is being released. To assist with proper interpretation of the data and to ensure that the information is being used to improve quality, supplemental information should be included as a component of the report. For the public, the reports should include explanations about why performance on an indicator reflects quality of care in a facility, as well as an explanation as to why lower scores are preferred (Marshall et al. 2004). It would also be beneficial to include information on the meaning of differences among provider, state and national averages as well as define what is considered an acceptable deviation from the mean (Mor 2005). For facilities, report cards should be accompanied by information on techniques and methods that may be helpful to improve scores on the quality measures where they are not performing well (Mukamel et al. 2008).

Recommendations for policy makers

Our primary recommendation to Canadian policy makers, based on our review of the literature, is that accountability, rather than consumer choice, should be the main motivator for considering reporting quality information in long-term care. We recommend that reporting begin with a period – possibly as long as two to three years – of internal reporting within the long-term care sector, with benchmarked reports to stimulate appropriate competition. Following this period, public reporting may make sense.

Recommendations for researchers

It is clear from our review of the US literature on public reporting in long-term care that there are gaps in our knowledge about how this works in practice, and how it could work if well designed, either for promoting consumer choice, or for increasing accountability and stimulating quality improvement. We believe that further research is needed to explore how best to design reporting systems, whether public or internal to an industry or facility, to motivate quality improvement. We also believe that further research on the dimensions of consumer choice in this sector – particularly as the number of long-term and acute care beds increase in a community along with the potential for consumer choice – is critically needed. Our interpretation of the state of the science in this area is that it is still significantly underdeveloped, and the opportunities that will emerge in Canada over the next several years, as MDS data become widely available, make Canada an ideal environment for conducting this research.

The links to public payment for long-term care services are also better aligned within Canada than in the United States, and we believe that this factor offers the potential to explore issues of the effect of reporting on long-term care quality on consumer choice.

Future research

Future research in the area of public reporting should include mechanisms to monitor and evaluate the process to determine whether the effects are long-lasting and result in overall improvement in quality measure scores. Future studies should also focus on developing indicators that provide information that is valued by the consumer, and on testing the impact of the measures upon healthcare choices (Schauffler and Mordavsky 2001).

Conclusion

It is difficult to derive strong lessons about the use of public reporting for continuing care in Canada from lessons learned in the United States and reported in the published, peer-reviewed literature. One conclusion that can be drawn is that public reporting cannot be relied upon as the only mechanism for quality improvement (Mukamel et al. 2008; Schneider and Lieberman 2001). Although public reporting has been ongoing in healthcare for well over 20 years, and for several years in long-term care, its impact on consumer choice and quality improvement remains largely unknown. The available evidence is mixed, and as yet, the literature is still developing. Canadian jurisdictions can learn from the US experience in developing public reporting processes. If policy makers in Canada want to see a large positive effect from public reporting, they should ensure that sufficient time and effort are invested in the development and implementation of reporting mechanisms and the education of, and dissemination to, industry and the public. Moving too quickly to public reporting can lead to distrust between providers and policy makers, and may result in attempts to "game" the reporting system. This result could prompt facilities to refuse admission to prospective residents who might make an institution's quality measures look worse.

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RESEARCH PAPER

After-Hours Information Given by Telephone by Family Physicians in Ontario

Renseignements téléphoniques offerts par les médecins de famille en Ontario après les heures normales de travail

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Abstract

This study describes instructions for after-hours care offered by family physicians' offices when patients telephone the practice. Randomly selected (n=1,680) Ontario family physicians and general practitioners were telephoned after hours from October 2007 to February 2008.

Instructions among the 1,102 eligible offices suggested emergency services (58.6%; 646/1,102), the toll-free, nurse-staffed Telephone Health Advisory Service (THAS) with on-call physician back-up (45.0%; 496/1,102), the practice's own after-hours clinic (27.9%; 307/1,102), an on-call physician (8.0%; 88/1,102) or a walk-in clinic (6.9%; 76/1,102). Some messages (13.9%; 153/1,102) provided no instructions. Physicians in a reformed model with obligations to provide some after-hours care were more likely to advise an after-hours clinic (32.0%; 285/891) than other physicians (10.4%; 22/211) ($p<0.001$).

Many family physician telephone messages in Ontario suggest emergency services only or do not provide any instructions. Only slightly more than half suggest use of the government-funded THAS. Patients may be unaware of many after-hours care options.

Résumé

Cette étude décrit les directives de soins offerts par les cabinets de médecins de famille quand les patients téléphonent après les heures normales de travail. Entre octobre 2007 et février 2008, nous avons communiqué par téléphone, après les heures normales de travail, avec des cabinets de médecins de famille et d'omnipraticiens choisis au hasard en Ontario (n=1680). Les directives offertes parmi les 1102 cabinets admissibles proposaient les services d'urgence (58,6 pour cent; 646/1102), le numéro sans frais pour le service téléphonique d'aide médicale (STAM) assuré par des infirmières avec le soutien d'un médecin sur appel (45,0 pour cent; 496/1102), la propre clinique du cabinet après les heures normales (27,9 pour cent; 307/1102), un médecin sur appel (8,0 pour cent; 88/1102) ou une clinique sans rendez-vous (6,9 pour cent; 76/1102). Certains messages ne proposaient aucune directive (13,9 pour cent; 153/1102). Les médecins qui travaillent selon un modèle réformé où ils ont l'obligation d'offrir des services après les heures normales de travail étaient plus enclins à proposer des cliniques après les heures de travail (32,0 pour cent; 285/891) que les autres médecins (10,4 pour cent; 22/211) ($p<0,001$). Dans plusieurs cas, les messages des médecins de famille en Ontario proposent seulement de recourir aux services d'urgence ou encore n'offrent aucune directive. Un peu plus de la moitié proposent d'utiliser le STAM financé par les fonds publics. Les patients risquent de ne pas connaître plusieurs des possibilités qui s'offrent à eux pour les services de soins après les heures normales de travail.

Since the restructuring of primary care in the province of Ontario that began in the 1990s, the majority of family physicians have joined a reformed model for the delivery and funding of primary care services that

stipulates some provision of after-hours care for rostered patients (Wilson 2006). After-hours features of these models include evening and weekend clinics, and for some, providing 24/7 back-up to the provincially funded Telephone Health Advisory Service (THAS) triage for rostered patients. THAS is a nurse-staffed service that triages patients to self-care, emergency department or 911 call, or seeing the family physician the next day; it can also contact the on-call physician when deemed necessary. This service is available only to physicians in specific reformed models. In addition, any person can use the provincially funded 24/7 Telehealth Ontario hotline, a toll-free, nurse-staffed health advice service. Other commonly used after-hours services include walk-in clinics, house-call services, emergency departments and urgent care centres.

The objectives of this study are to describe the type and frequency of different care options given to patients who call after hours, and to determine whether enrolment in a primary care reformed model is associated with after-hours care options.

Providing patients with after-hours access to their family physician is important because (a) it allows continuity, (b) patients are satisfied seeing their own physician (Howard et al. 2007) and (c) treating minor problems in a primary care setting costs less than treatment in the emergency department (Campbell et al. 2005). Continuity in primary care has been shown to reduce emergency department use (Christakis et al. 2001; Gill et al. 2000). It is in the best financial interest of physicians who belong to some of the reformed models in Ontario to encourage use of the after-hours clinic and THAS and to discourage use of walk-in clinics by their rostered patients. The reason for this policy is that the monetary access bonus for the physician group is negated for each patient visit to a family physician not in the group (such as a walk-in clinic).

To date, only limited research has assessed patient access to primary care after hours in Canada. A study in 2001 found that 62% of family physicians and general practitioners reported providing some form of after-hours care, ranging from 34% to 88% across the country (59% in Ontario) (Crighton et al. 2005). While the information that physicians give to their patients during clinic encounters regarding medical attention after office hours is not known, the telephone instructions they provide for their patients may be a good indication. In a study of after-hours telephone instructions provided by family physicians' offices in Toronto, Ontario in 2003 (Bordman et al. 2007), a wide range of instructions was offered, including 22% that only advised attending an emergency department and 18% that gave no instructions. Since that

study was published, a significant number of family physicians in Ontario have joined new primary care practice models that provide after-hours care for their patients.

The objectives of this study are to describe the type and frequency of different care options given to patients who call after hours, and to determine whether enrolment in a primary care reformed model is associated with after-hours care options.

Methods

Sampling

The 2007 Canadian Medical Directory was used to identify physicians listed with a specialty of family medicine or general practice in the province of Ontario. A random sample of 1,680 physicians, stratified by the 14 local health integration networks (LHINs), was selected.

Data collection on after-hours calls

Between October 2007 and February 2008, research assistants telephoned physicians' offices between 8 p.m. and 10:30 p.m. Monday through Friday, or on Saturdays from 9 a.m. to noon. A standard data collection form was used to document information provided by answering machines or individuals. Information collected on the form included physician or practice name; address; hours of operation; instructions (specifically for rostered patients) to use Telehealth Ontario or THAS; information on how to contact an on-call physician; the name, phone number or location of an after-hours clinic; instructions to go to (or request not to go to) a walk-in clinic; other after-hours options such as a house-call service; other numbers to call for after-hours care (e.g., paging or answering service); and instructions to use an emergency department, urgent care centre or 911 call. If instructions included conditional or multiple options, each was recorded. A sample of 45 physicians was used to train the research assistants for agreement on the coding scheme. Discrepancies among research assistants were discussed together with one author (MH), and the coding scheme and instructions were modified accordingly. When research assistants were not certain how to code information, it was flagged for one author (MH) to review and decide on the final code.

If a person answered the telephone call, such as an answering service or clinic staff, the caller described the study briefly and asked what information a patient would receive if calling at that time. If a switchboard was reached, the research assistant asked for the physician's office or telephone extension in an attempt to obtain the information.

The information on funding models was obtained from the Ministry of Health and Long-Term Care after data collection was completed.

Data analysis

Data analyses were conducted using SPSS version 15.0 (Chicago, IL). A descriptive analysis was undertaken on the number of and reasons for ineligible telephone numbers and the prevalence of instructions for different care options among eligible telephone numbers. Associations between physician practice model and characteristics (year of graduation and gender) and specific instructions were examined using Pearson's chi-square test. The criterion of statistical significance was set at alpha=0.05 (two-sided).

Results

Five-hundred seventy-eight physicians were deemed ineligible because the telephone number was incorrect (n=161, for example, no answer, personal number or not a healthcare organization); a family physician's office was not reached (n=395, for example, the physician was an emergency physician or worked in a specialty clinic such as dermatology or mental health); or a person was reached who declined to provide the information (n=22). The remaining 1,102 physician offices were included in the analysis. Of these, 1,056 (95.8%) of the calls went to a recorded message and 46 (4.2%) resulted in speaking to an individual directly.

Instructions for patients included a menu of more than one option 56.3% (621/1,102) of the time. Instructions commonly included suggesting that patients use emergency services (58.6%; 646/1,102); the toll-free, nurse-staffed Telephone Health Advisory Service for the physician's rostered patients (45.0%; 496/1,102); or visiting an after-hours clinic (27.9%; 307/1,102). Information given less often included contacting an on-call physician directly (8.0%; 88/1,102); suggesting the use of a walk-in clinic (6.9%; 76/1,102); or suggesting the use of the toll-free Telehealth Ontario service (6.6%; 73/1,102). Instruction to visit an emergency department or call 911 was the only instruction given by 14.7% (162/1,102) of offices. Some family physicians (13.9%; 153/1,102) provided none of these instructions for after-hours care.

Among physician messages that instructed patients to use THAS, 39.9% (198/496) mentioned that it was a nurse-staffed service, and 31.3% (155/496) mentioned that it was for use by registered patients.

Table 1 shows the distribution of different practice models and which models are financially negated if a patient visits a family physician outside the group. Table 2 displays the instructions provided by physicians in reformed models versus other physicians. Physicians in a reformed model were more likely to provide information on the availability of an after-hours clinic ($p<0.001$) than other physicians. However, physicians in reformed models were less likely than other physicians to provide the public Telehealth number ($p=0.03$), on-call physician information ($p=0.01$), other physician contact information ($p=0.01$) or instructions to use emergency services (an emergency department, urgent care centre or 911 call) ($p<0.001$). They were also less likely to provide no instructions ($p<0.001$).

TABLE 1. Distribution of practice models among 1,102 eligible family physician offices telephoned after hours

Funding model	% (n)	Group negated if a patient visits a family physician outside the group
Family Health Group	48.5 (534)	No
Family Health Network	20.5 (226)	Yes
Family Health Organization	5.9 (65)	Yes
Rural and Northern Physician Group	2.0 (22)	No
Group Health Cooperative	0.7 (8)	Yes
Other special reformed arrangements	3.3 (36)	No
Non-reformed models	19.1 (211)	No

TABLE 2. Instructions given in telephone message by physicians in reformed model and physicians not in a reformed model

	Total sample* % (n) (n=1,102)	In reformed model % (n) (n=891)	Not in reformed model % (n) (n=211)	*p* value†
Telephone Health Advisory Service (THAS)	45.0 (496)	52.5 (468)	13.3 (28‡)	<0.001
Telehealth Ontario	6.6 (73)	5.8 (52)	10.0 (21)	0.03
Emergency department, urgent care centre or 911	58.6 (646)	59.9 (534)	53.1 (112)	0.07
Walk-in clinic	6.9 (76)	7.2 (64)	5.7 (12)	0.44
Do not use walk-in clinic	1.2 (13)	1.3 (12)	0.5 (1)	0.29
After-hours clinic	27.9 (307)	32.0 (285)	10.4 (22)	<0.001
On-call physician	8.0 (88)	7.0 (62)	12.3 (26)	0.01
Other number – not mentioning any of above	8.2 (90)	7.2 (64)	12.6 (26)	0.01
Only emergency department‡/urgent care/911	14.7 (162)	12.6 (112)	23.7 (50)	<0.001
None of the above	13.9 (153)	11.1 (99)	25.6 (54)	<0.001

* Some physicians gave multiple options in the message; therefore, the categories are not mutually exclusive.
† For comparison between physicians in a reformed model and those not in a reformed model
‡ Physicians who were not in a reformed model but whose telephone number matched that of a physician in a reformed model

Approximately one-quarter of physicians (27.1%; 299/1,102) worked under a model in which they would be financially negated if a patient visited a walk-in clinic. Compared to physicians in reformed models without negations, these physicians (a) were significantly more likely to provide THAS information (58.2% [174/299] versus 49.7% [284/575], p=0.02), (b) were less likely to suggest a walk-in clinic (4.7% [14/299] versus 8.4% [50/592], p=0.04) and (c) were more likely to instruct patients not to use a walk-in clinic (4.0% [12/299] versus 0, p<0.001) (Table 3).

TABLE 3. Instructions given in telephone message for reformed-model family physicians with, versus without, negations for visiting other family physicians

	Total sample* % (n) (n=891)	With negations % (n) (n=299)	Without negations % (n) (n=592)	p = value†
Telephone Health Advisory Service (THAS)	52.5 (468)	58.2 (174)	49.7 (294)	0.02
After-hours clinic	32.0 (285)	34.4 (103)	30.7 (182)	0.26
Walk-in clinic	7.2 (64)	4.7 (14)	8.4 (50)	0.04
Do not use walk-in clinic	1.3 (12)	4.0 (12)	0	<.001

* Some physicians gave multiple options in the message; therefore, the categories are not mutually exclusive.

† For comparison between physicians with vs. without negations

There were no statistically significant differences in any of the instructions by year of graduation from medical school (<1970, 1970–1979, 1980–1989, 1990+) or gender.

Discussion

This study found that in a random sample of family physician offices in Ontario telephoned after hours, instructions to use an emergency department, urgent care centre or 911 call were the most frequent, followed by instruction to use THAS. The instruction to use THAS was more common among reformed practices than in other family practices. Few offices mentioned the Telehealth Ontario option, and nearly 14% provided no information on obtaining after-hours care. These results are similar to the study by Bordman and colleagues (2007), who also found that the emergency department was the most common instruction and that 9% gave Telehealth information, but found that a larger proportion (18%) provided no instructions. The main difference in the present study is the uptake of THAS for rostered patients of reformed models, which triages patients to emergency department or 911 call, self-care, or seeing the family physician the next day, or contacts the on-call physician in the group to see or speak to the patient immediately. Physicians may also choose to provide a direct

number for an on-call physician. Few, however, offer this information, presumably because THAS triage is available to avoid overuse of the on-call physician.

The instruction to go to a walk-in clinic was not significantly less common in reformed models as one might expect; however, it was a relatively uncommon instruction among all physicians. A small number of physicians in models with financial negation for outside use (i.e., walk-in clinics) instructed patients not to go to a walk-in clinic, whereas no physicians in reformed models without negation gave this instruction. The previous study in Toronto combined instructions to use walk-in clinics and after-hours clinics. In the present study we distinguished between messages that used the wording "walk-in clinic" versus "after-hours clinic" because use of these different services has implications for physicians in some models. While physicians in any reformed model were more likely to suggest the after-hours clinic than physicians who were not in a reformed model, this instruction was not significantly more common among models with financial negation compared to models without negation.

This study found that in a random sample of family physician offices in Ontario telephoned after hours, instructions to use an emergency department, urgent care centre or 911 call were the most frequent, followed by instruction to use THAS.

Many physicians in a reformed model who could offer the THAS number did not provide it. This omission may have occurred because enrolment in these models in Ontario was ongoing at the time, and some physicians may have been in the process of rostering patients and changing their organizational procedures around access and after-hours care. Although THAS is a service to assist physicians in meeting their requirements to provide after-hours care in Ontario, some may not present it on their telephone message and may offer direct on-call services instead. Some physicians provide more after-hours evening clinics than the minimum required and have staff answering telephones at the times we called. In addition, some physicians in reformed models choose not to advertise THAS on their messages. In a study of 21 physicians in Hamilton, Ontario, only one-third agreed that THAS gave the same advice they would (Neimanis et al. 2009), suggesting that some physicians may not be satisfied with the service. There were 28 physicians not in a reformed model at the time of this study but whose messages gave the THAS number. As the telephone numbers of these physicians matched a telephone number of a reformed-model physician, these may have been group practices or clinics sharing a central reception.

In a province that has committed resources to after-hours primary care accessibility, the finding that 13.9% of physicians' offices (11% in a reformed model and

26% of other physicians' offices) do not provide any instructions for after-hours care, and that similar proportions advise only the emergency department, calls into question the potential impact of reforms on improving access. While some physicians may communicate patient instructions in some other manner, such as brochures, signs or websites, these are unlikely to reach all patients, especially those who infrequently visit the physician. The fact that nearly half of family physicians not in a reformed model (49.3%) and almost a quarter of those in a reformed model (23.7%) either do not provide any patient instructions or do not provide instructions for accessing alternatives to emergency departments after hours may result in many patients' perception that the emergency department is the only option for after-hours care.

Limitations

A limitation of this study was the use of the Canadian Medical Directory, a private database to which physicians voluntarily provide information. Use of this database may have contributed to a high number of unusable telephone numbers. Some physicians working in more than one clinical setting and those with other professional or administrative roles in addition to their family practice may have been excluded because the telephone number available was not their family practice office. It is also possible that many physicians listed as family physicians did not have a family practice. We wished to ensure that the telephone numbers included were family practices, to avoid underestimating the prevalence of after-hours instructions.

Conclusion

Based on our review of telephone instructions for after-hours care provided by family physicians in Ontario, many physicians are offering alternatives to emergency services for after-hours care. Despite this finding, overall physician dissemination of alternatives to emergency services, at least through their after-hours telephone messages, has been less than ideal. Future research should examine reasons for this unexpected finding and explore possibilities for improving the communication of after-hours options to patients.

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ONLINE EXCLUSIVE

Getting a Bigger Bang for Your Buck: A Collaborative Approach to Enhancing Dementia Education Planning in Long-Term Care Homes

En avoir plus pour son argent : collaboration pour améliorer la planification de la formation en matière de démence dans les établissements de soins de longue durée

CARRIE A. MCAINEY, LORETTA M. HILLIER, MARGARET RINGLAND AND NANCY COOPER

Abstract

A collaborative of Ontario-based long-term care associations, researchers, clinicians and educators representing various education initiatives related to dementia care and challenging behaviours used existing research evidence on adult learning principles, knowledge transfer and performance improvement to develop an evidence-based approach to support practice change and improvement in long-term care. The collaborative was led by the two provincial long-term care associations with no external funds to support its activities. This effort illustrates how people with common challenges, visions and goals can work together to share their intellectual and physical resources to address pervasive problems.

Résumé

Une collaboration ontarienne entre associations, chercheurs et cliniciens œuvrant dans les soins de longue durée, ainsi que des éducateurs représentants des initiatives de formation en matière de démence et de comportements difficiles, utilise les données de recherches actuelles sur les principes d'apprentissage des adultes, le transfert de connaissances et l'amélioration du rendement pour développer une démarche fondée sur les données probantes afin d'appuyer les changements dans la pratique et l'amélioration des soins de longue durée. Cette collaboration a été dirigée par les deux associations provinciales de soins de longue durée, sans financement externe pour appuyer leurs activités. Cette initiative montre comment les personnes confrontées à des défis, à des visions et à des objectifs similaires peuvent travailler de concert afin de partager les ressources intellectuelles et physiques pour traiter des problèmes récurrents.

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ONLINE EXCLUSIVE

Research Paper

Factors Affecting Physician Performance: Implications for Performance Improvement and Governance

Facteurs qui influent sur le rendement des médecins : répercussions pour l'amélioration du rendement et pour la gouvernance

ELIZABETH F. WENGHOFER, A. PAUL WILLIAMS AND DANIEL J. KLASS

Abstract

Background: A physician's personal and professional characteristics constitute only one, and not necessarily the most important, determining factor of clinical performance. Our study assessed how physician, organizational and systemic factors affect family physicians' performance.

Method: Our study examined 532 family practitioners who were randomly selected for peer assessment by the College of Physicians and Surgeons of Ontario. A series of multivariate regression analyses examined the impact of physician factors (e.g., demographics, certification) on performance scores in five clinical areas: acute care, chronic conditions, continuity of care and referrals, well care and records. A second series of regressions examined the simultaneous effects of physician, organizational (e.g., practice volume, hours worked, solo practice) and systemic factors (e.g., northern practice location, community size, physician-to-population ratio).

Results: Our study had three key findings: (a) physician factors significantly influence performance but do not appear to be nearly as important as previously thought; (b) organizational and systemic factors have significant effects on performance after the effects of physician factors are controlled; and (c) physician, organizational and systemic factors have varying effects across different dimensions of clinical performance.

Conclusions: We discuss the implications of our results for performance improvement and physician governance insofar as both need to consider the broader environmental context of medical practice.

Résumé

Contexte : Les caractéristiques personnelles et professionnelles des médecins ne constituent qu'un, et non nécessairement le plus important, des facteurs déterminant le rendement clinique. Dans cette étude, nous avons évalué comment les facteurs personnels, organisationnels et systémiques affectent le rendement des médecins de famille.

Méthodologie : Nous avons étudié 532 médecins de famille choisis au hasard et soumis à une évaluation par les pairs effectuée par le Collège des médecins et chirur-

giens de l'Ontario. Une série d'analyses de régression multivariée a permis d'examiner l'incidence des facteurs personnels des médecins (aspects démographiques, homologation, etc.) sur la cote de rendement dans cinq domaines cliniques : soins de courte durée, états chroniques, continuité des soins et recommandations aux spécialistes, soins de routine et dossiers médicaux. Une seconde série d'analyses de régression a permis d'examiner l'effet simultané des facteurs personnels, organisationnels (par exemple, volume de la pratique, heures effectuées, pratique en solo) et systémiques (par exemple, pratique en région nordique, taille de la communauté, ratio médecin/population). *Résultats :* Notre étude dégage trois conclusions principales : (a) les facteurs personnels influencent de façon significative la pratique, mais ne semblent pas aussi importants que nous le pensions au départ; (b) les facteurs organisationnels et systémiques ont un effet significatif sur le rendement, et ce, après avoir effectué le contrôle des effets associés aux facteurs personnels; (c) les facteurs personnels, organisationnels et systémiques ont des effets variables sur les divers aspects du rendement clinique. *Conclusions :* Nous discutons des répercussions de nos résultats sur l'amélioration du rendement et sur la gouvernance pour les médecins, puisque toutes deux doivent être prises en compte dans le contexte général de la pratique médicale.

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ONLINE EXCLUSIVE

Research Paper

Financial and Work Satisfaction: Impacts of Participation in Primary Care Reform on Physicians in Ontario

Satisfaction au travail et satisfaction financière : impact de la réforme des soins de santé primaires sur les médecins, en Ontario

MICHAEL E. GREEN, WILLIAM HOGG, DAVID GRAY, DOUG MANUEL, MICHELLE KOLLER, SARAH MAATEN, YAN ZHANG AND SAMUEL E.D. SHORTT

Abstract

Governments in Ontario have promised family physicians (FPs) that participation in primary care reform would be financially as well as professionally rewarding. We compared work satisfaction, incomes and work patterns of FPs practising in different models to determine whether the predicted benefits to physicians really materialized. Study participants included 332 FPs in Ontario practising in five models of care. The study

combined self-reported survey data with administrative data from ICES and income data from the Canada Revenue Agency. FPs working in non–fee-for-service (FFS) models had higher levels of work satisfaction than those in FFS models. Incomes were similar across groups prior to the advent of primary care reform. Incomes of family health network FPs rose by about 30%, while family health group FPs saw increases of about 10% and those in FFS experienced minimal changes or decreases. Self-reported change in income was not reliable, with only 47% of physicians correctly identifying whether their income remained stable, increased or decreased. The availability of a variety of FFS- and non–FFS-based payment options, each designed to accommodate physicians with different types or styles of practice, may be a useful tool for governments as they grapple with issues of physician recruitment and retention.

Résumé

En Ontario, les gouvernements ont promis aux médecins de famille que leur participation à la réforme des soins de santé primaires comporterait des avantages à la fois financiers et professionnels. Nous avons comparé la satisfaction au travail, le revenu et les régimes de travail de médecins de famille œuvrant dans divers modèles de pratique, afin de déterminer si les avantages prévus se sont effectivement matérialisés. Cette étude comptait sur la participation de 332 médecins de famille en Ontario œuvrant selon cinq modèles de prestation de soins. Nous avons tenu compte de données de sondage déclarées volontairement par les médecins ainsi que de données administratives provenant de l'Institut de recherche en services de santé (IRSS) et de l'Agence du revenu du Canada. Les médecins de famille qui travaillent selon des modèles autres que la rémunération à l'acte (RAA) ont indiqué de meilleurs taux de satisfaction au travail que ceux qui fonctionnent selon la RAA. Avant l'instauration de la réforme des soins de santé primaires, les revenus entre les groupes étaient similaires. Le revenu des médecins qui travaillent dans les réseaux de santé familiale a augmenté de 30 pour cent et celui des médecins qui travaillent dans les groupes de santé familiale a augmenté de 10 pour cent, tandis que les médecins qui travaillent selon la RAA ont vu peu de changement ou une diminution de leur revenu. Les fluctuations de revenu déclarées volontairement ne sont pas fiables, car seulement 47 pour cent des médecins ont indiqué avec précision si leur revenu s'était maintenu, avait augmenté ou avait diminué. La présence d'une variété de modèles de rémunération (RAA ou non), qui sont conçus pour offrir aux médecins différents types et divers styles de pratique, peut s'avérer un outil pratique pour les gouvernements, car elle permet d'aborder la question du recrutement et du maintien en poste des médecins.

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ONLINE EXCLUSIVE

Research Paper

Indicators for Measuring Mental Health: Towards Better Surveillance

Indicateurs de mesure pour la santé mentale : vers une meilleure surveillance

CARA TANNENBAUM, JOEL LEXCHIN, ROBYN TAMBLYN AND SARAH ROMANS

Abstract

Accurate measurement and improvement of population mental health requires the recording of indicators that capture the full spectrum of disease severity. This paper describes four different strategies for measuring the prevalence of depression and anxiety in Canada based on data from the 2002 Canadian Community Health Survey – Mental Health and Well-being (Cycle 1.2) and the 2003 Quebec medical services claims database. The use of multiple indicators provides a more comprehensive picture of mental health needs than a single indicator alone. However, the validity of these indicators raises certain challenges and highlights the complexity of obtaining valid and sustainable measurements of mental health problems over time. We include a discussion of problems related to information availability and management.

Résumé

L'établissement d'indicateurs pour l'ensemble de l'indice de gravité des maladies est essentiel pour obtenir des mesures précises et pour améliorer la santé mentale de la population. Cet article décrit quatre stratégies pour mesurer la prévalence, au Canada, de la dépression et de l'anxiété, selon les données de l'Enquête sur la santé dans les collectivités canadiennes – Santé mentale et bien-être 2002 (cycle 1.2) ainsi que celles de la base de données 2003 de la RAMQ (Régie de l'assurance maladie du Québec). L'utilisation d'indicateurs multiples permet une meilleure compréhension des besoins en santé mentale que l'utilisation d'un seul indicateur. Cependant, la validité de ces indicateurs pose certains défis et fait voir la complexité quant à l'obtention de mesures valables et durables en matière de problèmes de santé mentale. Nous discutons ensuite des problèmes liés à la disponibilité et à la gestion de l'information.

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ONLINE EXCLUSIVE

Research Paper

Access to Family Physicians in Southwestern Ontario

Accès aux médecins de famille dans le sud-ouest ontarien

GRAHAM J. REID, THOMAS R. FREEMAN, AMARDEEP THIND, MOIRA STEWART, JUDITH BELLE BROWN AND EVELYN R. VINGILIS

Abstract

Objective: Shortages of family physicians (FPs) have been reported, but accurate data on the scope of this problem are sparse. The study objective was to determine the proportion of the population in southwestern Ontario without access to a regular FP and sources of usual medical care for individuals with and without a regular FP.
Method: Random-digit dialling was used to obtain a stratified, random sample of households from 10 counties in southwestern Ontario, which resulted in 1,387 participants (60.5% cooperation rate). Adults reported on themselves, while a random selection of parents reported on their children, yielding data on individuals ranging from 0 to 95 years of age.
Results: 9.1% (95% CI = 7.8% to 10.6%) of individuals did not have a regular FP. Most individuals without a regular FP used walk-in clinics (55%) or emergency rooms (13%) as their usual source of care, while 5.9% reported not receiving medical care. Lack of physicians accepting new patients was the most common reason for not having a regular FP (27%), although some individuals chose not to have one (9.9%) or had alternative access to care (13.2%).
Conclusions: Based on the assumption that the individuals who chose not to have a FP, or who had access to alternative care, would continue not to want a FP if one were available, we estimate that 5.1% of the population of southwestern Ontario requires a FP. The health implications of not having a regular FP in Canada need to be examined.

Résumé

Objectif : La pénurie de médecins de famille est bien documentée, cependant il y a un manque de données précises portant sur l'ampleur du problème. L'objectif de cette étude était d'évaluer la proportion de la population du sud-ouest ontarien qui n'a pas accès à un médecin de famille régulier et de connaître les sources habituelles de soins médicaux pour les personnes qui ont ou n'ont pas de médecin de famille régulier.
Méthodologie : Un système d'appels aléatoire a été employé afin d'obtenir un échantillon aléatoire stratifié de ménages dans 10 comtés du sud-ouest ontarien. En tout, 1387 participants ont répondu à l'enquête (un taux de coopération de 60,5 pour

cent). Les adultes ont répondu en leur nom et un échantillon aléatoire de parents ont répondu pour leurs enfants, ce qui a permis d'obtenir des données sur des personnes âgées de 0 à 95 ans.
Résultats : 9,1 pour cent (95 pour cent CI = 7,8 pour cent à 10,6 pour cent) des personnes indiquent ne pas avoir de médecin de famille régulier. La plupart des personnes qui n'ont pas de médecin de famille régulier utilisent les cliniques sans rendez-vous (55 pour cent) ou les services d'urgence (13 pour cent) comme source habituelle de services de santé, et 5,9 pour cent des répondants indiquent ne pas recevoir de services de médicaux. Le manque de médecins qui acceptent des nouveaux patients est la principale raison invoquée pour expliquer l'absence de médecin de famille régulier (27 pour cent), bien que certaines personnes choisissent de ne pas en avoir (9,9 pour cent) ou utilisent d'autre types d'accès aux services de santé (13,2 pour cent).
Conclusion : Si l'on suppose que les personnes qui choisissent de ne pas avoir de médecin de famille, ou qui utilisent d'autres types de services, continueraient de ne pas vouloir de médecin même s'il y avait disponibilité, nous estimons que 5,1 pour cent de la population du sud-ouest ontarien a besoin des services d'un médecin de famille. Il est nécessaire d'étudier quelles sont les répercussions sur la santé associées au fait de ne pas avoir de médecin de famille, au Canada.

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Getting a Bigger Bang for Your Buck: A Collaborative Approach to Enhancing Dementia Education Planning in Long-Term Care Homes

En avoir plus pour son argent : collaboration pour améliorer la planification de la formation en matière de démence dans les établissements de soins de longue durée

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EDUCATION FOR HEALTHY AND SAFE PLACES
TO LIVE AND WORK COLLABORATIVE GROUP[1]

Abstract

A collaborative of Ontario-based long-term care associations, researchers, clinicians and educators representing various education initiatives related to dementia care and challenging behaviours used existing research evidence on adult learning principles, knowledge transfer and performance improvement to develop an evidence-based approach to support practice change and improvement in long-term care. The collaborative was led by the two provincial long-term care associations with no external funds to support its activities. This effort illustrates how people with common challenges, visions and goals can work together to share their intellectual and physical resources to address pervasive problems.

Résumé

Une collaboration ontarienne entre associations, chercheurs et cliniciens œuvrant dans les soins de longue durée, ainsi que des éducateurs représentants des initiatives de formation en matière de démence et de comportements difficiles, utilise les données de recherches actuelles sur les principes d'apprentissage des adultes, le transfert de connaissances et l'amélioration du rendement pour développer une démarche fondée sur les données probantes afin d'appuyer les changements dans la pratique et l'amélioration des soins de longue durée. Cette collaboration a été dirigée par les deux associations provinciales de soins de longue durée, sans financement externe pour appuyer leurs activités. Cette initiative montre comment les personnes confrontées à des défis, à des visions et à des objectifs similaires peuvent travailler de concert afin de partager les ressources intellectuelles et physiques pour traiter des problèmes récurrents.

Over half of older persons with dementia live in long-term care (LTC) homes (Canadian Study of Health and Aging Working Group 1994). It is commonly accepted that up to 90% of patients with dementia develop behavioural problems (physical or verbal aggression, or both) or psychiatric symptoms at some point (Braun and Kunik 2004; Brodaty et al. 2001). LTC homes are challenged to meet the needs of this increasingly complex resident population.

Healthcare aides and personal support workers provide 70% of direct resident care in LTC homes (Health Professions Regulatory Advisory Council 2006). In Ontario, training certificate programs for healthcare aides and personal support workers have been offered through community colleges, private colleges and boards of education since the early 1980s. However, this minimal training in nursing support roles no longer equips these key front-line staff with the skills to meet the complex needs of the current resident population of LTC homes (Stolee et al. 2005).

There is much support for increased education for LTC staff (American Geriatrics Society and American Association for Geriatric Psychiatry 2003; Fitzpatrick 2002). In addition to ongoing staff education, LTC homes often turn to continuing education (CE) when faced with compliance citings related to Ministry of Health standards, a critical incident, accreditation, policy planning, or continuous quality improvement (CQI) related to prevention, risk management or enhancement of quality of life. While recent research indicates that 96% of personal support workers believe there is a need for work-related training, there are many challenges associated with a CE approach to increasing staff capacity in terms of knowledge and skills to improve healthcare (Brookman 2007). Generally, there is minimal evidence of sustained knowledge transfer (practice change) in LTC homes following CE (Aylward et al. 2003). Only in the past few years has attention been paid in LTC homes to the factors known to facilitate practice change, such as organizational and management support (Stolee et al. 2005). Administrators are challenged to provide CE because of limited resources, including paying for the education and backfilling positions so that staff can attend. Furthermore, those responsible for selecting educational programs for their staff have a multitude of programs to choose from, such that they have difficulty deciding which ones will be most effective in meeting their needs to improve resident care.

These challenges were well known to two major Ontario-based LTC associations: the Ontario Association for Non-Profit Homes and Services for Seniors (OANHSS) and the Ontario Long-Term Care Association (OLTCA). With a common vision of improving care for residents with dementia, these two associations partnered to establish a collaborative group consisting of representatives from their own associations and researchers, clinicians, health and safety experts, and educators representing various education and best practice initiatives for dementia care and responsive (challenging) behaviours. Multi-organizational collaboratives have been identified as an effective vehicle for learning about and disseminating best practices, problem-solving healthcare challenges, reducing duplication of services, and building practice capacity (Ermshoff et al. 2007; Marsteller et al. 2007; Øvretveit et al. 2002). Interagency collaboration in this instance was facilitated by individuals involved in different aspects of LTC who collaborated to problem-solve shared dilemmas experienced within the LTC system. Collaboratives, consistent with Communities of Practice (CoPs), have been defined as groups of people who share a common concern and a desire to resolve it (Wenger

1998). CoPs have been identified as a significant mechanism for improving practice in a number of communities, including family physicians (Endsley et al. 2005), healthcare students (Moule 2006), nurses within geriatric settings (Tolson et al. 2006) and various healthcare agencies (Lathlean and le May 2002). With a common vision of improving care for older persons with dementia, the collaborative (or CoP) described here used existing research evidence on adult learning principles, knowledge transfer and performance improvement to develop an evidence-based approach to support practice change and improvement in LTC.

This paper describes the process undertaken and lessons learned by the collaborative in developing its approach to enhancing CE in LTC.

Knowledge Translation Initiative

In late 2005, key leadership from OANHSS and OLTCA invited representatives from various educational programs and other key stakeholders (knowledge brokers, representatives from the Ontario Ministry of Health and Long-Term Care, clinicians, workplace safety educators, researchers) to join a collaborative named the Education for Healthy and Safe Places to Live and Work Collaborative Group.[1] Although the collaborative initially aimed to foster awareness and communication regarding educational programs available to LTC homes in Ontario, following lengthy discussions about the role and impact of education in LTC homes, it was acknowledged that education in and of itself would not resolve performance issues or change practice. Bolstered by the notion of fostering learning environments in which CE is but one strategy for enhancing capacity, this group moved forward to develop a tool to support LTC homes in their decision-making regarding staff education and development.

TABLE 1. Timeline of activities leading to the development of the DENA tool

December 2005

- Key stakeholders are invited by OANHSS and OLTCA to a meeting to share and gather information regarding current educational strategies for dementia.
- Plans are developed to create a matrix of available dementia-related programs. Additional key stakeholders are identified. The group formally commits to creating the Education for Healthy and Safe Places to Live and Work Collaborative Group.

February 2006

- Plans are discussed for developing a matrix describing each educational program. There is consensus that program information alone is not sufficient to assist homes in selecting the most appropriate education for their home/situation.
- The group decides to explore the development of an algorithm to assist homes in the education decision-making process. Support of a consultant is recommended.

March 2006

- Consultant retained.

April 2006

- Key issues related to the tool are articulated, including underlying principles, anticipated outcomes, resources and

supports available to facilitate decision-making, indicators for use, target audience and possible formats for the tool.
- Initial design for tool explored.

April – June 2006
- Initial version of tool developed.

June 2006
- Meeting to review and refine the tool. Group decides that current design is not sufficient and decides to use an algorithm to better help LTC homes to determine their needs for education and their capacity to support education.

July 2006
- Algorithm drafted.

August 2006
- Meeting to review and refine the tool. Initial discussion regarding the development of a matrix of education programs and marketing of the tool.

September 2006
- Tool revised.

October 2006
- Meeting to review and further refine the tool and obtain consensus on revisions. Parts I and II of the tool are finalized.
- Consultant support is terminated as members are able to undertake remaining tasks.

November 2006 – February 2007
- Plans to pilot-test tool developed.
- Members develop and refine the educational matrix (Part III).

March – April 2007
- DENA tool pilot-tested by LTC homes.
- Feedback shared with collaborative group. Changes to DENA tool decided.

May – August 2007
- DENA tool finalized.
- Online version of tool developed.

September 2007 – September 2008
- DENA tool marketed at various venues (e.g., OLTCA and OANHSS meetings, Canadian Coalition of Seniors' Mental Health annual meeting, Ontario Ministry of Health and Long-Term Care Innovation Expo, Ontario Safety Association for Community and Healthcare Conference, several Seniors' Health Research Transfer Network (SHRTN) Community of Practice Fireside Chats).
- Tool made available to all LTC homes.

LTC = long-term care
OANHSS = Ontario Association for Non-Profit Homes and Services for Seniors
OLTCA = Ontario Long-Term Care Association

A consultant with expertise in adult education and knowledge transfer was hired to assist the group in developing the tool. Over the course of almost three years, the collaborative met approximately 12 times, sometimes for day-long meetings, to develop the tool; additional work was done on this project between meetings. A timeline of activities leading to the development of the tool is presented in Table 1. Consensus for decision-making regarding development of the tool (components, revisions) was achieved through discussion.

Integrating knowledge of adult learning principles, knowledge transfer and performance improvement, and based on the collective experience and wisdom of the group, the collaborative first worked to identify key principles that would underlie the development of a decision-making tool for education. As well, this tool would need to address the challenges that LTC homes experience as they attempt to build capacity and improve care. The guiding principles were as follows:

- LTC homes require simple, user-friendly and client-focused tools to facilitate dialogue about existing gaps, strengths and needs for capacity building and education; link homes to available resources; and assist with proactive problem-solving (rather than reactionary decision-making) in a manner that allows homes to assume responsibility for ongoing education planning.
- Many different solutions could be implemented to address the issues that would bring an end-user to this tool; strategies other than CE can build on and support existing capacity to resolve performance gaps. There is much evidence highlighting the factors and strategies that facilitate and reinforce practice change (Broad and Newstrom 1992; Rushmer et al. 2004a,b).
- LTC homes require a well-thought-out and sustainable education plan. Decision-making regarding CE should take into account the organization's need and capacity to support education and should assist homes in determining the supports and strategies that are needed to enhance their capacity to manage specific physical and mental health issues.
- The decision-making process need not be conducted in isolation; various internal and external resources are available for consultation.

Results of the Knowledge Translation Initiative: The Dementia Education Needs Assessment (DENA) Tool

The collaborative group has developed a practical, evidence-based tool to help decision-makers in LTC homes to develop an action plan for education. As the group met over the course of three years, various formats and versions of the tool were developed and revised.

The purpose of the tool, called the Dementia Education Needs Assessment (DENA) tool, is to assist professionals (e.g., administrators/executive directors, directors of care/services, case managers, educators, clinicians, health and safety committees) working in LTC homes to make decisions about CE programs related to dementia. The tool is designed to assist organizations in supporting practice change and performance improvement through education, and acknowledges that education may not necessarily be the solution to their performance gaps; strategies other than CE can

build on and support existing capacity to improve clinical practice. To this end, the tool aims to help users determine whether they need education and are able to support practice change, and if so, to inform them of the available educational opportunities. Although CE can take many forms (e.g., informal, "teaching in the moment" opportunities, case-based learning), this tool focuses on formal education opportunities.

The tool consists of three parts; users are directed to proceed through each part in sequence. Each part consists of a series of questions designed to stimulate reflection and facilitate dialogue about performance gaps and needs for capacity building and education. The questions also link LTC homes to available resources and assists them with proactive problem-solving in a manner that allows them to assume responsibility for their education planning, rather than dictating the educational programs that they should choose. Set up in somewhat of an algorithmic format, users' responses to the various questions guide them through the tool.

Part I: Do you need education?

This first step of the tool assists users in determining whether education is what their organization currently needs, and provides suggestions for alternative options to build capacity. Four key questions guide users through this section of the tool:

1. WHAT IS THE ISSUE THAT BRINGS YOU TO THIS TOOL?

This step engages users to think about the issues that have brought them to the tool. The tool can be used for a variety of purposes, many of which are interrelated. Individuals or groups may find the tool helpful when faced with critical incidents (e.g., resident or staff injury), policy planning, risk management, budgeting and planning for staff development and education, or when trying to make sense of available education programs and determining whether these programs would be beneficial to their staff and residents.

2. WHAT ARE THE IDENTIFIED GAPS IN PERFORMANCE THAT EXIST IN YOUR ORGANIZATION?

When considering the gaps in knowledge or skills related to the care of older persons with dementia, tool users are asked to reflect on a few key questions: What are the skills or knowledge that you would like staff to have? What changes in performance would you like? What do you hope to achieve? What commitment to education have you already made in this area, and what has come of it? What remains to be accomplished? The answers to these questions will help users determine whether their organization requires further education, or whether other strategies are needed to build on existing capacity.

3. WITH WHOM HAVE YOU CONSULTED ABOUT DEMENTIA EDUCATION FOR YOUR ORGANIZATION?

Tool users are encouraged to collaborate with others when making decisions about continuing education and to consider that there is a wealth of knowledge and expertise available to help them with their decision-making. Depending on their particular performance issue or question, they are encouraged to consider consulting with resources both inside and outside their organization. Internal resources would include staff educators, social workers, clinical leadership, physicians and family and resident councils. External resources would include psychogeriatric resource consultants (PRCs),[2] best practice coordinators' (BPCs) provincial associations or organizations,[3] specialty geriatric psychiatry outreach programs and local education institutions (colleges and universities). These resources can help users make decisions about CE and how best to resolve performance gaps.

4. WHAT OTHER OPTIONS EXIST FOR DEVELOPING CAPACITY IN YOUR ORGANIZATION?

The underlying premise of the tool is that while some of the issues that bring people to it may be resolved through education, some may require other strategies for capacity building within homes. Tool users are encouraged to consider that they may already have the expertise they need within their organization to resolve existing issues, but may need to consider how best to support and use that expertise, or how they might best support staff to apply to their practice what they have already learned in CE programs. Drawing from the literature on factors known to support performance improvement (Bero et al. 1998; Berta et al. 2005; Broad and Newstrom 1992; Grol and Grimshaw 2003; Rummler and Brache 1990, 1995; Watkins and Marsick 1993), tool users are asked to consider strategies other than education to build on and enhance existing capacity in their organizations. These strategies could include clearly communicated management or leadership support; workplace policies and procedures that encourage practice change; on-the-job reinforcement of new skills (coaching, mentoring, networking); opportunities for staff to learn from one another (observe and model) and work together to solve a common problem or to experiment with new ideas or strategies; and creating a workplace culture that encourages change and new approaches. Finally, tool users are encouraged to consider working with internal and external resources to determine how they might best support, develop and enhance existing capacity in their organization.

Part II: Education Readiness Tool

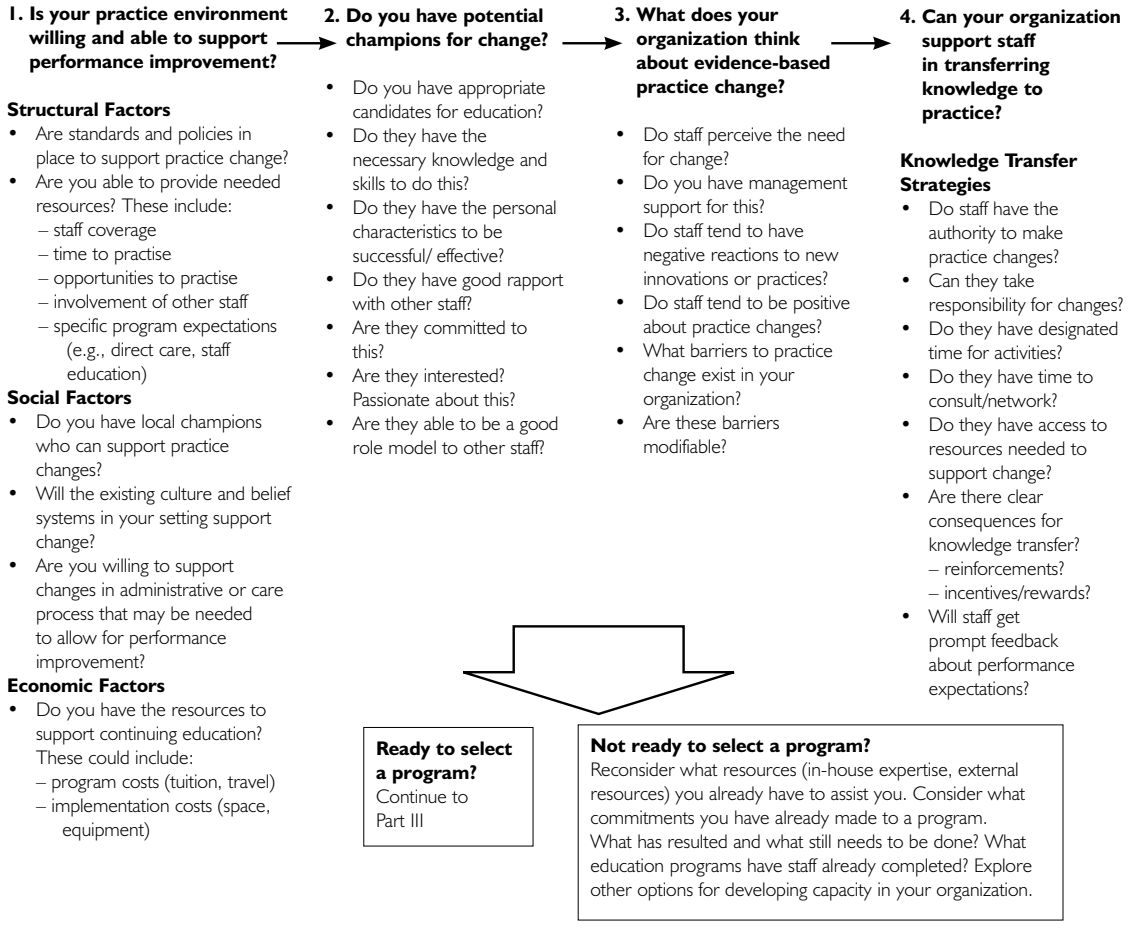
When users have determined that education is what their organization needs, the tool then forces them to think about whether their organization is ready for education.

Drawing from the literature on knowledge transfer, this section of the tool encourages users to consider whether they have the organizational supports and resources in place to promote education and to facilitate practice change, such as standards and policies, supplementary resources, champions for change, favourable organizational climate and effective knowledge transfer strategies. The emphasis of this part of the tool is to reflect on the evidence-based factors that make education optimally effective to facilitate and enhance practice change.

Figure 1 presents the Education Readiness tool. In this section of the DENA tool, users are asked to reflect on the four questions shown in the diagram.

FIGURE 1. Education Readiness tool

The reflective questions highlight the factors that will increase users' chance of success with education and practice change. This tool is not designed to provide a readiness score with regard to the formal education programs on the program matrix. Rather, the questions offer an opportunity to integrate practice with education. The tool emphasizes the success factors that make education optimally effective.



1. IS YOUR PRACTICE ENVIRONMENT WILLING AND ABLE TO SUPPORT PERFORMANCE IMPROVEMENT?

There is much literature on the factors that can support use of new knowledge and best practices (e.g., Bero et al. 1998; Berta et al. 2005; Berwick 2003; Broad and Newstrom 1992; Graham and Logan 2004; Rummler and Brache 1990, 1995). These factors are: (a) structural, including the policies, procedures and resources needed to support change, (b) social, including the people (e.g., champions) and attitudes (e.g., organizational culture) needed to support change and (c) economic, including the financial resources associated with providing education (e.g., tuition, travel) and implementing care approaches/strategies stemming from the education (e.g., space, equipment). In the absence of these factors, organizations will be challenged to optimize staff efforts to apply what they have learned in education programs to their clinical practice.

2. DO YOU HAVE POTENTIAL CHAMPIONS FOR CHANGE?

Change champions have been identified as critical for quality improvement in LTC homes (Scalzi et al. 2006). With limited resources for CE, the selection of appropriate candidates for education can maximize and sustain the benefits of education through ongoing modelling and teaching with other staff. Their attitudes, confidence, ability and aptitude, personality and relationship with other staff affect their ability to inspire others to transfer learning to clinical practice and improve care (Broad and Newstrom 1992; Hogan and Logan 2004).

3. WHAT DOES YOUR ORGANIZATION THINK ABOUT EVIDENCE-BASED PRACTICE CHANGE?

Organizational support for innovation, learning and practice change, at both the staff and management level, are necessary for practice change (McAiney et al. 2007; Stolee et al. 2005). Staff are more likely to engage in new practice activities when they perceive a need for change, have management support and have an organizational culture that values learning and innovation and actively seeks to identify and modify barriers to practice change.

4. CAN YOUR ORGANIZATION SUPPORT STAFF IN TRANSFERRING KNOWLEDGE TO PRACTICE?

Support for practice change is evident in the strategies that organizations engage in to facilitate performance improvement. Knowledge transfer strategies include ensuring that staff have the authority and ability to take responsibility for implementing care approaches/strategies learned in CE programs, as well as adequate resources to implement practice change such as time, equipment, space and tools (Rushmer et al. 2004a,

b). They also include ensuring that factors known to support transfer of learning to performance are in place, such as clear performance expectations as articulated in policies and procedures; clear consequences for practice change (reinforcement, incentives, rewards); and prompt feedback related to how well performance matches expectations (Rummler and Brache 1995).

As users are led through this section of the tool, they need to decide whether or not they are "ready" for education. When they determine that their organization is not able to support education, tool users are led to reconsider the resources they already have for assistance (in-house expertise, external resources); the commitments they have already made to education initiatives; the education staff have already completed; and exploration of other options for developing capacity in their organization. When users have concluded that their organization is ready for education – that is, they have the resources, potential change agents and organizational climate to support CE – they are led to Part III of the tool, a matrix of available education programs.

Part III: Selecting the most appropriate education for your organization

Part III of the DENA tool consists of a matrix of dementia-related education programs available to LTC homes in Ontario. This matrix provides information regarding the goals of the program, the target learner, method of delivery, teachers/trainers, length of training, cost and partners in delivery. The educational programs included in the matrix were suggested by the members of the Education for Healthy and Safe Places to Live and Work Collaborative Group. The collaborative used these programs in the conceptualization, development and testing of the DENA tool. Users are encouraged to apply DENA to support decision-making in relation to any dementia-related educational programs they are considering.

From the matrix, tool users select the most appropriate program for their organization, depending on the outcomes that they hope to achieve, the group(s) they want to target for education and their preferred educational format(s) (e.g., e-learning, classroom-based).

The DENA tool was pilot-tested in several LTC homes in the province and revised based on feedback received. Members of the Collaborative Group were asked to identify LTC homes that might be willing to pilot-test the tool. In identifying sites, members were asked to consider homes of different sizes from all parts of the province, and from both rural and urban areas. Contact people from the identified homes were sent an e-mail that described the initiative and DENA, and were invited to pilot-test the tool. Those that were interested in piloting the tool were asked to think of a recent situation in their home that prompted them to consider further education as a response. With that situation in mind, the pilot sites were asked to go through the DENA tool. They were then asked to complete an online survey in which they

described the ease or difficulty of using each part of the tool, its potential value and the time required to complete each section.

Twelve LTC homes pilot-tested the tool and completed the survey. Three-quarters of the respondents indicated that their homes were in a rural area. Homes were located in the central, south and eastern parts of the province. None of the homes were from northern Ontario. The average number of beds in the pilot sites was 138 (SD=26.4), ranging from 100 to 192 beds. Respondents' roles included directors of care (50%), educators (33%), administrators (8%) and nurse consultants (8%).

Overall, feedback on the tool was positive. Eleven of the 12 homes indicated that they would use DENA again to assist them in making decisions about the need for dementia education, and eight of the 12 thought that DENA could assist with education-related decisions in other areas. The pilot sites identified aspects of the tool that they would like changed, most notably the desire to remove the keyword search table, as most found this component of the tool confusing. The feedback on the tool was summarized and shared with the Collaborative Group. The tool was revised and finalized based on the feedback received.

Since finalization of the tool, the Collaborative Group has worked to promote and market it at various venues. An online version as well as an e-learning module were also developed (see www.denatool.org). The tool is available to all LTC homes in the province, as well as any other interested organization or group.

Lessons Learned

This collaborative was successful in its efforts to develop a tool to help LTC homes address pervasive challenges related to CE and performance improvement. A collaborative, participatory approach involving LTC associations, researchers, clinicians and other key stakeholders can provide an opportunity to marry research evidence and clinical experience to create effective knowledge translation. The success of this collaborative is related to factors inherent in CoPs, namely, the existence of a common goal, of both tacit (experience) and explicit (evidence) knowledge, and of important relationships among those in the group and with those outside it (Lathlean and le May 2002; Sandars and Heller 2006). Consistent with factors known to support CoPs, the collaborative described here was supported by identified leadership (i.e., LTC associations), regularly scheduled meetings and a high degree of networking among members (Lathlean and le May 2002). Moreover, members' respective agencies/organizations contributed their expertise and provided the necessary time and resources to participate in this initiative. Despite representatives from the educational programs having vested interests in promoting their own formats, the common vision of enhancing care for older persons with dementia in LTC homes drove the collaborative effort. As sug-

gested by Lathlean and le May (2002), CoPs can serve to break down interagency and interprofessional barriers and boundaries.

Initially, the Collaborative Group focused on developing communication strategies regarding available education programs; the move towards developing this decision-making tool required the recognition and acknowledgement of the limitations (e.g., human resources, operational practices, financial resources) that exist within LTC homes, as well as the need to support leaders in their quest to increase staff capacity to enhance care (Bradley et al. 2003; Rushmer et al. 2004b). The group recognized early that, owing to time constraints and workload issues, no one person in the group was able to lead the development of the tool in a timely fashion; a facilitator was therefore hired to help the group move the initiative forward. As the tool was being developed, there were some discussions about which key components should be included, with some members identifying priorities not necessarily shared by all members. The emphasis on using evidence to guide the development of the tool helped to resolve these issues.

The online version of DENA is housed on the Alzheimer Knowledge Exchange (AKE) website; the AKE has assumed responsibility for developing the online version within existing resources. Although the tool can be located on the Internet when searched for by name, it is currently not searchable by topic. While creating a searchable domain would increase accessibility, it could prove costly and, in the absence of resources for this project, may be beyond the capacity of the collaborative at this time.

This collaborative illustrates that resolution of common challenges can be achieved with minimal resource allocation. There was no external support for this initiative; all activities were undertaken with existing resources and in-kind contributions from the various members (e.g., representation from various organizations at the meetings). OANHSS and OLTCA pooled resources to hire the facilitator (cost: $5,600.00). Meeting and teleconference costs were approximately $2,500 (roughly $210 per meeting for 12 meetings), with meetings held at the OLTCA offices. The costs associated with posting the tool online, and development of the DENA e-modules (software and development), including the creation of a logo and look for the tool, were an in-kind contribution of $600 from the Alzheimer Knowledge Exchange (Alzheimer Society of Ontario). In addition, each participant spent much time working on the initiative between meetings, particularly during the development of the education matrix, reflecting in-kind contributions from their respective organizations.

Next steps include the development of sustainability strategies. The feasibility of including other programs in the matrix will need to be assessed. How and by whom the tool will be evaluated on an ongoing basis will also need to be determined. Opportunities to test the tool in other health sectors and settings should be explored further.

Conclusion

The development of the DENA tool illustrates how individuals within a CoP who have shared challenges, visions and goals can work together in a collaborative to share their intellectual and physical resources to problem-solve timely and pervasive problems. The DENA tool represents a creative method of informing LTC homes of what is known about how to facilitate practice change (i.e., the supports and resources that need to be in place, including standards and policies, resources, champions for change, supportive organizational climate and effective knowledge transfer strategies) and encouraging them to incorporate this knowledge into their organizational structure and philosophy for performance improvement. Further application and evaluation of this tool will inform future development and provide insight into how it can best achieve its goal of enhancing care.

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NOTES

1. Additional members of the Healthy and Safe Places to Live and Work Collaborative Group: Jennifer Barr, Program Consultant, Policy, Education and Health Promotion, Centre for Addiction and Mental Health; Patricia Boucher, Vice President, Ontario Safety Association for Community and Healthcare; Catherine Brookman, Director, Special Projects, Ontario Community Support Association; Josie d'Avernas, Associate Director, Schlegel–University of Waterloo Research Institute of Aging; Susan Furino, Program Consultant, Ontario Ministry of Health and Long-Term Care; Pam Hamilton, Psychogeriatric Resource Consultant, Providence Care; Robin Hurst, Mental Health Clinical Consultant, Saint Elizabeth Health Care; Stephanie Lappan-Gracon, Coordinator, Best Practice Champion Network, Registered Nurses' Association of Ontario; J. Kenneth LeClair, Geriatric Psychiatrist, Providence Care; Lori Schindel Martin, Associate Professor, School of Nursing, Ryerson University; Barb McCoy, Psychogeriatric Resource Consultant, Alzheimer Society of Hamilton and Halton; Maureen Montemuro, Clinical Nurse Specialist, St. Peter's Family of Services; Frances Morton, Knowledge Broker, Alzheimer Knowledge Exchange; Karen Parrage, Alzheimer Knowledge Exchange Coordinator; Karen L. Ray, Knowledge Broker, Seniors' Health Research Transfer Network; Josie Santos, Toronto Region Best Practice Guidelines Coordinator, North York General Hospital Seniors' Health Centre.
2. In Ontario, PRCs serve as educators, consultants and program developers to the LTC sector across the province.
3. BPCs in LTC assist nurses and staff in LTC homes in using best practices and incorporating evidence-based practices into their daily care. Both PRCs and BPCs are funded by the provincial Ministry of Health and Long-Term Care.

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RESEARCH PAPER

Factors Affecting Physician Performance: Implications for Performance Improvement and Governance

Facteurs qui influent sur le rendement des médecins : répercussions pour l'amélioration du rendement et pour la gouvernance

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Abstract

Background: A physician's personal and professional characteristics constitute only one, and not necessarily the most important, determining factor of clinical performance. Our study assessed how physician, organizational and systemic factors affect family physicians' performance.
Method: Our study examined 532 family practitioners who were randomly selected for peer assessment by the College of Physicians and Surgeons of Ontario. A series of multivariate regression analyses examined the impact of physician factors (e.g., demographics, certification) on performance scores in five clinical areas: acute care, chronic conditions, continuity of care and referrals, well care and records. A second series of regressions examined the simultaneous effects of physician, organizational (e.g., practice volume, hours worked, solo practice) and systemic factors (e.g., northern practice location, community size, physician-to-population ratio).
Results: Our study had three key findings: (a) physician factors significantly influence performance but do not appear to be nearly as important as previously thought; (b) organizational and systemic factors have significant effects on performance after the effects of physician factors are controlled; and (c) physician, organizational and systemic factors have varying effects across different dimensions of clinical performance.
Conclusions: We discuss the implications of our results for performance improvement and physician governance insofar as both need to consider the broader environmental context of medical practice.

Résumé

Contexte : Les caractéristiques personnelles et professionnelles des médecins ne constituent qu'un, et non nécessairement le plus important, des facteurs déterminant le rendement clinique. Dans cette étude, nous avons évalué comment les facteurs personnels, organisationnels et systémiques affectent le rendement des médecins de famille.
Méthodologie : Nous avons étudié 532 médecins de famille choisis au hasard et soumis à une évaluation par les pairs effectuée par le Collège des médecins et chirurgiens de l'Ontario. Une série d'analyses de régression multivariée a permis d'examiner l'incidence des facteurs personnels des médecins (aspects démographiques, homologation, etc.) sur la cote de rendement dans cinq domaines cliniques : soins de courte durée, états chroniques, continuité des soins et recommandations aux spécialistes, soins de routine et dossiers médicaux. Une seconde série d'analyses de régression a permis d'examiner l'effet simultané des facteurs personnels, organisationnels (par exemple, volume de la pratique, heures effectuées, pratique en solo) et systémiques (par exemple, pratique en région nordique, taille de la communauté, ratio médecin/population).
Résultats : Notre étude dégage trois conclusions principales : (a) les facteurs personnels influencent de façon significative la pratique, mais ne semblent pas aussi impor-

tants que nous le pensions au départ; (b) les facteurs organisationnels et systémiques ont un effet significatif sur le rendement, et ce, après avoir effectué le contrôle des effets associés aux facteurs personnels; (c) les facteurs personnels, organisationnels et systémiques ont des effets variables sur les divers aspects du rendement clinique. *Conclusions :* Nous discutons des répercussions de nos résultats sur l'amélioration du rendement et sur la gouvernance pour les médecins, puisque toutes deux doivent être prises en compte dans le contexte général de la pratique médicale.

A growing literature suggests that a physician's ability to provide good patient care and avoid medical errors depends on multiple factors (Donabedian 1966, 1988; Skinner 2002; Caulford et al. 1994; Ely et al. 1995; Grol 2002; Becher and Chassin 2001; Berwick 2003; Barach and Moss 2001; Chen and Hou 2002) including, but not limited to, their personal and professional characteristics. For example, numerous studies have demonstrated that physician characteristics such as age, sex, education/training credentials and competence (i.e., knowledge, skills and attitudes) may all influence how well physicians perform (Caulford et al. 1994; Ely et al. 1995; Norton et al. 1994, 1997; McAuley et al. 1990; Norman et al. 1993; Jansen et al. 2000). However, it has also been noted that these physician characteristics account for a surprisingly small proportion of total variation observed in performance; other factors are also at play (Donabedian 2000).

For example, some studies have concluded that older physicians do not perform as well as their younger counterparts (Norton et al. 1997; McAuley et al. 1990), a finding that seems to suggest that older physicians are generally less competent. However, it has also been observed that, compared to their younger colleagues, older physicians tend to work in different practice types, such as solo practice, which may offer fewer supports for effective record keeping and workload management; with different patient populations, including older individuals with more complex continuing care needs; and in different geographic locations, which, particularly outside urban areas, may offer less access to required tests, treatments and specialist referrals (Tepper et al. 2005; Donabedian 1992). Thus, it is possible to imagine an older physician who is well trained and competent, but who nonetheless performs poorly according to standard measures because of organizational and systemic problems (Grol 2002; Kopelow et al. 1992; Rethans et al. 2002). Such different interpretations of the sources of poor performance have major implications for designing and targeting policies and interventions aimed at improving and ensuring performance.

In addition to physician characteristics, administrative and organizational structures (Caulford et al. 1994; Grol 2002; Norman et al. 1993; Donabedian 2000; Robinson 1994; Jones 2000; Ram et al. 1998; Long 2002) and financial incentives/disincentives

(Robinson 1994; Safran et al. 2000; Morrow et al. 1995; Gillett et al. 2001; Goldfarb 1999; Hopkins 1999; Safran et al. 2002; Geneau et al. 2008), to name a few factors, can all have different effects on clinical performance and affect clinical behaviour. Yet, performance has traditionally been viewed as devoid of context (LaDuca 1994; LaDuca et al. 1984; Klass 2000, 2007a,b; Geneau et al. 2008), excluding both the context of the patient and the context of the organizational or systemic environments. A reason for this view may be the current lack of a comprehensive and unified conceptual framework of what individual physician performance entails (Klass 2000, 2007b). The concept needs to acknowledge the impact of the practice environment, including both the influence of organizational structures and the larger healthcare system as a whole, on the ability of physicians to perform adequately (Grol 2002; Robinson 1994; Klass 2007b; Long 2002).

In a previous paper (Wenghofer et al. 2006b), we explored the importance of the patient context in physician performance and demonstrated that performance is indeed a multidimensional construct rooted in the unique requirements of different types of physician–patient encounters. In this paper, we go on to explore how performance in these dimensions is influenced by physician factors and, additionally, by the broader organizational and systemic contexts to provide a conceptual framework within which physician performance can be studied. To do this, we analyze data from actual performance assessments of general/family practitioners (GP/FPs). We hypothesized that physicians' personal and professional characteristics constitute only one, and not necessarily the most important, determining factor of performance. We consider the implications of our findings on physician governance and performance improvement.

Data and Methods

Performance data

In 1980, the College of Physicians and Surgeons of Ontario (CPSO) initiated a peer assessment program that includes practice visits to a random sample of the province's approximately 28,000 physicians by trained physician assessors (peers). Approximately 2% to 3% of the total practising physician population of Ontario is assessed annually. In this study, we analyzed data from 532 GP/FPs randomly selected for peer assessments conducted between 1997 and 2000 by the CPSO. Since a detailed description of the CPSO's peer assessment process can be found in previous published studies (Norton et al. 1994, 1997, 1998, 2004; Norton and Faulkner 1999; McAuley and Henderson 1984; McAuley et al. 1990; Wenghofer et al. 2006a,b), we note here only that during their visits to a physician's practice, a single peer assessor typically reviews 20 to 30 complete patient records, discusses the findings with the physician and then

fills out a 46-item protocol relating to records and care quality. The inter-rater reliability between assessors has been shown to be excellent (kappa = 0.89) (unpublished internal studies from the CPSO). In our previous work (Wenghofer et al. 2006b), we discussed how we computed scores on multiple-item measures of performance from the assessment protocols for five dimensions of GP/FP performance (see Table A1 in the Appendix for detailed definitions):

1. managing patients with acute conditions and new presentations (acute)
2. managing patients with chronic conditions (chronic)
3. providing patients with continuity of care and referrals (continuity)
4. providing patients with well care and health maintenance (well care)
5. managing patient records (records)

The calculated scores for each dimension range from a minimum score of 1.0, indicating poor performance, to a maximum score of 4.0, indicating excellent performance (Wenghofer et al. 2006b).

Factors affecting performance

In this paper, we focus on the extent to which variation in physicians' scores along each performance dimension are explained by physician, organizational and systemic factors.

- Physician factors. We define physician factors as those attributes of the individual that have traditionally been the object of interest regarding physician performance and competence assessment. Physician factors specifically focus on those features that physicians "bring with them" to any practice setting or community. In our study these include age; sex; years in practice; medical school (North American vs. Other); College of Family Physicians of Canada (CFPC) certification; years practising in current setting (i.e., as a proxy indicator of experience with current patient population); and whether or not the physician had been previously peer assessed by the CPSO.
- Organizational factors. We define organizational factors as representative of the characteristics of the immediate setting in which the physician works. These are features that may change if a physician moves from one setting to another. In this study, these include solo practice, episodic care practice/walk-in clinic (WIC), total number of clinical and administrative staff; hours worked per week in primary practice; number of patient visits per week in primary practice; active hospital appointment (yes/no); teaching (yes/no); and focused practice scope (yes/no). The effects of solo (Norman et al. 1993; Shine 2002) and WIC (Jones 2000, 2006; Brown et al. 2002) practice structures were specifically evaluated because both are often considered to have potentially negative effects on practice.

- Systemic factors. The systemic factors we have selected are intended to provide a snapshot of several key features associated with the broader community in which a physician's practice is situated. These include access to 911 services at the time of assessment (yes/no); estimated minutes for access to emergency medical services (EMS); availability of four core diagnostic tests (expressed as a proportion); physician per 1,000 population ratio and northern practice locations (yes/no).

Data for physician, organizational and systemic factors were either extracted from the CPSO registry (which is verified through documentation reviews and extensive credentialling processes) or self-reported by physicians in a pre-assessment questionnaire as a required component of the peer assessment process. The physician-per-1,000-population ratio was calculated by linking CPSO registry data for primary practice address to the 1996 Canadian Census data at the census subdivision level, which closely mirrors municipal divisions. Northern location of practice was indicated at a very high level by the "forward sortation area" (FSA) code of primary practice address postal code (FSA="P").

Analysis

Descriptive statistics were produced for each of the five dimensional scores. We conducted two series of multiple regressions using different models. The first independent regression model involved regressing only the physician factors on each of the multiple-item measures of performance. The independent model thus estimates the effects of personal and professional characteristics without controlling for organization or system factors. The second full regression model examined the effects of the physician factors when organizational and systemic factors are entered simultaneously into the regressions. The variance estimates generated by the full regression model indicate the marginal (or net) increase in the variance explained by the group of variables representing the physician, organizational and systemic factors. The variance estimates, regression coefficients, standard errors of the coefficients for each model are reported. Variance inflation factors (VIFs), tolerance and between-predictor correlations were evaluated to determine the level of collinearity in the models. In view of the large number of independent variables entered in our model, we did not explore the potentially large number of interaction effects, as we were somewhat concerned with overparameterizing the model given our sample size (Lewis 2007).

Results

Physician and practice description

The average age of physicians in the sample was 51.0±9.91 years with a median of 50.

This is comparable to the 51.2-year average age of Ontario physicians (CPSO 2008a). The sex distribution of the sample shows that 88.9% of the assessed individuals were male and 11.1% female. The sample comprised more male physicians compared to the CPSO registry database, which shows that 67.9% of the physicians in Ontario are male and 32.1% female (CPSO 2008a).

The sample physicians worked an average of 29.8 hours and saw an average of 131 patients per week in their primary office setting. The sample physicians indicated that 50% (median) of the practices employed two or more administrative or clinical staff members (or both). This value did not differentiate between clinical and administrative staff, nor did it distinguish between part-time and full-time staff. In addition, 20.2% of sample physicians engaged in teaching, 5.4 % had clinically focused practices and 64.7% had active hospital appointments. Solo and WIC practices were the primary practice settings for 42.1% and 7.9% of the sample physicians, respectively.

Descriptive statistics of dimensions of performance

The majority (78%) of assessed physicians had satisfactory practices; 14.1% required a reassessment and 7.9% required an interview because of care concerns. This finding is consistent with the typical distribution of assessment results since the inception of the CPSO peer assessment program. The descriptive statistics for the scores on the five performance dimensions were positively skewed, reflecting the propensity of most physicians to do well on assessment (Table 1). However, as reported in earlier studies, the variations present in the dimensional scores are sensitive to significant differences in assessment outcomes (Wenghofer et al. 2006b).

TABLE 1. Descriptive statistics of performance dimension scores from peer assessment

n=532	Acute	Chronic	Continuity	Well care	Records
Mean	3.52	3.66	3.85	3.29	3.59
Standard Deviation	0.49	0.41	0.34	0.61	0.34
Minimum Score*	1.63	1.71	1.60	1.33	1.92
Maximum Score*	4.00	4.00	4.00	4.00	4.00

* Note: Possible range on all dimensional scores is a minimum score of 1.0 and a maximum score of 4.0.

Independent regression model

Results from the independent regression model, in which only the physician factor was evaluated, are presented in Table 2. Collinearity diagnostics indicated that years in practice is highly correlated with physician age (r=0.94); thus, years in practice was removed from all regression models (Kleinbaum et al. 1988). As in previous studies

of the peer assessment results (Norton et al. 1994, 1997; McAuley et al. 1990), our results confirmed that personal and professional characteristics, particularly sex and certification, and to a lesser degree age, significantly influenced performance with the exception of continuity of care, for which the independent regression model was not significant. However, unlike previous studies, the effects were found to vary across performance dimensions. For example, the regression results indicated that females perform better in acute care, well care and records management, but sex differences are not found in the other dimensions. Similar variation across performance dimensions were also found with age and CFPC certification. Increasing age was a significant predictor of declining performance in records only, while holding CFPC certification had a positive impact on performance in acute, chronic and well care as well as records. Attending a North American medical school, the number of years in the current practice setting and having been previously assessed did not significantly affect assessment performance in any of the dimensions.

TABLE 2. Independent regression model of multiple-item measure scores on physician factors

	Acute regression coefficient (std. error)	Chronic regression coefficient (std. error)	Continuity regression coefficient (std. error)	Well care regression coefficient (std. error)	Records regression coefficient (std. error)
Independent Model R^2	**0.074****	**0.046****	**0.023**	**0.079****	**0.120****
Age	–0.005 (0.004)	–0.005 (0.003)	–0.001 0.003)	–0.005 (0.004)	**–0.005* (0.002)**
Males	**–0.174* (0.067)**	–0.106 (0.058)	–0.061 (0.048)	**–0.302** (0.084)**	**–0.158** (0.046)**
Attended North American School	0.052 (0.054)	0.011 (0.046)	0.039 (0.039)	0.002 (0.067)	–0.014 (0.037)
Years in Current Practice at Time of Assessment	–0.002 (0.003)	0.004 (0.003)	0.004 (0.002)	0.004 (0.004)	–0.002 (0.002)
Holds CFPC Certification	**0.107* (0.045)**	**0.126** (0.039)**	0.058 (0.033)	**0.240** (0.057)**	**0.110** (0.031)**
Has Been Previously Assessed	0.066 (0.070)	0.015 (0.060)	0.030 (0.050)	–0.019 (0.088)	–0.015 (0.049)

* Significant at $p<0.05$

** Significant at $p<0.01$

Full regression model

The results of the full regression model measuring the simultaneous impact of physician, organizational and systemic factors on performance (Table 3) revealed that the way in which physician factors influence performance change when organizational and

systemic factors are taken into account. For example, unlike the independent model, in the full model age was not a significant predictor in any of the performance dimensions, and CFPC certification remained a significant predictor only in well care and records. In addition, years in current practice setting became significant for acute care in the full model. A similar pattern was also found with performance in the chronic and continuity of care dimensions, in that the physician characteristics were no longer significant once the effects of organizational and systemic factors were incorporated in the full model.

TABLE 3. Significant factors in the full regression model of multiple-item measure scores on physician, organizational and systemic factors

		Acute regression coefficient (std. error)	Chronic regression coefficient (std. error)	Continuity regression coefficient (std. error)	Well care regression coefficient (std. error)	Records regression coefficient (std. error)
	Model R^2	**0.199****	**0.142****	**0.123****	**0.193****	**0.233****
Significant Physician Factors	Males				**–0.236* (0.095)**	**–0.104* (0.050)**
	Years in Current Practice	**–0.007* (0.004)**				
	Holds CFPC Certification				**0.208** (0.068)**	**0.073* (0.036)**
Significant Organizational Factors	WIC Practice		**–0.166* (0.071)**			
	Number of Patient Visits per Week	**–0.002** (0.000)**	**–0.001** (0.000)**	**–0.001** (0.000)**	**–0.002** (0.001)**	**–0.001** (0.000)**
	Holds Active Hospital Appointment					**0.080* (0.036)**
Significant Systemic Factors	Proportion of Basic Diagnostic Tests Available		**0.350** (0.131)**	**0.391** (0.111)**	**0.458* (0.217)**	
	Physician to 1,000 Population Ratio	**0.0328* (0.013)**	**0.027** (0.011)**	**0.021* (0.009)**		
	Northern Practice Location	**–0.345** (0.095)**			**–0.332* (0.124)**	**–0.240** (0.065)**

* Significant at $p<0.05$

** Significant at $p<0.01$

Note: Regression coefficients for variables that were included in the full model but were not significant are not listed owing to space constraints.

In the full regression model, several specific variables from the organizational factors had significant effects on performance. Practice type, patient visits per week and holding an active hospital appointment each had varying effects in several of the dimensions. For example, physicians working in WICs performed less well in

the chronic care dimension. The most consistent organizational effects were found with patient visits per week, where performance in all five dimensions improved with declining numbers of patient visits per week.

Specific system variables were also significant in the full regression models. Physicians working in locations with low physician-to-population ratios performed more poorly in the acute, chronic and continuity care performance dimensions. Physicians with better availability of basic diagnostic tests performed better in the chronic, continuity and well care dimensions. Physicians with their primary practices in northern locations performed more poorly in acute care, well care and records than their southern counterparts, even after the effects of the physician-to-population ratio and number of patient visits per week had been taken into account.

The variance estimates from the full regression model are presented in Table 4. The physician factors were significant predictors, to varying degrees, for acute care (R^2=0.058; p<0.01), well care (R^2=0.067; p<0.01) and records (R^2=0.087; p<0.01), but not for chronic conditions or continuity of care. In comparison, the organizational factors had a varying impact on all dimensions except continuity of care, where the systemic factors predominated (R^2=0.057; p<0.01). The systemic factors significantly contributed to the variance in all five performance dimensions, but to varying degrees.

TABLE 4. R^2 values for regression of multiple-item measure scores on blocks of physician, organizational and systemic factors

	Total variance explained by independent model	Net R^2 values for each factor			Total variance explained by full model
		Physician factor	Organizational factor	Systemic factor	
Acute	**0.074****	**0.058****	**0.071****	**0.068****	**0.199****
Chronic	**0.046****	0.012	**0.061****	**0.045****	**0.142****
Continuity	**0.023**	0.015	0.038	**0.057****	**0.123****
Well Care	**0.079****	**0.067****	**0.054****	**0.045***	**0.193****
Records	**0.120****	**0.087****	**0.052****	**0.051****	**0.233****

* Significant at p<0.05
** Significant at p<0.01

Tolerance, VIFs and between-predictor correlations do not indicate any concerning levels of collinearity. The maximum VIF and minimum tolerance in either the independent or full model were 3.3 and 0.30, respectively. The highest level of correlation was found between number of patient visits per week and hours worked per week, with a correlation of r=0.73. As a precaution, hours worked per week was

removed from the regressions because it was thought that number of patients per week would give a better indication of practice load than hours alone. All collinearity statistics were well out of range of levels meriting concerns (Kleinbaum et al. 1988), with the one other exception of years in practice, which was noted earlier and was addressed by modifying the regression models.

Discussion

While strategies for improving and ensuring physician performance are increasingly seen as crucial considerations for improving outcomes for patients and the healthcare system, there remains a tendency to address them rather narrowly, as primarily or solely a function of the credentials, training and attributes of individual physicians (Klass 2007b). We suggest that this approach fails to take into account factors in the broader context of practice that are beyond physicians' direct control. We believe it has also led to a relatively negative view of the current strategies employed to improve performance, which place inordinate emphasis on the agency of individual physicians and, in the process, appear to blame them for shortcomings in the organizations or health systems in which they work. Indeed, our data, drawn from actual practice-based assessments of GP/FPs, suggest that in addition to the personal and professional characteristics of physicians, the characteristics of the organizations in which they work and the communities in which those organizations are located also have important and concurrent effects on their ability to provide appropriate care to their patients across a number of key performance dimensions.

Three key findings emerge from our analyses.

First, our findings challenge the assumption that assessment can, or should, be targeted on the basis of individual characteristics alone. Although the results of both the independent and full regression analyses support the findings of previous research that sex, age and certification do affect performance, they do not appear to be nearly as important as previously thought (Norton et al. 1994, 1997; McAuley et al. 1990). For example, our data indicate that while female physicians outperformed males on some dimensions, such as well care or acute care, there were no differences in others (e.g., chronic care) once organizational and systemic differences were taken into consideration. Similarly nuanced findings were found with respect to CFPC certification. The results of previous studies that focused primarily on physician factors have led to several regulatory practices that may now need to be reexamined. For example, in Ontario a physician is selected for peer assessment at age 70 (CPSO 2008b). We are not suggesting that continuing age-related assessment is not important, but rather that other organizational structures may have a greater influence than age alone. Organization-related assessments might also be considered. Initiatives to improve performance targeted on the basis of personal attributes alone may likely miss their mark more often

than they hit. Clearly, the broader practice context needs to be considered in regulatory and improvement policies.

Further support for this idea is illustrated in our second key finding, which is that specific organizational and systemic factors, in addition to physician factors, all have significant effects on performance after controlling for physician factors. Of course, the idea that such external factors may influence physician behaviour is not new. For example, many studies have found evidence of small area variation in patterns of health services and physician practice patterns (Jin et al. 2003; Brownell 2002; Brownell et al. 2002; Veugelers et al. 2003; Chaudhry et al. 2001; Hospital Report Research Collaborative 2004a,b,c; Chan 2002; CIHI 2007b; Konkin et al. 2004; CMA 2008), including those found in northern and rural locations (Norton et al. 1997; Tepper et al. 2005; Baldwin et al. 1999; Probst et al. 2002; Chan and Shultz 2005; May et al. 2007; CIHI 2007a). Our findings support these earlier studies, which suggest an impact of the broader practice environment on physician performance. For example, physicians who have better access to diagnostic tests and specialist consults more appropriately diagnose, treat and refer patients; and physicians located in northern locations face practice challenges that are different from those seen among physicians in southern Ontario. Thus, we need to consider that working in different practice environments may require different skills and knowledge specific to the practice context.

A third key finding is that individual, organizational and systemic factors appear to have varying effects across different dimensions of performance, emphasizing the need to conceptualize and measure performance as multidimensional. As a result, the answer to the question, "What influences physician performance the most?" and its corollary, "Where should incentives and policies for improvement be placed?" is, "It depends on the specific dimension of performance under scrutiny." For example, our finding that the management of chronic conditions in walk-in clinics is poorer than other settings while acute condition management is not, suggests that certain organizational structures may be more supportive and effective for certain types of care over others. As new practice structures are introduced and promoted as part of primary care reform initiatives, this finding may be particularly important for planning. This finding also suggests the importance of systematically monitoring organizational and systemic factors and linking change in these factors, particularly during periods of health system restructuring, to variations in physician performance. For instance, Ontario has implemented two major reforms that affect physicians: a reform of primary care aimed at encouraging more GP/FPs to work in multidisciplinary teams (i.e., family health teams) with shared patient records and alternatives to fee-for-service such as capitation; and the regionalization of hospital, home care and long-term care services into local health integration networks (LHINs). Knowing more about how such reforms affect physician performance could go some considerable way towards identifying and redressing organizational and systemic problems that lead to poor per-

formance, and equipping individual physicians to respond constructively and proactively to a changing environment.

Limitations and strengths

There are some limitations to consider when interpreting the results of these analyses. Most obviously, there is a considerable amount of residual variation that is not explained by the data; the sources of such variation remain to be understood. A likely possibility is that this is related to limitations in the data. While chart reviews are considered one of the standard methods of practice evaluation (Wakefield et al. 1995), charts alone have been shown to represent only a subset of activities actually performed by physicians during a patient visit (Rethans et al. 1994). However, data gathered in the CPSO assessment protocols are augmented with additional information (Brook et al. 1996) from the physician-assessor interview and unpublished CPSO internal quality control studies (e.g., inter-assessor rating and decision validation) have shown the methodology to be reliable. Further, the data representing physician, organizational and systemic factors are by no means exhaustive; neither are our categorizations of the data variables into each of physician, organizational or systemic factors set in stone.

Finally, this study focuses on clinical dimensions of performance. There are other important aspects to performance, such as patient communication, patient outcomes and team performance, to name a few, that were not looked at in this study. Our future work will further investigate the impact of individual practitioner, organizational and systemic factors in these important areas to help complete the performance picture.

Despite these limitations, we think that this study has important implications for physician performance policies in two main areas: performance improvement and governance. We believe the strength of our study lies in understanding physician performance within the broader constructs of the practice environment and demonstrating the importance of collecting these data for future research. Better physician practice data concerning organizational structure and systemic resources will further improve our ability to investigate the impact of the practice environment on performance.

Implications of the study

A core purpose of performance evaluation is needs assessment for education and performance improvement. While continuing medical education (CME) and continuing professional development (CPD) initiatives have typically focused on refreshing the physician's clinical skills and knowledge, our findings suggest that such initiatives may be ineffective if they ignore the broader context in which clinical decision-making takes place, particularly where organizational and systemic factors may be a source of poor performance. While individual competence remains a crucial prerequisite for high per-

formance, it may not be sufficient to conclude that poor performance can simply be rectified through "upgrading." For example, on dimensions such as chronic care and continuity of care, the results suggest that quality improvement initiatives should also consider organizational and systemic factors because physician factors appear to have less impact on performance in these dimensions. Performance issues that are more heavily influenced by organizational and systemic factors will be more effectively addressed through organizational and systemic policies or programs (e.g., organizational performance incentives, systemic resource allocation, or professional governance) rather than an exclusive reliance on the CPD of individual practitioners as the panacea for performance improvement. This approach speaks to the need both to carefully target CME/CPD to performance issues that are more heavily influenced by individual-level factors, and more generally, for CME/CPD curricula to include content that will assist individual physicians in identifying and coping with external factors that affect their practices.

We feel that our findings have governance implications, particularly suggesting the need for remodelling regulatory and tort systems, which are designed, among other things, to apportion accountability in the health workplace. Such issues become increasingly salient, particularly in jurisdictions such as Ontario, where ongoing primary care reforms have resulted in the introduction of family health teams and the promotion of interdisciplinary care provision, producing increasingly more complex practice environments that involve multiple regulated healthcare professions. The interdependence of competence is not easily accommodated in a system that has been designed to apportion accountability and responsibility only on an individual level. The determination of liability or professional accountability needs to reflect the reality of complex interdependence of physicians in organizations within systems.

Picturing how these concepts might be operationalized is somewhat tricky. Consider the example of physician migration as an illustration. Ensuring the mobility of the physician workforce without compromising patient safety and standards of care has primarily been evaluated by ensuring equivalency of physician training, credentials and certifications across jurisdictions (HealthForceOntario 2007; Norcini and Mazmanian 2005). However, with each move of a physician's practice, it is possible that the population needs, organizational structures and resource availability may differ from those in which the physician was originally trained or gained his or her practice experience. These differences may require physicians to develop new sets of competencies and performance skills to meet local needs and provide care that may be considered specialized or outside their typical scope of practice (Baldwin et al. 1999; Probst et al. 2002; Tulloh et al. 2001; Breon et al. 2003). Yet currently, these contextual aspects of performance are not taken into consideration when evaluating the readiness of a physician to enter a new practice environment. In other words, the skills and knowledge required in one practice setting may not be sufficient for another. As a

result, differences in physician performance should no longer be conceptualized simply as the outcome of credentials, training and personal attributes, but rather the product of complex and concurrent effects of physician, organizational and systemic factors.

Conclusions

Our analysis has demonstrated that organizational and systemic factors, in addition to physician factors, can all significantly affect physician performance. Concepts of physician performance have for too long focused primarily or solely on the individual practitioner, with emphasis on attributional elements of competence rather than valid measures of performance. Employing a conceptual framework that considers physician performance within a broader environmental construct will allow us to develop better processes of performance evaluation, to design appropriate interventions and to support performance improvement and governance models for individuals, teams and systems.

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Appendix
Five dimensions of GP/FP performance

TABLE A1

Performance dimension	Description
Managing Patient with Acute Conditions and New Presentations (ACUTE)	Physician's performance in dealing with new patients or known patients presenting a new complaint or condition. Conditions are generally non-urgent and will often involve the formulation of a diagnosis, for either acute or chronic conditions, and recommendation(s) for treatment.
Managing Patients with Chronic Conditions (CHRONIC)	Physician's performance in dealing with patients with chronic conditions. Conditions will usually require long-term monitoring and may be present with or without co-morbidities.
Providing Patients with Continuity of Care and Referrals (Continuity Care)	Physician's performance in dealing with patients who are referred for treatment, surgical procedures, diagnostic procedures or otherwise, to the care of other physicians. Includes the appropriateness of referral (i.e., indications) and follow-up.
Providing Patients with Well Care and Health Maintenance (Well Care)	Physician's performance in well care visits and preventive health maintenance, including patient visits for annual check-ups, screening, well baby visits, etc.
Managing Patient Records and Recording Skills (Records)	Physician's performance in records management and recording skills. This reflects the mandatory elements of record format required by legislation and some additional features of the organization and recording tools used.

RESEARCH PAPER

Financial and Work Satisfaction: Impacts of Participation in Primary Care Reform on Physicians in Ontario

Satisfaction au travail et satisfaction financière : impact de la réforme des soins de santé primaires sur les médecins, en Ontario

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Abstract

Governments in Ontario have promised family physicians (FPs) that participation in primary care reform would be financially as well as professionally rewarding. We compared work satisfaction, incomes and work patterns of FPs practising in different models to determine whether the predicted benefits to physicians really materialized. Study participants included 332 FPs in Ontario practising in five models of care. The study combined self-reported survey data with administrative data

from ICES and income data from the Canada Revenue Agency. FPs working in non–fee-for-service (FFS) models had higher levels of work satisfaction than those in FFS models. Incomes were similar across groups prior to the advent of primary care reform. Incomes of family health network FPs rose by about 30%, while family health group FPs saw increases of about 10% and those in FFS experienced minimal changes or decreases. Self-reported change in income was not reliable, with only 47% of physicians correctly identifying whether their income remained stable, increased or decreased. The availability of a variety of FFS- and non–FFS-based payment options, each designed to accommodate physicians with different types or styles of practice, may be a useful tool for governments as they grapple with issues of physician recruitment and retention.

Résumé

En Ontario, les gouvernements ont promis aux médecins de famille que leur participation à la réforme des soins de santé primaires comporterait des avantages à la fois financiers et professionnels. Nous avons comparé la satisfaction au travail, le revenu et les régimes de travail de médecins de famille œuvrant dans divers modèles de pratique, afin de déterminer si les avantages prévus se sont effectivement matérialisés. Cette étude comptait sur la participation de 332 médecins de famille en Ontario œuvrant selon cinq modèles de prestation de soins. Nous avons tenu compte de données de sondage déclarées volontairement par les médecins ainsi que de données administratives provenant de l'Institut de recherche en services de santé (IRSS) et de l'Agence du revenu du Canada. Les médecins de famille qui travaillent selon des modèles autres que la rémunération à l'acte (RAA) ont indiqué de meilleurs taux de satisfaction au travail que ceux qui fonctionnent selon la RAA. Avant l'instauration de la réforme des soins de santé primaires, les revenus entre les groupes étaient similaires. Le revenu des médecins qui travaillent dans les réseaux de santé familiale a augmenté de 30 pour cent et celui des médecins qui travaillent dans les groupes de santé familiale a augmenté de 10 pour cent, tandis que les médecins qui travaillent selon la RAA ont vu peu de changement ou une diminution de leur revenu. Les fluctuations de revenu déclarées volontairement ne sont pas fiables, car seulement 47 pour cent des médecins ont indiqué avec précision si leur revenu s'était maintenu, avait augmenté ou avait diminué. La présence d'une variété de modèles de rémunération (RAA ou non), qui sont conçus pour offrir aux médecins différents types et divers styles de pratique, peut s'avérer un outil pratique pour les gouvernements, car elle permet d'aborder la question du recrutement et du maintien en poste des médecins.

A key element in Canadian primary care reform is a focus on finding the most appropriate funding mechanism for providers (Romanow 2002; Shortt 2004). Fee-for-service models (FFS), still the dominant approach in Canada, pay a fixed rate per service provided. Capitated models provide a fixed rate per patient rostered, while salary models pay providers a negotiated amount for a fixed period of service. Mixed/blended models combine elements of more than one of the above models, and some schemes provide bonus payments for particular activities or for meeting quality targets. The adoption of non-FFS models is considered a key element of primary care reform, and physician interest in these options has been rising, although there is little interest in purely capitated models (Hutchison 2004; Hutchison et al. 2001; Hunter et al. 2004; Macinko et al. 2003; Martin 2003; Shortt 2004; Starfield and Shi 2002). Ontario has introduced a number of alternatives to FFS (Table 1), with predictions of higher incomes and greater work satisfaction used as incentives for physicians to convert. We conducted a cross-sectional study to determine whether the predicted benefits to physicians actually materialized, by comparing work satisfaction, work patterns and income for physicians remaining in FFS with those who had recently switched to one of two new models, family health networks (FHN) and family health groups (FHG), or who practised in one of two established alternatives to FFS, health services organizations (HSO) and community health centres (CHC).

TABLE 1. Primary care payment models of interest and elements of primary care reform

Model	Patient enrolment (rostering)	Enhanced access (mandatory after-hours access and on-call)	Support for multidisciplinary team approaches	Support for enhanced information technology	Non-FFS payment	Payment method
FFS	No	No	No	No	No	FFS
FHG	Yes	Yes	No	No	No	FFS + bonuses
FHN	Yes	Yes	Yes	Yes	Yes	Blended
HSO	Yes	Yes	Yes	Yes	Yes	Capitation
CHC	Yes	Yes	Yes	Yes	Yes	Salary

Note: Above reflects the status of each model in 2004/05. Since then, other patient enrolment models (PEMs) have been developed in Ontario, and IT support has been extended to more models. Pay-for-performance quality bonuses have also been extended to all PEMs.

Methods

All primary care physicians in Ontario were eligible for selection. All FHN, HSO and CHC physicians and a random selection of FFS and FHG physicians were identified

for recruitment. We used a modified Dillman technique that included reminders and repeat mailings to recruit participants (Dillman 1999; Field et al. 2002). Participants were asked to consent to a review of five years of their income tax records by a third party (an accounting firm); to consent to a review of the administrative data on all billings submitted to the Ontario Health Insurance Plan (OHIP) to determine workload; and to complete a self-reported survey on work satisfaction (Bovier and Perneger 2003) and primary care reform that was included with the recruitment package. Participants sent their surveys, along with consents for the income and administrative data portions of the study, directly to KPMG, a national accounting firm, which assigned a study ID number for each physician.

All physicians were also asked to complete a Canada Revenue Agency form T1013, giving KPMG authorization to access their data for tax years 2000 to 2004. All personal tax information remained in the custody of KPMG at all times and was never released to the study team in an identifiable format. Income information (gross professional/business income, net professional/business income, employment income, investment income) for each of the tax years was added to survey information by KPMG. A key file was created with the study ID number and identifying information for the participating physicians; following completion of data quality checks, the identifying information was deleted from the data set prior to transfer to the research team.

A copy of the key file created by KMPG was sent to the Institute for Clinical Evaluative Sciences (ICES), where it was used to identify the study physicians in the OHIP claims database and the Ontario Physician Workforce Database (OPWD). Once the required data had been acquired, all identifying information except the study ID number was removed from this data set and the key file was destroyed. Summary information on physician characteristics was obtained from the OPWD for our study physicians and for all family physicians in Ontario (by model), while practice characteristics and workload measures were obtained from the OHIP claims database.

The study was reviewed and approved by the Research Ethics Boards at Queen's University, the University of Ottawa and Sunnybrook and Women's College Hospital.

Results

Three hundred and thirty-two family physicians (FPs) agreed to participate, with the overall participation rate for all groups being 20.2%. This rate varied significantly by model of practice, from a high of 38% for FHN physicians to a low of only 7.5% for FFS, with the other groups ranging from 16% to 23%. Some physicians had anomalous income results, with increases or decreases in income of greater than 50% of baseline. Review of responses to other questions found that almost all were absent from practice for all or part of our pre-/post-change index years, leaving a sample size of 220 for the income change analysis.

Non-FFS physicians (FHN, HSO, CHC) were more satisfied overall with their payment model, and in almost all of the measured dimensions of work satisfaction, than physicians in FFS models (FHG and FFS). Inter-group differences were statistically significant (ANOVA) for all items except quality of patient care (Table 2). Regression models were used to adjust for possible confounding variables. Items included in the model were gender, age, location of practice, patient volume (number of visits), years since graduation and payment model (FFS-based = FHG+FFS vs. blended/capitated/salary-based = FHN/HSO/CHC). Regression analysis was repeated using only FFS/FHG and FHN respondents. In the regression models, payment model was the only statistically significant predictor of overall satisfaction ($p<0.001$), satisfaction with model ($p<0.001$) and the personal rewards (p=0.02) and income ($p<0.001$) domain scales. Patient volume (number of visits) was the only significant predictor for the burden domain score ($p=0.002$), and there were no significant predictors for the patient care domain. When asked whether they would choose their current primary practice model again, FHN physicians were significantly more likely (85.3%) than either FHG (54.8%) or FFS (41.0%) physicians to indicate that they would definitely or probably choose their current model.

TABLE 2. Relationships of work satisfaction to practice model

	n	%	General satisfaction	Practice model	Personal rewards	Burden	Patient care	Income
Type of practice[a]			$p<0.001$	$p<0.001$	$p=0.001$	$p=0.002$	$p=0.056$	$p<0.001$
FHN	112	34	5.31 (1.05)[dc]	5.56 (1.02)[dc]	5.56 (0.74)[d]	3.76 (1.21)	4.94 (0.92)	5.32 (1.19)[dc]
FHG	127	38	4.67 (1.25)[bef]	4.61 (1.24)[bef]	5.57 (0.78)	3.39 (1.22)[e]	4.70 (1.03)	4.13 (1.14)[bef]
FFS	38	11	4.55 (1.33)[bef]	4.71 (1.51)[bef]	4.96 (0.91)[bf]	3.88 (1.42)	4.52 (1.12)	4.00 (1.24)[bef]
CHC	32	10	5.41 (1.04)[dc]	5.69 (1.09)[dc]	5.49 (0.86)	4.34 (1.13)[c]	5.06 (0.85)	5.09 (1.19)[dc]
HSO	23	7	5.57 (0.99)[dc]	5.91 (0.73)[dc]	5.64 (0.70)[d]	3.61 (1.13)	4.88 (0.88)	5.30 (1.11)[dc]

[a] ANOVA, differences between groups
[b] Post hoc Bonferroni, significantly different ($p<0.05$) from FHN
[c] Post hoc Bonferroni, significantly different ($p<0.05$) from FHG
[d] Post hoc Bonferroni, significantly different ($p<0.05$) from FFS
[e] Post hoc Bonferroni, significantly different ($p<0.05$) from CHC
[f] Post hoc Bonferroni, significantly different ($p<0.05$) from HSO

Physicians had also been assured that participating in primary care reform initiatives would be financially rewarding. Survey participants were asked if they felt their real net incomes over the previous five years had increased, decreased or remained the same. There were significant differences in perceptions among groups, with 79.1% of FHN physicians reporting an increase, compared to 34.8% of FHG physicians and

26.7% of those in FFS ($p<0.001$) (Table 3). We felt it was also important to evaluate this claim quantitatively using an accurate source of data, in this case obtained from the Canada Revenue Agency by KMPG and passed on to the research team in an anonymous fashion with the consent of the participating physicians.

TABLE 3. Real versus perceived changes in income

	Actual changes vs. perceived changes and discrepancy				
	Payment model				
	FFS	FHN	CHC	FHG	HSO
n	30	86	25	109	22
Actual Changes in Real Net Income (2000–2004) (Proportions)					
Decreased*	23.33	15.12	12.00	16.51	9.09
Remained the same (±10%)**	36.67	17.44	48.00	33.94	40.91
Increased*	40.00	67.44	40.00	49.54	50.00
Pearson $chi^2(8) = 16.1523$ Pr = 0.040					
Perceived Changes in Real Net Income (2000–2004) (Proportions)					
Decreased*	53.33	4.65	40.00	35.78	27.27
Remained the same**	20.00	16.28	28.00	29.36	36.36
Increased*	26.67	79.07	32.00	34.86	36.36
Pearson $chi^2(8) = 58.8233$ Pr = 0.000					
Discrepancy between Perceived and Actual Changes (Proportions)					
Under-perceived	50.00	10.47	44.00	43.12	31.82
Right-perceived	33.33	63.95	40.00	36.70	63.64
Over-perceived	16.67	25.58	16.00	20.18	4.55
Pearson $chi^2(8) = 35.0645$ Pr = 0.000					

* By over 10%
** ±10%

Annual income was defined as the sum of net professional, net business and employment income (investment income was not included), and was adjusted for the cost of living by converting all figures into real 2004 dollars using the Ontario Consumer Price Index. All groups were similar prior to the change, with the mean real net income for all study physicians at $163,300. There were no significant differences among groups in income levels, the growth rates in income, the attributes of the

patient population or activity levels prior to change in payment model. Post-change, significant differences were noted among groups, with FHN and HSO physicians having mean/median incomes between $196,000 and $211,000 while FHG, FFS and CHC physicians were sitting between $170,000 and $177,000. FHN physicians experienced gains in mean and median income of greater than 30%, FHG physicians experienced gains of about 10% and FFS physicians either had minimal increases or decreases in income over the same period (Table 4). We also estimated the "treatment effect" or "difference in difference" on FP income of switching to new payment models. These measures represent the gain that they realize relative to what they would have earned had they remained within the FFS model. Using this method of analysis, the average growth rate of income was 31% for FHN doctors and 12% for FHG doctors relative to their FFS counterparts. Estimates of change for income growth are very similar (28% for FHN doctors, 13% for FHG doctors) in the multivariate analysis (adjusted for age, gender and year of graduation).

TABLE 4. Pre- and post-change real net income (2004 dollars) by model

Current payment model		Actual number of months after change	Total annual real net income pre-/post-change			
			Pre-change income (Year 2000)	Post-change income (Year 2004)	Actual change in income (Post – Pre)	% change in income (Post – Pre)/Pre
FHN	Mean	10.13	161,596.9	206,763.1	45,166.2	31.3
	SD	2.67	62,316.8	87,657.7	53,369.6	32.1
	Median	11.50	153,350.2	196,573.5	43,069.2	33.7
	25 Percentile	9.00	118,090.4	14,454.2	14,447.5	9.6
	75 Percentile	12.00	208,599.4	252,669	75,461.8	50.1
FHG	Mean	10.08	162,583.4	176,808.8	14,225.4	11.8
	SD	2.94	71,344.6	86,164.8	43,952.8	27.9
	Median	12.00	157,381.6	160,113	12,517	9.6
	25 Percentile	9.00	115,464.6	127,979	–6,117.5	–4
	75 Percentile	12.00	198,181.3	215,096.5	33,078.5	22.3
FFS	Mean	12.00	165,718.5	170,138.9	4,420.4	3.2
	SD	0.00	66,791.7	81,070	49,921.2	30.6
	Median	12.00	150,776.1	178,673	–2,048	–1.6
	25 Percentile	12.00	122,409.4	115,186	–10,623.2	–9.3
	75 Percentile	12.00	217,471.7	227,474	30,801.3	20.8

TABLE 4. Continued

CHC	Mean	N/A	148,036.6	171,894.5	23,858	19.2
	SD		45,722.8	44,915.5	25,991.1	23.5
	Median		138,045.6	155,137	15,648.6	9.2
	25 Percentile		121,915.6	145,355	5,790.6	4.1
	75 Percentile		153,283.7	195,718	32,711.4	26.8
HSO	Mean	N/A	183,037.1	210,440.8	27,403.7	24.2
	SD		66,862	52,945.6	41,334.6	36.4
	Median		178,408.1	204,792.5	20,713.8	10.1
	25 Percentile		114,963.6	186,052	2,225.9	0.9
	75 Percentile		229,466.4	251,932	38,015.5	45.4
Total	Mean	10.35	163,307.4	187,998.4	2,4691	18.5
	SD	2.70	66,014.6	82,665	48,750.8	31.5
	Median	12.00	156,006.9	176,906	18,295.6	11.6
	25 Percentile	9.00	116,629.8	130,984	–2,624.9	–2.8
	75 Percentile	12.00	204,682.4	232,065.5	52,652.2	36.9

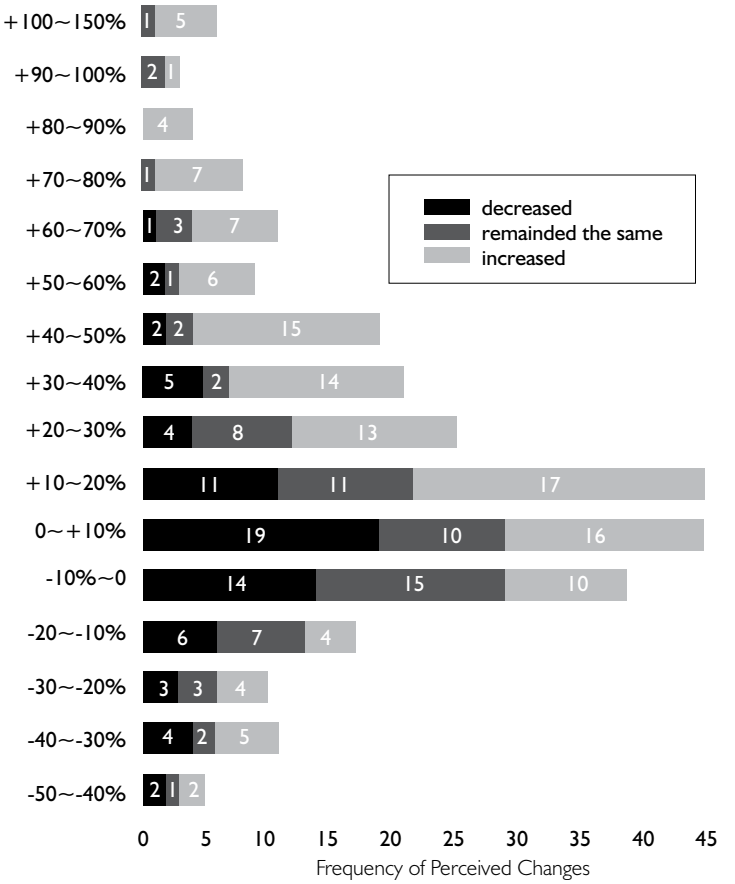
Note: Number of doctors in each model: 25 in FFS, 70 in FHN, 92 in FHG, 15 in CHC and 18 in HSO.
Total number of doctors in all models: 220.

Because we had both quantitative and self-reported data on income change, we were also able to evaluate the accuracy of the perceptions reported by study participants. Table 3 summarizes the results of this evaluation by payment model. Fewer than half of the study participants correctly identified their direction of income change. The degree of discrepancy varied significantly by model, with FHN and HSO physicians having the most accurate perceptions ($p<0.001$). Participants in all models except for FHN were more likely to under-perceive their actual change in income, while FHN physicians were more likely to over-perceive this. Figure 1 presents a summary of responses by the degree of actual income change.

OHIP data were used to compare the patient populations for each group pre- and post-change for a range of factors including gender, age and prevalence of common chronic diseases, such as diabetes and heart disease. Inter-group comparisons indicated the groups were quite similar. In addition, a number of workload measures, including total visits, ER visits, nursing home visits, hospital visits, home/office visits and involvement in obstetrics were assessed before, during and after transition. Some inter-group differences were noted both pre- and post-change, with FHN physicians being more active in the provision of ER services, hospital visits, nursing home visits and obstetrics than physicians in the FFS or FHG groups. This finding may be explained at least

in part by the fact that FHN physicians are more likely to be located in rural regions. There was minimal change in the number of days worked. FHN physicians saw a decrease in total visits and visits per day, while there was no change for FHG physicians and a slight increase for FFS physicians (Figure 2). We did not identify any clear changes in work patterns or practice composition that might account for major changes in income or differences in work satisfaction observed during the study period.

FIGURE 1. Proportion of perceived changes by range of actual percentage changes

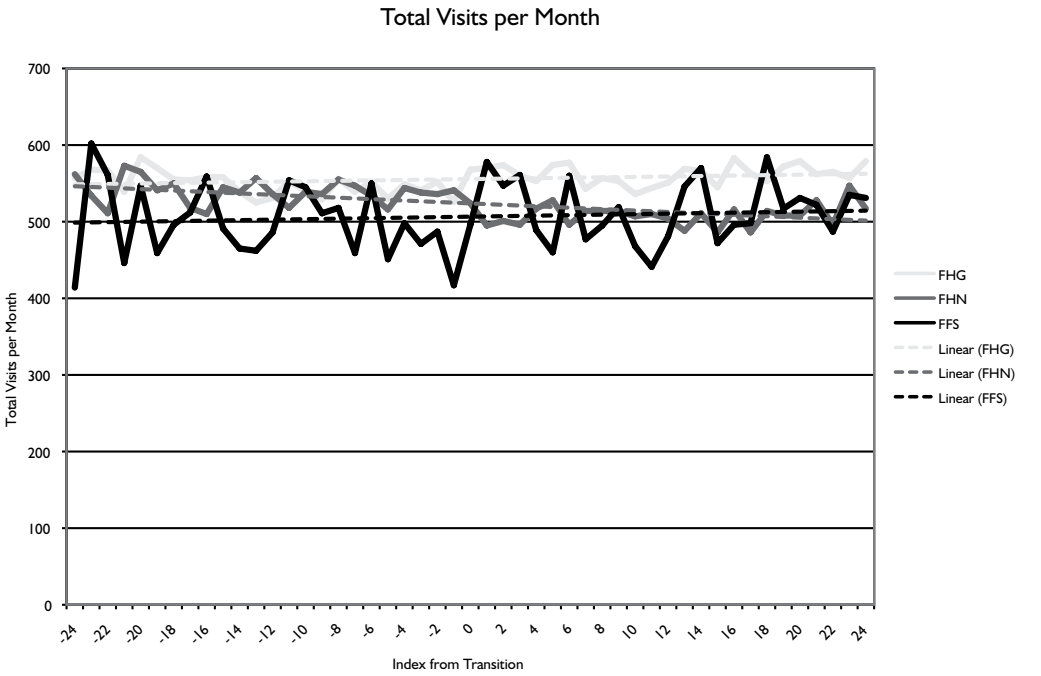


Discussion

Physicians' satisfaction with their work is important, as this factor has been linked both to improved retention and possibly to improved performance (Grol et al. 1985; Lichetenstein 1984). It has also been identified as an important indicator of success for primary care reform efforts in Canada (CIHI 2006; Watson et al. 2004). International research has suggested that payment model may be related to physicians'

work satisfaction, but results do not consistently support any one model (Grembowski et al. 2003; Murray et al. 2001; Nadler et al. 1999; Simoens et al. 2002). In Canada, physicians' work satisfaction has been reported as either poor or at best middling, with family medicine ranking among the least satisfied specialties (Baerlocher 2006; Spurgeon 2003; Sullivan and Buske 1998). Studies in Ontario showed that work satisfaction among FPs declined between 1993 and 1999, that few FPs felt that primary care reform had a favourable effect on their practices and that few supported capitation or patient rostering (Cohen et al. 2001; Hunter et al. 2004). In contrast, the differences in work satisfaction discerned in this study favoured funding models that included both these elements.

FIGURE 2. Total visits per month by model



Time 0 = date of transition for FHN and FHG and average date of transition for FHN/FHG combined for FFS (who did not convert).

Study informants who participated in new funding models both perceived and achieved increases in real net income. While Figure 1 shows that the greater the change in income, the more likely it is that the perception is correct, it also shows that misperceptions occur even with large changes in real net income. When changes are examined between a loss or gain of 30% (which represents the vast majority of income change expectations one would encounter), the reported changes in income are not

significantly different from a random allocation of the participants to the response categories. These findings emphasize the need for data sources on professional income that do not rely on self-reported perceptions. They also point to the need for communication of accurate data on income and future income expectations to physicians and physicians in training, as these can affect career-choice decisions for trainees as well as work satisfaction for practising physicians (Nicholson and Souleles 2001, 2002).

Limitations and strengths

Our results need to be interpreted cautiously, given some important limitations. First and foremost is the participation rate, which was low overall and which varied significantly by group. We are therefore most confident of the results reported for within-group changes in the FHN physicians (38% participation rate) and less certain about comparisons across groups, most particularly for comparisons with FFS physicians (only 7.5% participation rate). When considering how to interpret this limitation, readers should bear in mind that response rates for physician surveys for any purpose are generally only moderate (54% in a review of published surveys) (Asch et al. 1997), and that response rates are lower when surveys are anonymous (Asch et al. 1997, 2000; Dillman 1999; Field et al. 2002). As we were requesting sensitive and confidential personal information, such as billing data and income tax data, in addition to a self-reported survey, we were not surprised by a poor response rate. We had considered other methods of acquiring the data, but were not able to identify any other means of accurately quantifying income change over time that did not rely on self-reporting, a method that we felt would not have been reliable. This concern was confirmed by the results of this study.

To the best of our knowledge, this is the first study of physicians from any country that has ever requested and obtained access to income data from such a reliable source. We are somewhat reassured by the fact that our observed income changes in each group are fairly close to estimates of expected income change generated by practice profiling and modelling of anticipated billings under different payment schemes that were communicated to physicians at the time (R. Wilson, former CEO, Ontario Family Health Networks, personal communication 2006). To account for the risk of a significant non-respondent bias, particularly for the FFS group, we sought evidence to identify the ways in which the study physicians differed from the general Ontario physician population. We were able to use administrative data to conduct a fairly comprehensive comparison of study participants to the overall Ontario physician population within each model of care (Table 5). Study participants of all group types were more likely to be Canadian-trained and practising in rural areas. In addition, we used analytic techniques, such as regression models including possible confounding vari-

ables, that are aimed at minimizing the impact of these biases on our conclusions. We acknowledge that the generalizabilty of these findings will nonetheless remain questionable, but feel they are still valuable additions to our understanding of the impact of participation in primary care reform in Ontario, particularly in terms of understanding the experience of early adopters of new payment models. We can fairly securely say that FHN physicians experienced significant financial gains and were highly satisfied with their decision to change models. There is much less certainty about how this finding compares to the experiences of physicians in other payment models.

TABLE 5. Comparison of study physicians to Ontario GP/FP population

	Total Ontario GP/FP physician population					Study physicians				
	CHC	**FFS**	**FHG**	**FHN**	**HSO**	**CHC**	**FFS**	**FHG**	**FHN**	**HSO**
n	186	5,349	3,706	590	165	31	39	123	105	21
Age (mean)	42.56	50.06	46.82	45.02	50.25	41.61	43	45.54	46.12	51.86
Sex (% male)	41.94%	66.14%	64.81%	64.92%	72.73%	51.61%	61.54%	60.98%	64.76%	85.71%
Years since graduation (mean)	16.37	23.72	21.11	19.18	24.51	14.9	16.79	20.02	20.34	26.9
Foreign trained (%)	9.68%	24.72%	18.20%	10.45%	9.09%	6.45%	13.16%	9.76%*	6.67%	23.81%*
Rural (%)	9.14%	10.54%	8.09%	32.71%	2.42%	19.35%	15.38%	22.76%*	33.33%	4.76%
Total Visits	N/A	4,418	6,725	5,329	N/A	N/A	5,229	5,862	5,454	N/A
Emergency Visits	N/A	243	170	331	N/A	N/A	642	703*	666*	N/A
Office Visits	N/A	3,772	5,907	4,279	N/A	N/A	4,350	4,884	4,251	N/A
Total Payments	N/A	$145,131.43	$216,007.30	$161,879.64	N/A	N/A	$173,331.21	$198,692.40	$150,831.12	N/A

Classification data for HSO and CHCs based on 2003/04 status and for FHGs and FHNs based on Dec. 1, 2005. All demographic and workload data based on 2003/04.

* $p<0.05$ for difference between study physicians and total Ontario GP/FP population (within the same model) (ER visits based on proportion ER visits/total visits

Physicians were placed in groups based on the following hierarchy:

1 HSO, 2 CHC, 3 FHN, 4 FHG, 5 FFS

Physicians in HSO or CHC do not have reliable or useful OHIP claims data for these measures.

Selection bias is another issue that needs to be addressed. Physicians self-selected into the various payment models based on their own priorities and preferences and perceived benefits or risks of the models. Because the study took place during an early, introductory phase of the implementation of the FHN and FHG models, our sample is limited to the early adopters. It is quite possible that these physicians represent those who were either most likely to benefit from change or most dissatisfied with FFS. If this interpretation is correct, the positive findings of the study in terms of income and work satisfaction might be attenuated for those physicians making the change later on.

Conclusions

There is sufficient overlap at the individual level in both the work satisfaction and income results to support the notion that some physicians will enjoy both financial success and a high level of work satisfaction in each of the different models. However, the results of this study show that for some physicians, there is a benefit in moving to a non-FFS model. Given the significant challenges that Ontario faces in the recruitment and retention of FPs, the availability of a menu of payment models that may be attractive to physicians with different practice styles may help both to attract new physicians and also to retain those currently in practice (Shortt et al. 2005).

We limited our focus to the impact of primary care reforms on physicians, as uptake of reformed models will require the enthusiastic participation of this key professional group if it is to succeed. Evaluation of the impact of the various practice models on a wide range of process and outcome measures, including access and quality of care, is required as primary care reform continues to evolve.

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RESEARCH PAPER

Indicators for Measuring Mental Health: Towards Better Surveillance

Indicateurs de mesure pour la santé mentale : vers une meilleure surveillance

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Abstract

Accurate measurement and improvement of population mental health requires the recording of indicators that capture the full spectrum of disease severity. This paper describes four different strategies for measuring the prevalence of depression and anxiety in Canada based on data from the 2002 Canadian Community Health Survey – Mental Health and Well-being (Cycle 1.2) and the 2003 Quebec medical services claims database. The use of multiple indicators provides a more comprehensive picture of mental health needs than a single indicator alone. However, the validity of these indicators raises certain challenges and highlights the complexity of obtaining valid and sustainable measurements of mental health problems over time. We include a discussion of problems related to information availability and management.

Résumé

L'établissement d'indicateurs pour l'ensemble de l'indice de gravité des maladies est essentiel pour obtenir des mesures précises et pour améliorer la santé mentale de la population. Cet article décrit quatre stratégies pour mesurer la prévalence, au Canada, de la dépression et de l'anxiété, selon les données de l'Enquête sur la santé dans les collectivités canadiennes – Santé mentale et bien-être 2002 (cycle 1.2) ainsi que celles de la base de données 2003 de la RAMQ (Régie de l'assurance maladie du Québec). L'utilisation d'indicateurs multiples permet une meilleure compréhension des besoins en santé mentale que l'utilisation d'un seul indicateur. Cependant, la validité de ces indicateurs pose certains défis et fait voir la complexité quant à l'obtention de mesures valables et durables en matière de problèmes de santé mentale. Nous discutons ensuite des problèmes liés à la disponibilité et à la gestion de l'information.

The use of health indicators for mental health surveillance is critically lacking. Mental health indicators currently in use in Canada and elsewhere include suicide rates, hospitalization rates (e.g., in-hospital stay or discharge data), utilization rates of health resources (e.g., number of psychiatrists or psychiatric beds per capita) and self-reported use of mental health services or disorders (e.g., derived from national surveys). Unfortunately, these mental health indicators do not capture the broad spectrum of severity that characterizes this field. Suicide represents an extreme and often acute manifestation of distress. Monitoring hospital service use captures only the very small proportion of individuals who are very sick and need to receive in-hospital treatment, compared to the much larger contingent who receive out-patient or community services. Self-reported disorders in surveys often fail to capture isolated, subthreshold or short-lived cases, and mild cases that

could be detected and treated early are also missed. Canada has recently created a Mental Health Commission to develop a national mental health strategy (Mental Health Commission 2008; Standing Senate Committee 2006). However, without an effective surveillance system that provides ongoing comprehensive and timely information on the entire spectrum of population mental health, it will be challenging to plan and allocate mental health resources, monitor the effectiveness of new policies and programs, and assess the success of mental health reform.

As part of a larger project on health indicators funded by the Health Policy Research Program of Health Canada, we sought to evaluate available measures of mental illness that span a wider spectrum of disease severity than those currently in use. Key criteria for indicator selection included ensuring that the indicators are measurable, verifiable, meaningful, policy relevant and capable both of assessing trends over time and of providing key regional, provincial, demographic and socio-economic breakdowns. We felt that there were distinct advantages to using existing databases and therefore considered potential data sources, data availability and the challenges of reconciling different databases. We believed that a variety of databases could be used to strengthen the accumulated weight of evidence derived from disparate sources, and at the same time not add any significant administrative burdens that would be necessitated by the creation of entirely new databases.

Canada has the privilege of having population-based administrative databases that document all services provided to the population by physicians under public insurance (approximately 99% of physicians). In addition, Statistics Canada has surveyed Canadians about the state of their mental health through the 2002 Canadian Community Health Survey – Mental Health and Well-being (CCHS Cycle 1.2). Our main objective was to use data from these existing data sources to explore the feasibility of selecting alternative health indicators for depression and anxiety, to be used as part of a national surveillance system on mental health. We chose depression and anxiety as prototype mental health symptoms/disorders as these are two of the most common neuro-psychiatric illnesses leading to days off work, unemployment and years of life lived with disability (WHO 2001; Health Canada 2002; Lim et al. 2000).

Methods

We evaluated four potential indicators of depression and anxiety in the adult (aged 18 and over) Canadian population: self-reported subthreshold mental health symptoms, self-reported full diagnostic disorders, physicians' billings for outpatient mental health visits and use of psychotropic medications.

For self-reported mental health symptoms, we analyzed data from the participants in the 2002 CCHS. The CCHS is a key component of the Population Health Surveys Program of Statistics Canada that aids in the development of public policy;

provides data for analytic studies that will assist in understanding the determinants of health; collects data on the economic, social, demographic, occupational and environmental correlates of health; and aims to increase the understanding of the relationship between health status and healthcare utilization. Statistics Canada conducted Cycle 1.2 over the period May 2002 to December 2002, and focused on collecting mental health data from a nationally representative sample of people aged 15 and older (Statistics Canada 2003). The CCHS content was based on a selection of mental disorders from the World Mental Health Survey; input from an expert group of mental health professionals guided the content development and strategic direction of the study (Statistics Canada 2003; World Mental Health Survey 2005).

We included two different measures for self-reported diagnostic disorders: those respondents reporting symptoms that meet the full, gold-standard Diagnostic and Statistical Manual IV (DSM-IV) criteria for depressive and anxiety disorders, and those reporting any two or more criteria for a mental health disorder (a subthreshold condition) (Rowe and Rappaport 2006). For assessment of mental disorders, the CCHS 1.2 employed a Canadian adaptation of the Composite International Diagnostic Interview (CIDI) version used in the WHO Mental Health 2000 initiative (Kessler and Ustun 2004). Only individuals aged 18 years and older living in the 10 provinces across the country were included in the analysis, yielding a final sample of data from 15,889 men and 19,347 women.

The physician billings mental health indicator was derived from the medical services claims database from the province of Quebec. Because each province maintains separate healthcare systems, it was not possible to combine data nationwide. The province of Quebec was selected owing to immediate availability of the database to the study investigators; it covers the costs of essential medical care for 8.5 million provincial residents. The Quebec health insurance agency (RAMQ) is responsible for beneficiary enrolment and reimbursement of all physicians. The RAMQ maintains a database of all Quebec beneficiaries (name, age, sex, residence) and all medical services received by beneficiaries (date, diagnosis, type and location of service and provider). For the physician billings indicator, we calculated the proportion of mental health ICD-9 diagnostic billing codes covering depression and anxiety disorders entered by 28,426 Quebec physicians on 3,204,637 unique patients (55% female, 45% male) aged 18 years and older in the 2003 RAMQ medical services claims database. We report unadjusted results as well as adjusted results, by 0.87 for women and by 0.75 for men, to obtain population prevalence. Only 87% of Canadian adult women and 75% of Canadian adult men consult a physician each year for their health (Statistics Canada 2003). Without the adjustment quotient, outpatient visits for mental health symptoms could be overestimated, assuming that those who do not consult do not have health problems.

We validated billings by general practitioners in the Quebec RAMQ database as an indicator of the proportion of the population with a mental health disorder by using data from the Medical Office of the 21st Century Study (MOXXI). MOXXI is a Quebec-based research project testing the potential benefits of implementing an electronic prescription, drug and disease management system for primary care physicians and other healthcare practitioners (Tamblyn et al. 2006). As part of this project, 100 physicians were asked to verify the accuracy of 340 diagnostic codes for 330 unique patients against their electronic patient chart records. Cases billed for these 330 patients by generalists or specialists for anxiety or depressive disorders were abstracted from these 340 records and presented back to primary care physicians with the question, "Does your patient have this problem, yes or no?" Out of 125 cases of depression that were billed and reviewed, 119 (95%) were coded correctly. Out of 112 cases of anxiety that were billed and reviewed, 110 (98%) were coded correctly.

To derive an indicator based on medication use, we used the Canadian Community Health Survey – Mental Health and Well-being (CCHS Cycle 1.2 for 2002) database. Psychotropic drug use was self-reported, with respondents being asked whether in the past 12 months they had taken any medication to reduce anxiety or nervousness or for depression (Statistics Canada 2003). If respondents reported use of at least one drug from these classes, the CCHS 1.2 collected more comprehensive data by asking respondents to produce medication containers for drugs used in the two days preceding the interview. Self-reported medication names were recorded and coded with a modification of the WHO's anatomical therapeutic chemical codes (WHO Collaborating Centre 2005). We operationally defined psychotropic drugs as those used for the treatment of any type of depression or anxiety. Data from 15,889 men and 19,347 women aged 18 years and older were included in the analysis.

Results

Table 1 shows the annual prevalence derived from these four potential indicators of depression and anxiety. The lowest estimate, 8% of women and 4% of men, comes from self-reported use of medications for these two disorders. Intermediate estimates are based on the proportion of the population who reported symptoms that fulfilled the DSM-IV diagnostic criteria for depression or anxiety. The highest estimates are based on the percentage of the population with a subthreshold diagnosis and the proportion of diagnostic billing codes for either depression or anxiety. It is noteworthy that despite being derived from two different population sets (CCHS respondents from across Canada and Quebec residents' visits to doctors), these latter two estimates are similar – 20% of women and 14% of men, based on CCHS data and the adjusted physician billings data.

TABLE 1. Prevalence of depression and anxiety in Canadian men and women aged 18 years and older using different indicators

	Annual prevalence (% of population)				
	Self-reported symptoms (subthreshold DSM-IV depression and anxiety disorders)	**Self-reported criteria fulfilling DSM-IV diagnosis of either depression or anxiety**	**Proportion of physician billings for anxiety or depression (unadjusted estimate)**	**Proportion of physician billings for anxiety or depression (adjusted estimate*)**	**Self-reported use of medications for depression and anxiety**
Women	20	11	24	20	8
Men	14	10	18	14	4

* Adjustment: Prevalence from RAMQ data multiplied by 0.87 for women and by 0.75 for men according to the proportion of women and men consulting any MD per year according to CCHS Cycle 1.1 data

Discussion

Estimates of the proportion of the Canadian population with depression and anxiety vary widely according to the different indicators used, ranging from 8% to 24% in women, and from 4% to 18% in men. Because each indicator taps a different aspect of mental illness, it is to be expected that the prevalence would get smaller at each step in the therapeutic continuum. Not all subthreshold symptom clusters become a threshold syndrome – which in turn may not warrant a decision to seek treatment – and not all treatment involves medication. Rather than relying on a single set of numbers, the approach we have taken, of comparing and contrasting the results from multiple databases, paints a more informative profile of the different aspects of Canada's overall mental health state, according to different levels of severity. If showcased alongside national suicide rates and psychiatric hospital admission rates, for example, these indicators would enable decision-makers to better predict the need for mental health services across the spectrum of care.

Although our study did not permit repeated measurement of these indicators over time, this would be easy to accomplish. For the physician billings indicator, measurement could be carried out at any time, and the indicators derived from the CCHS could be reassessed with every subsequent cycle of the national survey (every two to three years). As long as the possibility exists for repeated measurements, and the methods for measuring each indicator do not change, these indicators would be useful for surveillance purposes. However, should the questions in the national surveys change and not measure exactly the same symptoms, or if new billing codes were introduced for physicians, or more physicians opted out of public coverage, then the indicators would not be comparable over time.

In order for surveillance to be effective, the importance of linkage between data sets and across time needs urgently to be addressed. Privacy regulations in Canada do not permit an assessment of the extent to which people in the estimates overlap. Nor is it possible to determine remissions, incident cases, or progression from mild symptoms to full-fledged DSM-IV diagnoses. Statistics Canada and other government departments in possession of health data need to allow greater access to the data and facilitate longitudinal follow-up by qualified health researchers, as is the case in the United States and the United Kingdom. National data collection initiatives such as the CCHS must be sustained, and provinces must work together to integrate and validate administrative data. Furthermore, for indicators to be both meaningful and policy relevant, and to provide useful information to policy makers seeking to improve mental health conditions, they must also address underlying root causes of distress and not focus solely on symptomatic outcomes. Individually linked longitudinal data that allow assessments of depth and length of time in low-income circumstances, labour force data and data on unpaid work, time stress and rates of chronic stress all need to be considered during mental health surveillance.

Strengths and limitations

The strengths, limitations and biases inherent in the indicators described in this paper must be acknowledged (Table 2). In the absence of a gold standard or biologic indicator of a mental disorder, there is no way of determining the accuracy of these estimates. The stigma associated with mental health disorders may lead to underreporting of symptoms by participants in the CCHS survey data, as well as by physicians in their billing practices, and thus create problems in predicting the need for mental health services (Patten 2008). Future surveys should consider adding questions about people's perceived need for mental health services as there may be a gap between meeting diagnostic criteria and wanting help. Since medication use and physicians' diagnoses contained in administrative databases do not differentiate the severity of disease, new surveys should also incorporate questions that capture this variable within a DSM-IV diagnosis. The psychotropic drug indicator offers important information about the use of pharmaceutical management, but may also say more about patient preferences for treatment and the prescribing practices of physicians than about the severity of symptoms per se. A more reliable measure of medication consumption for mental illness could be derived from pharmacy databases across the country once all provinces collect data on all prescriptions filled. In countries where centralization of electronic records for dispensation of pharmaceuticals has already occurred, this indicator is easier to extract.

TABLE 2. Strengths and weaknesses of the various indicators for deriving estimates of the proportion of the Canadian population aged 18 and older with depression and anxiety

Criteria	Method of estimating proportion of the population with anxiety or depression		
	Self-reported symptoms (subthreshold symptoms and diagnostic disorders)	**Proportion of physicians' billings for mental health complaints**	**Self-reported use of medications for depression and anxiety**
Feasibility of use	Currently can be derived only from national surveys on mental health, which are costly, and are usually conducted only every 5 to 10 years.	Could be derived from existing fee-for-service databases that are available in most provinces. Alternatively, electronic medical records (EMRs) will soon be universally available, and this indicator could be derived from the EMR database.	Could be easily derived from existing pharmaceutical databases that are available in most provinces in addition to reporting in national health surveys on mental health.
Gender sensitivity	Women are more likely to express distress through symptoms of depression and anxiety. Men are more likely to develop problems with alcohol and illicit substance use.	Need to adjust for differential health-seeking behaviours by men and women, especially for mental health symptoms.	Takes into account higher rates of prescribing and drug use among women, as well as more frequent health service utilization by women.
Capable of providing key regional, provincial and demographic breakdowns	Yes	Yes	Yes
Advantages	Use of DSM-IV diagnostic criteria (and subthreshold criteria) make international comparisons possible if mental health surveys using the same instruments are conducted in other countries.	1) Captures both outpatient and inpatient healthcare system utilization for mental distress and disorders. 2) ICD-9 (now ICD-10) codes are used internationally for physician billing. 3) Captures people with emotional distress who seek alternative forms of treatment such as counselling or psychotherapy (within the part of the healthcare system paid for publicly).	International comparisons are possible given accepted international standards for classifying prescription medications, and a growing body of literature on how to measure drug use accurately across populations and time.
Disadvantages	1) Recall bias or reluctance to admit to stigmatizing mental health symptoms might lead to underestimation of prevalence rates. 2) Because the surveys are conducted only every 5 to 10 years, the data may not be up to date. Expense and effort required to conduct surveys mean these data are not sensitive to short-term changing trends.	1) Does not capture people with distress who do not seek care from physicians or who seek care from salaried physicians or other providers outside the public healthcare system. 2) Underestimation of diagnostic claims may occur because mental health providers tend to list the least stigmatizing diagnosis on the billing claims form for reasons of patient confidentiality. 3) Overestimation of procedure codes for counselling may occur if physicians bill discussion of other health conditions under the counselling code.	1) Psychotropic drugs are a mixed group of medications, used for indications other than mental health complaints. 2) Issues with interpretation include erroneous judgments on under- or overtreatment for men and women. 3) Danger of reflecting marketing practices and physician prescribing patterns more than patient disease levels.

Conclusion

Our study highlights clear advantages of using multiple data sources to monitor and track the full spectrum of our population's mental health, and also illustrates that a single measure is not adequate to uncover the severity of disease within a single population. Mental health surveillance will require a conglomerate of indicators, and would best be served by including upstream determinants of mental health in addition to downstream symptomatic outcomes. The potential for linking data across data sources and time, as well as the privacy issues involved in such an endeavour, urgently require regulation in order to accelerate effective mental health surveillance in Canada. The use of a standardized set of indicators that takes into account health determinants, the severity of symptoms and the use of healthcare services would permit more useful international comparisons.

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RESEARCH PAPER

Access to Family Physicians in Southwestern Ontario

Accès aux médecins de famille dans le sud-ouest ontarien

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Abstract

Objective: Shortages of family physicians (FPs) have been reported, but accurate data on the scope of this problem are sparse. The study objective was to determine the proportion of the population in southwestern Ontario without access to a regular FP and sources of usual medical care for individuals with and without a regular FP.
Method: Random-digit dialling was used to obtain a stratified, random sample of households from 10 counties in southwestern Ontario, which resulted in 1,387 participants (60.5% cooperation rate). Adults reported on themselves, while a random selection of parents reported on their children, yielding data on individuals ranging from 0 to 95 years of age.
Results: 9.1% (95% CI = 7.8% to 10.6%) of individuals did not have a regular FP. Most individuals without a regular FP used walk-in clinics (55%) or emergency rooms (13%) as their usual source of care, while 5.9% reported not receiving medical care. Lack of physicians accepting new patients was the most common reason for not having a regular FP (27%), although some individuals chose not to have one (9.9%) or had alternative access to care (13.2%).

Conclusions: Based on the assumption that the individuals who chose not to have a FP, or who had access to alternative care, would continue not to want a FP if one were available, we estimate that 5.1% of the population of southwestern Ontario requires a FP. The health implications of not having a regular FP in Canada need to be examined.

Résumé

Objectif : La pénurie de médecins de famille est bien documentée, cependant il y a un manque de données précises portant sur l'ampleur du problème. L'objectif de cette étude était d'évaluer la proportion de la population du sud-ouest ontarien qui n'a pas accès à un médecin de famille régulier et de connaître les sources habituelles de soins médicaux pour les personnes qui ont ou n'ont pas de médecin de famille régulier.
Méthodologie : Un système d'appels aléatoire a été employé afin d'obtenir un échantillon aléatoire stratifié de ménages dans 10 comtés du sud-ouest ontarien. En tout, 1387 participants ont répondu à l'enquête (un taux de coopération de 60,5 pour cent). Les adultes ont répondu en leur nom et un échantillon aléatoire de parents ont répondu pour leurs enfants, ce qui a permis d'obtenir des données sur des personnes âgées de 0 à 95 ans.
Résultats : 9,1 pour cent (95 pour cent IC = 7,8 pour cent à 10,6 pour cent) des personnes indiquent ne pas avoir de médecin de famille régulier. La plupart des personnes qui n'ont pas de médecin de famille régulier utilisent les cliniques sans rendez-vous (55 pour cent) ou les services d'urgence (13 pour cent) comme source habituelle de services de santé, et 5,9 pour cent des répondants indiquent ne pas recevoir de services médicaux. Le manque de médecins qui acceptent des nouveaux patients est la principale raison invoquée pour expliquer l'absence de médecin de famille régulier (27 pour cent), bien que certaines personnes choisissent de ne pas en avoir (9,9 pour cent) ou utilisent d'autre types d'accès aux services de santé (13,2 pour cent).
Conclusion : Si l'on suppose que les personnes qui choisissent de ne pas avoir de médecin de famille, ou qui utilisent d'autres types de services, continueraient de ne pas vouloir de médecin même s'il y avait disponibilité, nous estimons que 5,1 pour cent de la population du sud-ouest ontarien a besoin des services d'un médecin de famille. Il est nécessaire d'étudier quelles sont les répercussions sur la santé associées au fait de ne pas avoir de médecin de famille, au Canada.

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There is a substantial literature pertaining to the importance of primary care to the health of the population and efficient functioning of the healthcare system as a whole (Starfield 1994; Shea et al. 1992; Welch et al. 1993; Gulliford 2002). With Canada's universal healthcare coverage, financial barriers

to access to physician care are removed, and it is intended that the delivery of healthcare coincide with healthcare needs (Commission on the Future of Health Care in Canada 2002). Yet, shortages of family physicians (FPs) both in rural and urban settings have been regularly reported (e.g., Bailey 2007). Accurate data on the scope of this problem are sparse. Data from the Health Services Access Survey, a supplement of the Canadian Community Health Survey, indicated that 13.7% of Canadians (aged 12 and older) reported that they did not have "a regular family physician"; in Ontario, this percentage was significantly lower at 8.8% (Sanmartin et al. 2004). Analyses of the Canadian Health Services Access Survey found that among individuals with a regular FP, 15% still reported problems in accessing routine care (i.e., annual examination, care for ongoing illness, care for minor non–life-threatening problem) (Sanmartin and Ross 2006).

Access to a FP may affect morbidity and mortality. Generally, individuals of lower socio-economic status and who have poorer health tend to use more FP and hospital services (Kephart et al. 1998; Dunlop et al. 2000; Iron et al. 2004). There is some evidence implying that access to the care provided by FPs may reduce mortality due to income disparities (Veugelers and Yip 2003). Inequities in availability and access to appropriate care may contribute to disparities in health and even make existing inequities worse. Thus, the present study examined socio-demographic factors that might be related to access to FP care, including income, educational attainment and immigration.

The present study aimed (a) to determine the proportion of the population in southwestern Ontario without access to a regular FP, (b) to examine differences in healthcare utilization between individuals with or without access to a regular FP and (c) to explore whether subpopulations (e.g., people living in rural areas, individuals from low-income families) varied in their access to a FP.

Southwestern Ontario was selected as the target population because it includes a range of both rural and urban centres. We examined sources of regular healthcare for individuals with or without a regular FP, and inquired about individuals' efforts to obtain one. Understanding these issues and perspectives has implications for health human resources planning.

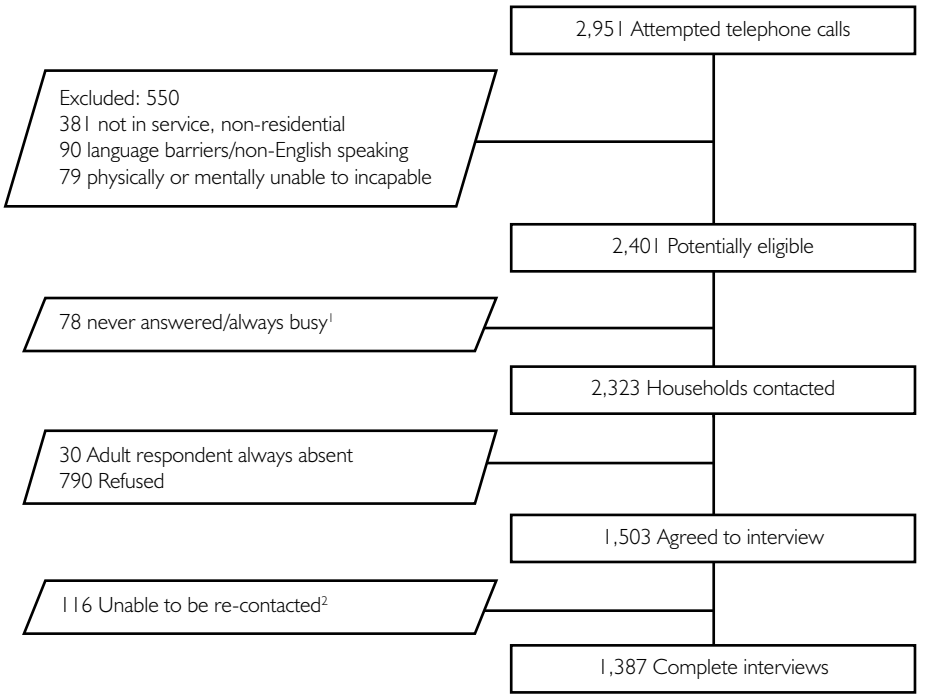
Methods

Sampling

We used random digit dialling procedures to select households; within households having more than one possible respondent, we used the most recent birthday to identify respondents (O'Rourke and Blair 1983). Respondents aged 18 or older and residing in one of the 10 counties in southwestern Ontario were eligible for the study. Excluded were residents of old age homes, jails and other institutions, and individuals without telephones. Figure 1 shows the recruitment. The total sampling frame was the 625,230 households in these 10 counties. A total of 1,387 interviews were completed

for a cooperation rate of 60.5% (cooperation rate #4, interviews completed divided by all eligible individuals contacted) and a response rate of 56.4% (response rate #4, interviews completed divided by all eligible individuals contacted plus an estimate of cases from the number of cases of unknown eligibility) (American Association for Public Opinion Research 2006). (Calculation of the cooperation rate used formula COOP4; the response rate used formula RR4.) Respondents were asked to report on whether or not each member of their household had a FP, and then completed a detailed interview regarding their health and utilization of healthcare. To obtain information on children (aged 17 and younger), one-half of parents were randomly assigned to complete the detailed interview regarding their child with the most recent birthday. As parents could have reported on a child or themselves, the term "target person" is used to indicate the individual for whom data were obtained.

FIGURE 1. Recruitment of respondents



[1] Attempts were made during the day and the evening – during the week and on weekends – with a minimum number of 12 calls to each telephone number, of which at least 10 were made during evening and weekend hours, before a household was deemed to be a non-response.
[2] Attempts were made to encourage most refusers to participate in the survey by calling them at least once after they first refused.

Procedures

Interviews were completed by the telephone survey unit at York University in Toronto, Ontario between June 26 and September 11, 2006. Interviews lasted 19 minutes on

average (+4.8). Standard response options were provided for virtually all questions, with the option to record an "other" category in most cases. All text responses were coded by a research assistant and verified by one of the authors (GJR). The interview was based on a pilot study with over 800 respondents, and the final version was tested on a small sample (n=7).

Measures

ACCESS TO FAMILY PHYSICIANS

Access to a FP was determined by the question, "Do you have a regular family doctor? By that I mean one doctor who can see you?" Probes ensured that respondents were reporting on their access to regular primary medical care rather than specialist care. For other members of the household, respondents were asked, "Does [she or he] have a regular doctor?" If parents reported regularly accessing a paediatrician for their child's care, this response was included as having a regular FP.

DEMOGRAPHICS

Standard questions were used to assess socio-demographic characteristics (e.g., family income, immigration status) (Statistics Canada 1998). Response options for education and employment were combined into smaller, conceptually relevant categories. The respondent's employment was categorized as (a) unemployed (which also included homemaker, retired, disabled, on maternity leave), (b) self-employed or (c) student/employed. Family income and size were used to compute four categories of income adequacy ranging from low (i.e., <$15,000 for one or two people) to high (i.e., >$60,000 if one or two people; >$80,000 if three or more people) (Sanmartin and Ross 2006). A healthcare rurality index was computed for each respondent based on address (i.e., postal code). Developed in 2004 by the Ontario Medical Association, the rurality index builds on previous work (Leduc 1997) and incorporates aspects of the community (e.g., population, weather, distance to referral centre) and the healthcare system (e.g., number of active FPs, ambulance availability) (Kralj 2005); scores ranged from 0 to 100 (most rural). We also assessed whether the target person had been diagnosed with any chronic medical conditions and any psychiatric disorders, and overall health status (1 = excellent, 5 = poor).

UTILIZATION OF HEALTHCARE SERVICES

If the target person had a FP, we assessed the duration of time they had had one. If the target person did not have a FP, questions related to efforts and decision-making in obtaining a physician were asked. The source of regular medical care used most

often was determined. A commonly used measure of health service utilization during the previous year was employed to inquire about use of a wide range of health professionals (e.g., physiotherapist, psychologist) (Browne et al. 1990).

Data Analysis

Complex sample analysis procedures in SPSS Version 15 (2006) were used to estimate the proportion of the population with a FP. A two-stage sample approach was used, with stratification by region and clusters of households in stage 1. At stage 2, we treated data on individuals within each household as being sampled with certainty, as respondents reported on each member of the household. All other analyses were conducted without applying the complex sampling adjustments.

Prior to the multivariate analyses, missing data were imputed as follows. Respondents who either refused to report on their country of birth, or did not know or refused to answer when they immigrated, were coded as having not immigrated (n=6). The mode was used when respondents did not report their employment status (n=2), education (n=15) or duration residing in current location (n=1). Similarly, the mode was used when information on the target person's psychological or emotional problems (n=1), chronic medical conditions (n=18) or health status (n=4) were not reported. When the target person's age was missing (n=30), the average age of either the adults or children in the sample was used. For respondents who declined to report their postal code (n=60), the average rurality index for their county was used. When a rurality index was not available, the average index for the participant's forward sortation area (n=27) or county (n=13) was used. When the respondent refused to report (n=242) or did not know (n=81) the family income, the SPSS expectation maximization procedure (2006) was used to impute missing data based on the respondent's employment status, age, marital status, educational attainment, years since immigration and years residing in current location. Because of small cell sizes (<5%), the categorical variable for years residing in current location was regrouped.

Source of regular medical care was compared for individuals (i.e., target person) with and without a regular FP using chi-square. Given the low frequency of utilization of some locations, visits to a clinic, hospital or community health centre were combined. Healthcare utilization during the previous year was compared for individuals with and without a regular FP using the Mann–Whitney U test. Given the low frequency of utilization of some providers, visits to the following providers were combined: (a) other allied health providers (audiologist, nutritionist, occupational therapist, speech pathologist) and (b) other health providers (chiropractor, naturopath and any other providers). The false discovery rate method, which controls the error rate at alpha = 0.05, was used to adjust for multiple comparisons (Benjamini and Hochberg 1995); this method has been shown to balance type 1 and type 2 errors (Benjamini

and Hochberg 2000). These analyses were conducted with SPSS Version 15 (2006).

Logistic regression was used to examine correlates of whether or not the target person had a FP. Analyses were conducted with STATA Version 10 (2006). Predictor variables, selected a priori (Babyak 2004), included respondent's employment status, educational attainment, years since immigration, years residing in current location, rurality index for respondent's home, and marital status, and the target person's age and gender. To inform these analyses we conducted post hoc power calculations.

Results

The 1,387 respondents reported on whether or not each member of their household had a FP (N=3,360; data were missing for 22 individuals). Detailed information was obtained on 1,163 adult respondents and 224 children.

Table 1 summarizes the demographic characteristics. Close to one half had been diagnosed with a chronic medical condition, and 6.4% had been diagnosed with a psychological or emotional problem, during the previous year. Most individuals reported they were in excellent (29.3%) or very good (33.2%) health.

TABLE 1. Demographic characteristics

	n (or M)	% (or ±SD [mode])
Respondent		
Marital Status		
Single	549	39.6
Married/Living with partner/Common-law	838	60.4
Educational Attainment		
Less than high school	229	16.5
Completed high school	426	30.7
At least some community college/technical school	377	27.2
University education (bachelor's)	279	20.1
University education (graduate and professional)	76	5.5
Employment		
Unemployed, Retired, Homemaker, Disability, Maternity or Other	519	37.4
Self-employed	100	7.2
Any employment or student	768	55.4
Income Index		
Low	118	8.5
Lower-middle	192	13.8

TABLE 1. Continued

Upper-middle	567	40.9
High	510	36.8
Immigrants	212	15.3%
Years since immigration	5.1	±14.3 [0.0]
Rurality Index	27.7	±19.8 [7.22]
Duration of Residence		
Less than 6 months to less than 2 years	75	5.4
2 years to less than 5 years	147	10.6
5 years to less than 10 years	172	12.4
10 years or more	993	71.6
Gender of Target Person		
Female	825	59.5
Age of Target Person		
0 to 12	149	10.7
13 to 17	68	4.9
18 to 25	147	10.6
26 to 40	182	13.1
41 to 55	336	24.3
56 to 70	305	22.0
71 or older	158	11.4
86 to 99	11	0.8
Missing	29	2.1
Chronic Medical Condition		
No conditions	800	57.7
Only one condition	441	31.8
Two or more conditions	146	10.5
Diagnosed with Psychological or Emotional Problem in Past Year		
Yes	89	6.4
Health Status		
Excellent	406	29.3
Very good	461	33.2
Good	317	22.9
Fair	140	10.1
Poor	63	4.5

Note: Results incorporate imputation of missing values as specified in the data analyses section, with the exception of age.

Key demographic data were compared to the 2006 Census for the same 10 counties from which the sample was drawn (Statistics Canada 2008). Compared to the population, our sample under-represented single respondents, had slightly (i.e., 2–4%) more adults who were not in the labour force, had more families with incomes less than $40,000 and fewer families with incomes of $100,000 or more; we had slightly fewer 25-64 year olds who did not graduate from high school and slightly more university graduates (see appendix, Table a1). There were no differences in terms of the proportion of individuals who moved within the previous year or previous five years, or the proportion of immigrants; however, our sample had a higher proportion of immigrants who had been in Canada for more than 45 years. In terms of the comparison with the target person, our sample had few men/boys (41% vs. 49%). The age distribution was also significantly different from the population. Although the proportions in most age categories were very similar, our sample had slightly (1%–3%) fewer children and younger adolescents (<15 years) and young adults (20 to 24 years), and slightly more (1%–4%) adults in the age ranges of 55 to 74 years old.

Access to a regular family physician

Overall, 9.1% (95% CI = 7.8% to 10.6%) of individuals within the households surveyed did not have a regular FP, which translates into an estimated 139,307 (95% CI = 117,786 to 160,828) individuals in southwestern Ontario.

Detailed information was obtained for the 1,387 target individuals. Of the 1,235 individuals who had a regular FP, they had been with this physician for 12.6 years (+10.1) on average. Among the 152 individuals who did not have a FP, 17 (1.2%) had never had a FP (this information was not reported for eight individuals). On average, individuals had been without a regular FP for 6.9 years (+7.3; median = 5, range 0–39 years).

The main reasons for not having a FP were related to lack of access (27.0%, no FPs, FPs not taking new patients; 30.3%, doctor moved/retired/deceased/changed practice) or the individual had not tried to get a FP (e.g., moved, 13.8%). However, some individuals choose not to have a FP (9.9%) or had access to alternative care (13.2%). (The remaining 5.9% had no response to this question.) About half the individuals without a FP were not actively looking for one (47.7%). When these 62 individuals were asked why they were not looking, 27.4% reported they had given up looking, one individual (1.6%) was on a waiting list, 38.7% were not interested or felt they were healthy and did not need one, 17.7% preferred walk-in clinics, or they were students who used the healthcare services at their university or college (8.1%) or had access to a physician or other healthcare provider elsewhere (6.4%).

We combined individuals' reasons for not having and not looking for a FP into three categories: (a) did not have a regular FP and chose not to have one (25.0% of indi-

viduals without a FP), (b) had access to alternative care (19.1%) and (c) did not have a regular FP mainly because of lack of access or other reasons (55.9%). These percentages were used to provide alternative estimates for the number of individuals needing a FP.

Sources of regular medical care and healthcare utilization

Sources of usual care were significantly different between those with versus those without a regular FP (chi-square [5] = 759, $p<0.001$). Most individuals without a regular FP used walk-in clinics (55%) and emergency rooms (13%), or one of a number of alternative locations (20%; see Table 2). Among individuals with a FP, 13% used other locations or providers as their usual source of care. Compared to individuals with a FP, those without had more visits to walk-in clinics and fewer visits to dentists or pharmacists and fewer total visits (see Table 3).

TABLE 2. Sources of usual medical care by whether or not the target person has a regular family physician

	Person has a regular family physician		
	No	Yes	Overall
	(Col %)	(Col %)	(Col %)
Walk-in clinic	55.3%	3.6%	9.2%
Other hospital, clinic, provider, etc.	19.7%	7.5%	8.9%
Emergency room	13.2%	1.1%	2.4%
Do not receive medical care	5.9%	0.1%	0.7%
Did not answer, don't know	5.9%	0.1%	0.7%
Family physician	0.0%	87.7%	78.1%
Column N	152	1,235	1,387

Col % = Percentages are by column

Correlates of having a regular family physician

Results of the logistic regression are presented in Table 4. The overall model was significant (likelihood ratio [LR] chi-square [20] = 77.79, $p<0.001$). The longer respondents' families had been residing in their current location, the more likely they were to have a FP. When the target person was married, or living with two parents in the case of children, they were more likely to have a FP (OR = 2.17). Women/girls were also more likely to have a FP than men/boys (OR = 1.91). None of the other factors were significantly related to whether or not individuals had a FP.

TABLE 3. Healthcare utilization (number of visits) during the previous year by whether or not the target person has a regular family physician

	Person has a regular family physician				Mann-Whitney U	*p*
	No		Yes			
	M	SD	M	SD		
Medical Services						
Walk-in clinic	1.85	3.98	0.68	1.71	70,864	0.000 *
Emergency room	0.53	1.52	0.53	1.27	90,565	0.367
Nurse	0.57	3.10	0.53	2.98	93,419	0.858
Paediatrician	0.07	0.26	0.57	1.59	1,365	0.211
Other physician specialists	0.84	2.34	0.94	3.59	93,223	0.852
Allied Health Professions						
Pharmacist	3.18	9.03	3.83	6.75	76,258	0.000 *
Physiotherapist	0.61	4.36	1.03	5.16	91,493	0.328
Other allied health	0.20	1.03	0.43	2.58	91,532	0.338
Mental Healthcare						
Social worker	0.14	1.63	0.16	1.34	92,962	0.501
Counsellor	0.01	0.08	0.07	0.71	92,798	0.303
Psychiatrist	0.31	2.21	0.23	2.42	92,358	0.288
Psychologist	0.12	1.46	0.10	1.54	93,118	0.429
Other Health Providers						
Dentist	0.98	1.27	1.62	1.90	70,788	0.000 *
Other health provider	1.46	4.21	2.26	6.38	91,231	0.474
Total of All Visits	10.79	16.54	12.41	16.32	81,169	0.006 *

* Significant after false discovery rate adjustment.

Power for select variables in the logistic regression was calculated. For sex, which was statistically significant, the power was, as would be expected, adequate: power = 0.76. Two variables that were not significant had low power. For psychological problems in the past year, power = 0.04, and for the contrast between high versus low family income, power = 0.59.

To help understand the effects of marital status and sex, we explored the reasons why individuals in these groups did not have a FP. The most common reasons for not having a FP for all groups were related to lack of access (e.g., FPs not taking new patients). The next most common reason for men who were single was that they chose not to have a FP; other individuals rarely had this reason. There were, however, no significant differences in the reasons for not having a FP in terms of marital status or sex; thus, these findings only suggest potential underlying differences.

TABLE 4. Logistic regression predicting having a family physician

Predictor variables		OR	(95% CI)	*p*
Respondent/Family Demographics[1]				
Employment[2]	Self-employed	0.534	(0.265–1.077)	0.080
	Any employed or student	0.767	(0.475–1.239)	0.279
Educational attainment[3]	Completed high school	0.838	(0.489–1.434)	0.518
	At least some community college	1.260	(0.686–2.313)	0.456
	At least some university	0.802	(0.430–1.497)	0.489
	University or professional graduate	1.172	(0.469–2.926)	0.734
Income group[4]	Lower-middle	1.480	(0.771–2.841)	0.238
	Upper-middle	1.850	(1.024–3.342)	0.042
	High	1.741	(0.893–3.393)	0.104
Years since immigrating to Canada		1.006	(0.991–1.020)	0.448
Years residing in current location[5]	2 to less than 5 years	1.986	(0.989–3.989)	0.054
	5 years to less than 10 years	3.123	(1.512–6.450)	0.002
	10 years or more	4.209	(2.337–7.581)	0.000
Rurality index		1.003	(0.994–1.012)	0.523
Marital status[6]	Married/Living with partner	2.171	(1.475–3.197)	0.000
Target Person Characteristics				
Gender[7]	Female	1.909	(1.320–2.762)	0.001
Age	Year	0.998	(0.988–1.009)	0.723
Number of chronic physical health problems[8]		1.149	(0.837–1.576)	0.390
Psychological problems past year[9]		1.239	(0.591–2.593)	0.570
Health status[10]		0.876	(0.725–1.057)	0.167

OR = odds ratio; 95% CI = 95% confidence interval

[1] When the target individual was a child, parent demographics are reported.

Reference categories: [2] unemployed, [3] less than high school, [4] low, [5] less than 2 years, [6] single, [7] male, [8] 0, 1 or 2 conditions, [9] no psychological problems, [10] excellent.

Discussion

Almost one in 10 residents of southwestern Ontario (9.1%) did not have a regular FP. This figure is higher than previously found for all residents of Ontario (Sanmartin et al. 2004). The difference may be due to geographic variation within Ontario or to the timing of the survey.

Issues related to access were reported as the main reasons individuals did not have a regular FP. Interestingly, 23% of individuals (4.8% of the total sample) reported the

reason they were without a FP was that they choose not to have one or had access to alternative care. Walk-in clinics and employers providing in-house clinics for their staff appear to provide alternative sources of care for these individuals without a regular FP. However, we found that 13% of individuals with a regular FP reported that their usual source of healthcare was not their FP. Unlike the health maintenance organizations in the United States, the Canadian system does not impose barriers to patients accessing services other than their FP. Ontario has recently introduced family health networks and teams, which provide incentives for physicians to provide comprehensive care to their enrolled patients. It is unknown whether these changes in the organization of primary healthcare will result in changes in patients' patterns of accessing care.

There were surprisingly few correlates of not having a FP. The lack of differences in terms of socio-economic factors (e.g., employment, educational attainment, income) or immigrant status suggests that overt bias in having a regular FP is not present. This finding is consistent with those of other studies showing that income does not influence access to primary care (Blendon et al. 2002; Finkelstein 2001). Our study did not have the power to detect the observed effects of variables such as income that might be viewed as highly relevant for policy; future studies with a larger sample size could be conducted to test the stability of our findings. Individuals who had been residing in their current location for less than two years were the least likely to have a regular FP. Lack of physicians taking new patients would account for why individuals who were new to the area would not have a regular FP. This finding is consistent with the average duration for being without a regular FP of 6.9 years.

The finding that individuals who were married (or children in two-parent families) and women/girls were more likely to have a FP might indicate preferences for type of care. There was some indication that this might have been true, as exploratory analyses suggested some single men reported choosing not to have a FP while virtually no other groups of individuals reported this reason. However, the most common reason across all groups for not having a regular FP was lack of access. Our sample had fewer men/boys than the population of southwestern Ontario. As such, our results may slightly underestimate the overall proportion of residents without a FP.

Limitations

A sizeable percentage of respondents did not report their family income. Thus, lack of significant results for this variable should be interpreted with some caution. Only individuals residing in one region of Ontario were sampled. Future studies should examine other areas of the province and country. Only English-speaking individuals participated. This study does not inform us about the important and potentially vulnerable population of individuals who are not English-speaking. Similarly, we excluded individuals who were in old age homes, jails and other institutions, and individuals

without telephones. As such, our results cannot be generalized to these groups. A sizeable percentage of individuals who were contacted declined to participate. It is unclear how this factor may have affected the findings.

Conclusions and Implications

Using data from all individuals within the households surveyed, 9.1%, or an estimated 139,307 individuals in southwestern Ontario, are without a FP. If we use the detailed information on reasons why individuals did not have a FP and their reasons for not looking, and assume that individuals who reported they chose not to have a FP or had access to alternative care would not change their decision if more FPs were available, we would estimate that 77,902 individuals (5.1% of the population) require a FP. Alternatively, if those who reported regularly using walk-in clinics or alternative care would prefer a FP, we would estimate that 104,480 individuals (6.8%) require a FP. These are gross estimates, and the number of FPs needed to care for this population should be tested under various conditional assumptions, such as the distribution of FPs within specific regions and varying workloads by FPs' age and sex.

Thirteen per cent of individuals without a FP used an emergency room (ER) for their usual source of medical care. Problems with overcrowded ERs and concerns about "abuse" of the ER have existed for a number of years in Canada and elsewhere (Afilalo et al. 2004; Palmer et al. 2005). Lack of access to regular FPs may be viewed as one factor contributing to this problem (Starfield 1994). However, given the relatively low percentage of the population without a regular FP who use the ER as their source of usual care and the fact that the average number of ER visits did not differ between individuals with and without a FP, it is unlikely that lack of access to a FP is a substantive factor influencing ER use. However, others have found that lack of a regular physician among those with chronic medical conditions does result in more ER visits and hospitalization (Glazier et al. 2008).

Perhaps more disturbing was the percentage of individuals without a FP who did not receive medical care (5.9%) or who were unable, or unwilling, to report where they received regular medical care (5.9%). There are implications of not having a regular FP. For individuals with chronic illness and especially those with co-morbidities, the lack of comprehensiveness and continuity of care provided by a FP may result in poorer health outcomes. Similarly, individuals who do not have a regular FP may not receive preventive medicine practices and screening procedures (e.g., pap smears, colorectal cancer screening) regularly. These issues need further examination.

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Appendix
Supplementary table

TABLE A1. Demographic characteristics compared to 2006 Census

	Access to family physicians		2006 census southwestern ontario		
	n	%	n	%	Chi-square
Respondent					
Marital Status					39.4***
Single	549	39.6	594,165	47.4	
Married/Living with partner/ Common-law	838	60.4	658,645	52.6	
Educational Attainment (25- to 64-year-olds)					25.1***
Less than high school	97	12.9	131,135	16.2	
Completed high school	208	27.7	229,345	28.3	
Some or Completed community college or technical school	242	32.3	282,010	34.8	
Some university or Completed BA	145	19.3	110,025	13.6	
MA, PhD or professional degree	58	7.7	57,410	7.1	
Educational Attainment (65+ years old)					64.7***
Less than high school	104	34.6	92,405	43.1	
Completed high school	106	35.2	46,225	21.5	
Some or Completed community college or technical school	35	11.6	51,205	23.9	
Some university or Completed BA	40	13.3	16,085	7.5	
MA, PhD or professional degree	16	5.3	8,620	4.0	
Employment[1]					11.89**
Not in labour force	485	35.1	414,425	32.6	
Employee	723	52.4	711,075	56.0	
Self-employed	124	9.0	92,895	7.3	
Unemployed	49	3.5	51,185	4.0	
Income Categories					108.9***
Less than $20,000	106	10.0	25,795	6.0	
$20,000–$29,999	120	11.3	30,190	7.0	
$30,000–$39,999	128	12.0	39,720	9.2	
$40,000–$49,999	119	11.2	42,560	9.8	

TABLE A1. Continued

$50,000–$59,999	112	10.5	41,575	9.6	
$60,000–$69,999	84	7.9	40,175	9.3	
$70,000–$79,999	84	7.9	36,930	8.5	
$80,000–$89,999	65	6.1	32,845	7.6	
$90,000–$99,999	60	5.6	27,625	6.4	
$100,000 or more	186	17.5	115,240	26.6	
Immigration					0.8
Immigrants	212	15.3	243,100	16.2	
Non-immigrants	1,175	84.7	1,258,995	83.8	
Years since immigration					26.3***
46+	75	35.4	55,365	22.8	
36 to 45	36	17.0	37,430	15.4	
26 to 35	25	11.8	32,865	13.5	
16 to 25	27	12.7	34,465	14.2	
11 to 15	10	4.7	23,495	9.7	
6 to 10	12	5.7	25,725	10.6	
0 to 5	27	12.7	33,745	13.9	
Mobility[2]					
Residing in same city/town/area					
< 1 year	31	2.2	73,725	4.9	0.826
1 year or more	1,355	97.8	1,424,000	95.1	
Residing in same city/town/area					
< 5 years	222	16.0	227,050	15.9	0.022
5 years or more	1,164	84.0	1,203,340	84.1	
Sex of Target Person					39.4***
Male	562	40.5	749,965	48.95	
Female	825	59.5	782,100	51.05	
Age of Target Person					164.7***
0 to 4	49	3.6	83,535	5.5	
5 to 9	50	3.7	90,810	5.9	
10 to 14	64	4.7	104,930	6.8	
15 to 19	88	6.5	108,820	7.1	
20 to 24	55	4.1	102,165	6.7	
25 to 29	59	4.3	88,425	5.8	
30 to 34	62	4.6	90,935	5.9	

TABLE A1. Continued

35 to 39	75	5.5	99,650	6.5	
40 to 44	94	6.9	121,155	7.9	
45 to 49	111	8.2	122,120	8.0	
50 to 54	108	8.0	111,300	7.3	
55 to 59	117	8.6	101,230	6.6	
60 to 64	124	9.1	78,660	5.1	
65 to 69	82	6.0	63,055	4.1	
70 to 74	83	6.1	54,250	3.5	
75 to 79	62	4.6	47,340	3.1	
80 to 84	49	3.6	35,605	2.3	
85 to 99	25	1.8	28,115	1.8	

Note: Participants who had missing data or refused to answer specific questions were excluded from these comparisons.
[1] Employment. Census data include individuals aged 15 years and older. Data from the current study include individuals 18 years and older; data were coded as follows: Employed – employed full-time or part-time, including individuals who were students or retired but also reported working; Not in labour force – student, retired, family/homemaker, and individuals who were disabled or on maternity leave.
[2] Mobility. Residing in same city/town/area was taken from the Census categories that included individuals living at the same address and non-migrant movers (i.e., living within the same Census subdivision).

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