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Health Services, Management and Policy Research
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Two Wings and a Prayer: Should Canada Make It Easier for Canadian Doctors Trained Abroad to Enter Practice Here?
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ASHLINDER GILL ET AL.

Data Matters • Discussion and Debate • Research Papers
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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Politiques de Santé/Healthcare Policy 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 *Politiques de Santé/Healthcare Policy* 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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A cross-sectional Ontario study of seniors who received a new prescription for one of two drugs, aliskiren or sitagliptin, found that approximately half of these orders did not conform to the therapeutic notes of the Ontario Drug Benefit Formulary. Policy makers may wish to take note.

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e105  The Effect of Rostering with a Patient Enrolment Model on Emergency Department Utilization

RAAJ TIAGI AND YURIY CHECHULIN

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e122  Deliberative Dialogues as a Strategy for System-Level Knowledge Translation and Exchange

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Une étude transversale effectuée en Ontario auprès des aînés qui ont reçu une nouvelle ordonnance pour un des deux médicaments, aliskirène ou sitagliptine, révèle qu'environ la moitié de ces ordonnances ne respectent pas les recommandations des notes thérapeutiques présentes sur le Formulaire des médicaments de l'Ontario. Les responsables des politiques seront certainement intéressés par ce constat.

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La réforme des soins de santé primaires en Colombie-Britannique, amorcée en 2002, vise la promotion de « cliniques familiales offrant des services intégraux » par le biais de primes d'incitation et autres programmes de soutien aux cliniques. Une analyse longitudinale laisse croire que les efforts ne permettent pas d'atteindre les objectifs visés.

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ASHLINDER GILL, KERRY KULUSKI, LIISA JAAKKIMAINEN, GAYATHRI NAGANATHAN, ROSS UPSHUR ET WALTER P. WODCHIS

Cette étude qualitative s'appuie sur des entrevues semi-dirigées auprès de patients, d'aidants naturels et de médecins de famille pour décrire les principaux thèmes liés à la gestion de la multimorbidité. Les points de vue des aidants naturels et des médecins apportent des pistes importantes pour la gestion de la multimorbidité et aident à trouver des stratégies pour faire face aux défis en matière de soins.

90  Attente pour la consultation auprès d'un spécialiste pour un nouvel état de santé, en Ontario : impact sur la vie des patients

DANIEL W. HARRINGTON, KATHI WILSON ET MARK W. ROSENBERG

Parmi les patients en attente d'une consultation auprès d'un spécialiste, les femmes, les personnes d'âge moyen, les nouveaux immigrants, les personnes à faible revenu et celles dont l'état de santé est le plus fragile sont les plus enclins à déclarer les effets suivants : inquiétude, stress, anxiété, douleur, stress sur la famille, détérioration de l'état de santé et perte d'emploi. Cette recherche démontre la nécessité de traiter l'impact du temps d'attente sur des sous-groupes particuliers de la population.

Exclusivité en ligne

e105  L'effet de l'inscription des patients, à l'aide d'un modèle d'adhésion, sur l'utilisation des services des urgences

RAAJ TIAGI ET YURIY CHECHULIN

L'inscription des patients à l'aide d'un modèle d'adhésion des patients (MAP) est associée à une réduction statistiquement significative des visites (non urgentes) aux services des urgences. Au cours de la période d'étude (de 2006/07 à 2010/11), l'inscription des patients à l'aide du MAP a permis de réduire les visites aux services des urgences de 3 % en Ontario, ce qui se traduit par une économie d'environ 8 millions de dollars pour les hôpitaux.

e122  Le dialogue délibératif comme stratégie d'échange et de transfert de connaissances au niveau du système

JENNIFER A. BOYKO, JOHN N. LAVIS ET MAUREEN DOBBINS

À l'aide d'observations sur le dialogue délibératif, d'évaluations faites par les participants aux dialogues ainsi que d'entrevues, les auteurs ont étudié cette démarche d'échange et de transfert de connaissances pour la prise de décision. Les éléments conceptuels observés présentent un bon potentiel d'applicabilité, mais il faut en réexaminer la pertinence en fonction de divers enjeux et contextes.

 Examen par les pairs

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EDITORIAL

Teams Make the Dream Work

Publishing a journal is a community effort – albeit more a modern quilting bee than a barn-raising, since it requires continued contributions from an evolving group of committed experts. National Volunteer Week fell during the time when this issue of the journal was being prepared, and I am pleased to take this opportunity to celebrate and thank those who made it possible to publish *Healthcare Policy/Politiques de Santé* over the past year.

We would have nothing to publish without the careful research and thoughtful commentary submitted for consideration by authors from around the globe. This issue provides an excellent example of the range of policy-relevant topics addressed in the journal's pages. Morris Barer, Bob Evans and Lindsay Hedden discuss the evolving approach to entry-to-practice of international medical graduates; Ainslie Hildebrand and colleagues highlight the disconnect between therapeutic notes and actual prescribing practice for seniors; and several authors look at the effectiveness of primary care reform. Other papers illuminate the perspectives of patients and those who care for them. For instance, Daniel Harrington, Kathi Wilson and Mark Rosenberg ask about the impact that waiting for a specialist consultation has on patients' lives. Likewise, Ashlinder Gill and colleagues used semistructured interviews with patients, their informal caregivers and family physicians to describe key themes in managing multiple conditions so as to help identify strategies to address care challenges. Then there are explorations of the knowledge creation and exchange process itself, such as the range of research related to appropriateness of care and the use of deliberative dialogues for knowledge exchange.

To ensure effective peer review for such a broad range of topics, we reach out to experts around the world. Last year, 121 reviewers carved time out of their busy schedules to provide feedback on papers considered for publication in this journal. (Please see the list of reviewers on pages 104.) Their feedback was carefully considered by our team of dedicated editors (listed in the journal's masthead on page 6). Our regular editorial team was joined this year by Jean-Louis Denis, who is serving as the guest editor of a special issue on approaches to accountability in the health sector.

These dedicated volunteers – along with Ania Bogacka and her colleagues and freelancers at Longwoods Publishing – make it possible to publish high-quality content in each issue of *Healthcare Policy/Politiques de Santé*.

On behalf of our readers, and the many who will ultimately benefit from their thoughtful reading and use of the journal's content, I would like to thank all those who contributed to the success of the journal over the past year. If you are interested in joining us as a reviewer for future issues, please contact us at www.longwoods.com/reviewer-registration/healthcare-policy.

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

Les équipes rendent possible le rêve

La publication d'une revue est un effort collectif – plutôt du ressort de la ruche ouvrière que du chantier de construction –, puisqu'elle demande l'apport d'un groupe d'experts en constante évolution. La Semaine de l'action bénévole a coïncidé avec la préparation du présent numéro et je tiens à profiter de cette occasion pour remercie tous ceux et celles qui ont rendu possible, au cours de l'année écoulée, la publication de *Politiques de Santé/Healthcare Policy*.

Il serait impossible de publier cette revue sans les travaux de recherche et les commentaires judicieux soumis par des auteurs provenant d'un peu partout sur la planète. Ce numéro constitue un excellent exemple de l'éventail des sujets abordés par la revue. Morris Barer, Bob Evans et Lindsay Hedden traitent de l'entrée en pratique des étudiants en médecine diplômés à l'étranger; Ainslie Hildebrand et ses collaborateurs font état du décalage entre les notes thérapeutiques et les pratiques de prescription pour les aînés; et plusieurs auteurs se penchent sur l'efficacité des réformes des soins de santé primaires. D'autres articles présentent les points de vue des patients et de leurs soignants. Par exemple, Daniel Harrington, Kathi Wilson et Mark Rosenberg s'intéressent à l'impact de l'attente pour une consultation auprès d'un spécialiste sur la vie des patients. De leur côté, Ashlinder Gill et ses collaborateurs ont mené des entrevues semi-dirigées auprès de patients, de leurs aidants naturels et de leurs médecins de famille pour décrire la gestion des situations de multimorbidité, et ce, afin de définir des stratégies pour

faire face aux défis en matière de soins. Il y a aussi des études sur les processus de production et d'échange de connaissances, tels que la portée des recherches sur la pertinence des soins ou l'emploi du dialogue délibératif comme stratégie d'échange de connaissances.

Afin d'assurer l'examen par les pairs d'une telle variété de sujets, nous faisons appel à des experts du monde entier. L'année dernière, 121 examinateurs ont donné de leur temps pour fournir des commentaires sur les articles soumis à la publication. (Veuillez consulter la liste des examinateurs à la page 104.) Ces commentaires ont été pris en compte par l'équipe de rédaction (présentée dans le bloc générique, à la page 6). Cette année, Jean-Louis Denis s'est aussi joint à l'équipe de rédaction à titre de directeur scientifique invité pour un numéro spécial sur les démarches ayant trait à l'obligation de rendre compte dans le secteur de la santé.

Ces bénévoles dévoués – de pair avec Ania Bogacka, ses collègues et des travailleurs pigistes – rendent possible la publication d'un contenu de qualité dans chacun des numéros de *Politiques de Santé/Healthcare Policy*.

Au nom de nos lecteurs et de tous ceux qui tirent profit de la lecture et du contenu des articles, je voudrais aussi remercier ceux et celles qui ont participé au succès de cette revue au cours de l'année écoulée. Si vous désirez vous joindre à nous comme examinateur pour les prochains numéros, veuillez communiquer avec nous à l'adresse suivante : www.longwoods.com/reviewer-registration/healthcare-policy.

JENNIFER ZELMER, BSC, MA, PHD

Rédactrice en chef

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Two Wings and a Prayer: Should Canada Make It Easier for Canadian Doctors Trained Abroad to Enter Practice Here?

Deux ailes et une prière : le Canada devrait-il faciliter l'entrée en pratique des médecins canadiens formés à l'étranger?

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Abstract

About 3,600 Canadians are currently studying medicine abroad (CSMAs). Most hope to return to practise in Canada. But the road back is not easy. These graduates must complete postgraduate residency training in Canada and alas, there are less openings than there are aspirants. One might have thought, amid the endless rhetoric of "physician shortages," that an obvious solution would be to increase the number of residency positions. But provincial governments are well aware, even if the media are not, that Canada is in the early stages of a dramatic expansion in physician supply fuelled by increased domestic training capacity. Last time the physician supply outpaced population growth, as it is doing today, governments choked off the entry of international graduates. It could happen again.

Résumé

Environ 3600 Canadiens étudient actuellement la médecine à l'étranger. La plupart d'entre eux espèrent pratiquer la médecine au Canada. Mais le chemin du retour n'est pas facile. Ces diplômés doivent effectuer leur formation en résidence au Canada et, hélas, il n'y a pas assez d'ouvertures. On pourrait penser, avec le discours constant qui rappelle la « pénurie de médecins », qu'une des solutions serait d'accroître le nombre de postes de résidence. Mais les gouvernements provinciaux savent bien, même si les médias l'ignorent, que le Canada en est aux premiers stades d'une expansion importante de l'offre de médecins, nourrie par un accroissement des capacités domestiques de formation. La dernière fois que l'offre de médecins a dépassé la croissance démographique, comme c'est le cas aujourd'hui, les gouvernements ont freiné l'entrée de diplômés provenant de l'étranger. Cela pourrait encore se produire.

History, it has been said, is the school of princes. Hegel, however, concluded that the only thing we learn from history is that we learn nothing from history. This would suggest that princes tend to be very poor students. That could be a problem if, indeed, "those who do not remember the past are condemned to repeat it" (Santayana 1905).

In 2010, approximately 700 Canadians obtained medical degrees outside Canada and were seeking entry to practise in Canada (Canadian Resident Matching Service 2010). The number of Canadians studying medicine abroad (CSMAs) has grown rapidly since 2000 (Canadian Resident Matching Service 2014), to the point where behind the current crop of graduates seeking practice opportunities in this country is a large and still-growing group – currently about 3,600 (Canadian Resident Matching Service 2010). The majority of them are studying at schools in English-speaking countries – predominantly the United Kingdom, Australia and New Zealand – but in 2013 there were about 30 different countries hosting CSMAs in around 130 different medical schools (Canadian Resident Matching Service 2014). The 130 schools represent an increase of 50 schools over four years (Canadian Resident Matching Service 2010, 2014). And every year, even more new schools are choosing to offer international students – North Americans in particular – the opportunity to study medicine (Shepperd 2011; Walsh et al. 2011). In part, this trend reflects the fact that a number of countries have realized that establishing a medical school that caters to "Western" standards, or expanding capacity for international students, can be a profitable export industry, a source both of foreign exchange and of high-paying employment for local elites. These schools are becoming more aggressive in their recruitment of Canadian students in particular (Shepperd 2011).

St. Andrews University in Scotland is one excellent example of this phenomenon. The school has launched a medical program that specifically targets Canadians, advertising linkages to the Faculty of Medicine and Dentistry at the University of Alberta and offering dedicated

assistance with preparation for exams and residency matches back in Canada. The program costs in excess of $250,000 for tuition alone (Queen's University 2013; University of St. Andrews n.d.).

But like the illicit drug trade, the trade in medical school spots requires eager buyers. In 2011/12 there were about 23,800 applications for the approximately 2,900 places in Canadian medical schools (Association of Faculties of Medicine of Canada 2013a). Most (about three-quarters) of CSMAs are among those behind the 88% of unsuccessful applications (Canadian Resident Matching Service 2010). In turn, 90% of them intend to return to Canada for post-graduate training (Canadian Resident Matching Service 2014).

But the road back is long and highly uncertain. A degree from an accredited medical school abroad grants a Canadian nothing more than an opportunity to go to the next step in the process – attempting to pass two entrance exams (compared to the single exam required for graduates of Canadian medical schools). The first of the two examinations, the MCCEE – Medical Council of Canada Evaluating Exam – is an assessment of an international medical graduate's (IMG) general medical knowledge that is designed to assess skills required at the level of entry into a Canadian residency postgraduate program (Medical Council of Canada 2014a). The MCCEE is a prerequisite for the second exam, required by all graduates, international or Canadian, seeking residency training, the MCCQE – Medical Council of Canada Qualifying Exam (Part I). The MCCQE tests knowledge, clinical skills and attributes for entry into supervised clinical practice within a postgraduate training program (Medical Council of Canada 2014b).

Those who successfully jump these hurdles must then compete for a spot in a minimum two-year (length depending on the choice of specialty) residency training program in Canada, the final requirement for securing a licence to practise here. Opportunities for IMGs, whether CSMAs or not, are limited. In the most recent year for which statistics are available, there were approximately 3,280 first-year residency positions funded in Canada. But the majority of these (around 2,900) are intended to ensure that all graduates of Canadian medical schools are able to complete their pre-licensure training. There is a "dedicated quota" for IMGs (which includes CSMAs), but this typically amounts to less than 10% of available slots (Canadian Resident Matching Service 2012). The highly restricted number of residency positions reserved for IMGs represents a real and present choke point for CSMAs (and other IMGs) who have Canadian practice aspirations. And CSMAs are increasing rapidly in numbers and also increasingly displacing non-Canadian IMGs in these sought-after R-1 postgraduate training spots (Walsh et al. 2011).

Why are there so few residency positions available to CSMAs? After all, is there not a serious and enduring shortage of physicians in Canada? The media keep up a steady drumbeat of such claims, studded with personal stories of people who cannot find a doctor and those whose doctor is leaving the country, changing communities or retiring. Stories of shortages in particular specialties, resulting in long waits for surgery or other services, also abound. The overall picture conveyed is of "shortage, shortage, shortage!"

And do CSMAs not represent an inexpensive solution to these problems? They are, after all, Canadian talent trained at someone else's expense (usually their own). This particular medical workforce "policy" seems patently absurd. Of course, there is no single policy at play here. The current situation is the outcome of a myriad of provincial residency position funding decisions. And residencies cost money. But that explanation is too simple by far, and everyone involved in the process understands this apparent paradox. It is not a result of people being stupid, ignorant or malicious.

An increase in residency positions sufficient to satisfy external "demand" would increase significantly the rate of growth of the Canadian medical workforce. The 3,600 current CSMAs implies an increase in the neighbourhood of about 900 additional entrants to practice per year. But of course, if one were truly to open the spigot to all interested graduates, then we might expect the number of CSMAs to balloon (recall the number of Canadians coveting a career in medicine who do not get into Canadian medical schools, the increasing availability of international medical training opportunities and the specific marketing of that capacity to frustrated Canadians).

Conspicuously scarce in the media coverage is recognition that Canada is in the process of a major expansion in physician supply from domestic sources, the effects of which are just now starting to be felt, but which will grow and be with us for decades. This is a consequence of decisions taken 20 years ago. Between 1997/98 and 2012/13, first-year enrolment in Canadian medical schools increased about 85%, from 1,577 to 2,913. This implies about 2,900+ new entrants to practice each year, until or unless the size of the domestic class changes. At the other end of the working life, for the next two decades, there will be, on average, 1,500 to 1,800 physicians retiring each year. The arithmetic is not complex; the consequences are beginning to be transparent. Over the last five years, Canadian physician supply increased 4.1% per year, which was three times faster than the growth of the population (CIHI 2012). Only those who have had their heads in the sand will be surprised by now-emerging early reports of new Canadian graduates having trouble establishing practices. This increase is not inconsistent with localized or specialty-specific shortages, but the overall numbers and trends are what they are, and what they will continue to be.

But surely there are other things going on. First, the emergence of un- or underemployed physicians appears, at this point, to be clustering in specialties such as surgery that require public investment in complementary capacity (staffed and funded operating suites) (Branswell 2013; Dempsey 2012). Second, the increasing feminization of the physician workforce means less effective physician supply because of fewer hours of work per physician (Crossley et al. 2009; Watson et al. 2006). Third, an aging population will need more doctors – and the population is certainly aging. Lastly, IMGs have always been an efficient solution to our chronic undersupply problems in rural and remote areas.

Each of these claims is found wanting when viewed through an evidence lens. Thirty years of research has consistently shown that population aging, in and of itself, will raise the need for and use of physician services by about 0.5% per year well into the future (Evans et al.

2001). Physician supply is growing far faster than that. That supply will not be overwhelmed by the coming wave of grey (though other sectors of the healthcare system – long-term and continuing care, and mental health, for example – will see dramatically increased demands).

While Canada has relied heavily on IMGs to provide medical services to rural and remote communities, physicians from abroad have, in fact, never been a sufficiently reliable and stable supply chain to represent a "permanent" solution, and only the delusional would believe that it can become so using just CSMAs. Solutions such as this for addressing the problems of attracting and retaining physicians in smaller communities in a vast geography turn out to be compelling, simple and wrong (Canadian Foundation for Healthcare Improvement 2013).

The composition of the physician workforce has, indeed, become more female. First-year entrants to medical schools in Canada are now about 56% female, and have been since 1999 (Association of Faculties of Medicine of Canada 2013c). But the more important trend here is a secular decline in physicians' hours of direct patient care over time (Crossley et al. 2009), which would seem to reinforce the claim that more physicians are needed. The inconvenient truth, however, is that even as hours of work are falling, (fee-adjusted) billings per doctor are increasing (McGrail et al.). This implies either a steady increase in activity per physician, fee creep (average fees rising faster than is reflected in the official fee increases) or both. To the extent that it reflects the first possibility, reconciliation with the claims of ever-worsening shortages will remain challenging.

As for the emerging employment problems faced by certain specialties, this is a natural consequence of different rates of growth in interconnected parts of a system. But that problem will grow more severe, and it will spread to other specialties unless provincial/territorial governments are planning to increase hospital and other components of ministry/department of health budgets sufficiently to keep up with the consequences of their decisions two decades ago on physician training capacity. And if they do not, the pressure to relax restrictions on private delivery and payment will increase apace (Fayerman 2014).

Whatever is going on, what seems incontestable is that (a) physician supply continues to grow much faster than the population; (b) physician expenditures continue to grow faster than physician supply; (c) these trends show no signs of abating; and (d) the trends are, or will be soon, a significant headache for ministers of health everywhere. From 2002 to 2007, per capita inflation-adjusted expenditures on physician services in Canada increased 18.5%. From 2007 to 2012, the increase was 17.4% (CIHI 2013). Balancing fiscal imperatives against the forces unleashed with the decisions about medical school capacity promises to be one of the most vexing challenges for healthcare policy makers over the coming decade.

It is difficult to reconcile these trends with the often-reported patient experiences in gaining timely access to some physician services. One possible explanation can be found in recent analyses from British Columbia showing a significantly increased share of physician expenditure being accounted for by dramatic growth in diagnostic services provided to the elderly, and particularly the very elderly (McGrail et al. 2011). This increase is not accounted for by increases in the numbers of seniors or in their average age.

Given these circumstances, it is difficult to imagine provincial ministers of health high-fiving the notion of opening up more residency slots for physicians trained abroad, whether or not they happen to be CSMAs. Indeed, we might do well to recall some not-so-ancient local history. We have been here before.

In 1964 the Hall Commission report projected a significant shortage of physicians (Royal Commission on Health Services 1964). That projection was based on assumptions that the baby boom would continue, and that "medicare" would result in both a dramatic increase in patient demand and significant migration south of Canadian physicians. The policy response was a significant increase in Canadian medical school enrolment: 970 first-year medical students at Canadian medical schools in 1960 increased to over 1,800 by 1975 (Association of Faculties of Medicine of Canada, personal communication, March 30, 2014). It is now well known that the population explosion failed to arrive and patient demand did not explode (and there was a war in Vietnam) – but the medical school expansion continued apace. As a result, physician supply per capita began to increase dramatically, and policy makers, scrambling to adjust, clamped down hard on the entry of foreign medical graduates in the mid-1970s (Evans 1976). They also tried, but failed miserably, to moderate the flow of domestic production. Not until 1989 did population growth finally catch up with the two-decades-earlier increase in medical school enrolment.

This stabilization of physician supply per capita in the early 1990s provided a breathing space during which some fundamental changes might have been made in how medical services are funded and delivered (Barer and Stoddart 1991). Two examples: significant changes could have been made in the way that diagnostic services are organized and paid for (Bayne 2003; British Columbia Royal Commission on Health Care and Costs 1991); more nurse practitioners could have been trained, and more flexible use (as substitutes, not complements) could have been made of them. Myriad other policy options were available to anyone serious about taking advantage of evidence available at the time.

Alas, instead, policy makers embraced new opportunities for old mistakes. They were convinced by medical school leadership that a surplus that most of them acknowledged was about to flip over, and that drastic measures needed to be taken, now. Virtually overnight, a surplus became a shortage in the common rhetoric, and beginning in about 1998, a second wave of dramatic domestic medical school expansion got underway. Hegel was right yet again.

If past history is a guide, there will not be any cuts to medical schools in Canada in the foreseeable future; and Canadian provinces' past experiences with other blunt attempts to control costs are not encouraging (Barer et al. 1996). Therefore, the only lever that beleaguered provincial ministers of health may have to constrain this whole process is to further tighten the noose around the necks of IMGs, and that will include CSMAs.

This approach is likely to be politically much more difficult this time, because a much larger proportion of those IMGs are CSMAs. They are politically organized, and they have a built-in local constituency.

So who loses this time? CSMAs stranded abroad? Taxpayers? Or does this become the proverbial straw that breaks the back of medicare?

Stay tuned, and hold on tight.

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DATA MATTERS

Adherence to Prescribing Recommendations Made on a Provincial Formulary

Suivi des recommandations pour les médicaments d'ordonnance indiquées sur un formulaire provincial

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Abstract

Guidance regarding appropriate and cost-effective use of prescription drugs is published in the Ontario Drug Benefit Formulary in the form of "therapeutic notes." We conducted a cross-sectional study of all residents of Ontario aged 66 and older who received a new prescription for one of two drugs, aliskiren or sitagliptin, between December 1, 2008 and March 31, 2012 to determine how frequently such guidance is followed. Approximately half of initial prescriptions for aliskiren and sitagliptin were prescribed in a manner that did not conform to the therapeutic note recommendations (51.4% and 49.3%, respectively). Given this high rate of non-conformance, policy makers may wish to use other mechanisms to influence prescriber behaviour to improve the quality and efficiency of healthcare.

Résumé

Les recommandations visant une utilisation adéquate et efficace par rapport au coût des médicaments sur ordonnance sont publiées dans le Formulaire des médicaments de l'Ontario sous la forme de « notes thérapeutiques ». Nous avons effectué une étude transversale de tous les résidents de l'Ontario âgés de 66 ans et plus qui ont reçu une nouvelle ordonnance pour un des deux médicaments, aliskirène ou sitagliptine, entre le 1er décembre 2008 et le 31 mars 2012 afin de déterminer à quel point les recommandations sont suivies. Environ la moitié des premières ordonnances pour l'aliskirène et la sitagliptine ont été prescrites d'une façon qui ne respecte pas les recommandations des notes thérapeutiques (51,4 % et 49,3 %, respectivement). Étant donné ce taux élevé de non-conformité, les responsables de politiques pourraient souhaiter employer d'autres mécanismes visant à influencer le comportement des prescripteurs afin d'améliorer la qualité et l'efficience des services de santé.

The optimal allocation of resources in healthcare requires that interventions be delivered judiciously (Birch et al. 1993; Mitton and Donaldson 2002). A variety of mechanisms exist to ensure that interventions are broadly available when proven efficacious and cost-effective, and restricted when not cost-effective (McMahon et al. 2006; Morgan et al. 2006). With respect to prescription drugs, the bluntest instruments are simply to deny public reimbursement or deny regulatory approval. These mechanisms are typically used when there are major safety concerns or a lack of evidence supporting efficacy, and sometimes also when a drug is extraordinarily expensive (McMahon et al. 2006). However, many medications are effective or cost-effective for some patients but not for others. In addition to subtler methods used to guide prescribing, such as clinical practice guidelines, decision support tools and educational outreach, the implementation of moderately stringent reimbursement restriction mechanisms has shown to be effective in these cases

(Marshall et al. 2006; Wettermark et al. 2010). The use of less stringent prescribing guidance embedded within a formulary has not been studied, yet is commonly used in Ontario, Canada (Laupacis 2002).

This form of guidance, referred to as "therapeutic notes" in Ontario, is published in the Ontario Drug Benefit Formulary and is primarily intended to promote cost-effective prescribing. Physicians are encouraged, but not required, to follow the guidelines provided in the therapeutic notes (MOHLTC 2013), and anecdotal evidence suggests that many medications are used in a manner that is inconsistent with these recommendations. The objective of our study was to determine how frequently such guidance is followed and to determine patient and prescriber characteristics that are associated with non-conformance – i.e., prescribing that is not in accordance with the therapeutic note recommendations.

Materials and Methods

We conducted a retrospective cross-sectional study using several linked healthcare databases in Ontario. In 2013, the province had a population of nearly 13 million residents who had universal access to hospital and physician services (Statistics Canada 2013). Almost 2 million of these residents were aged 65 years or older and received universal drug coverage that could be captured in administrative databases. Although there were approximately 200 drug products listed with therapeutic notes on the Ontario Drug Benefit Formulary at the time of this study, most simply provided information about dosing, side effects or interactions. Of those that specified a drug should be used only in specific clinical circumstances, many had clinical criteria that did not lend themselves to examination using administrative data. We selected aliskiren and sitagliptin for this study because they were the only drug products in which the therapeutic notes were stable over time and specified clinical criteria that could be operationalized using our administrative data sources. We conducted this study according to a pre-specified protocol and obtained ethics approval from the Research Ethics Board at Sunnybrook Health Sciences Centre (Toronto, Ontario).

We ascertained patient characteristics, prescriber characteristics, prescription drug use and outcome data from the records of five databases linked through the Institute of Clinical Evaluative Sciences (ICES). These include the Registered Persons Database (RPDB), which records vital status and patient demographics; the Canadian Institute for Health Information Discharge Abstract Database (CIHI-DAD), which records diagnostic and procedural information during hospital admissions; and the Ontario Health Insurance Plan (OHIP) database, which contains health claims for both in-patient and outpatient physician services. We used the Ontario Drug Benefit (ODB) database to identify prescription drug use and the ICES Physician Database (IPDB) to obtain prescriber information. The ODB database contains highly accurate records of all outpatient prescriptions dispensed to patients aged 65 years or older (Levy et al. 2003).

We established two separate cohorts of residents of Ontario aged 66 and older who filled a new outpatient prescription for aliskiren or sitagliptin between December 1, 2008 and March 31, 2012 and analyzed them separately (sitagliptin was available on formulary only from June 1, 2010). We excluded the following patients from the analysis: (a) those who received a prescription for the study drug in the year prior to cohort entry to ensure that patients included in the study were new users, (b) those in their first year of eligibility for prescription drug coverage (aged 65 years) to avoid incomplete medication records and (c) those with missing prescriber information in IPDB (this accounted for 2,243 [8.8%] records in the aliskiren cohort and 4,602 [9.6%] records in the sitagliptin cohort). We then established separate cohorts of all unique physicians who wrote the initial prescription for aliskiren or sitagliptin to patients in each respective patient cohort.

The prescribing recommendations listed on the Ontario Drug Benefit Formulary for aliskiren and sitagliptin are reported in Box 1. The maximum drug coverage for prescriptions under the Ontario Drug Benefit program is 100 days' duration. We defined non-conformance in the aliskiren cohort as the absence of a prescription for both a thiazide diuretic and either an angiotensin converting enzyme inhibitor (ACEi) or an angiotensin II receptor blocker (ARB) during the 120 days prior to the aliskiren prescription. For the sitagliptin cohort, we defined non-conformance as the absence of a prescription for metformin at the maximum dose of 2,000 mg/day during the 120 days prior to the sitagliptin prescription. We were unable to ascertain information on blood pressure control, glycaemic control or drug intolerance.

BOX 1. Therapeutic notes listed on the Ontario Drug Benefit Formulary

Aliskiren

"For patients with moderate hypertension who have not achieved blood pressure targets while on maximally optimized therapy with a thiazide-diuretic and an angiotensin converting enzyme inhibitor (ACEi) OR a thiazide-diuretic and an angiotensin II receptor blocker (ARB)." (MOHLTC 2009)

Sitagliptin

"For treatment of Type 2 diabetes in patients on maximal doses of metformin (2,000 mg/day) who have:

1. *Inadequate glycemic control (defined as HbA1c >0.07) and intolerance or contraindication to a sulfonylurea; or*
2. *A HbA1c less than or equal to 0.07 and elevated 2 hour post prandial glucose (PPG >10 mmol/L) or fasting plasma glucose (FPG >7 mmol/L) levels and intolerance or contraindication to a sulfonylurea; or*
3. *Inadequate glycemic control (HbA1c >0.07) and on maximal doses of a sulfonylurea and for whom insulin is not an option" (MOHLTC 2010)*

We analyzed data acquired from the aliskiren and sitagliptin cohorts separately. In each cohort, we used descriptive statistics to summarize patient and prescriber characteristics and determine the proportion of patients that received non-conforming prescriptions. As an exploratory analysis, we used simple logistic regression and multivariable logistic regression, adjusting for potential confounders (remaining predictor variables included in the model), to determine patient and prescriber characteristics associated with non-conformance to therapeutic notes. We used a generalized estimating equation in both cases to account for potential clustering of patient data by physician. We conducted all analyses with SAS, version 9.2 (SAS Institute Inc, Cary, NC).

Results

Among Ontarians aged 66 and older, there were 23,291 patients who received a new prescription for aliskiren and 43,196 patients who received a new prescription for sitagliptin during the study period. Characteristics of these patients are outlined in Table 1. Overall, 11,967 (51.4%) patients received prescriptions for aliskiren that did not conform to the therapeutic notes criteria; 21,308 (49.3%) patients received prescriptions for sitagliptin that did not conform to the therapeutic notes criteria.

There were 3,608 physicians who initiated patients on aliskiren and 6,421 physicians who initiated patients on sitagliptin during our study period. Among these physicians, the majority were male and approximately 80% were general practitioners or family physicians. The median number of patients initiated on aliskiren or sitagliptin per physician during the 3.3-year accrual period was two (range, 1–56) for aliskiren and three (range, 1–46) for sitagliptin. Results of the adjusted models to evaluate prescriber characteristics associated with the receipt of non-conforming prescriptions in both cohorts are reported in Tables 2 and 3. After adjustment for potential confounders, none of the observed prescriber characteristics was strongly associated with non-conformance.

TABLE 1. Characteristics of all new older users of aliskiren and sitagliptin in Ontario, Canada

Patient characteristics	Aliskiren cohort (n=23,291)	Sitagliptin cohort (n=43,196)
Demographics and health status		
Age, median (IQR)	75.1 (70.4–80.6)	73.4 (69.3–78.7)
Sex (female)	13,321 (57.2%)	20,531 (47.5%)
Income quintile		
Lowest income quintile	5,195 (22.3%)	9,334 (21.6%)
Second income quintile	5,258 (22.6%)	9,789 (22.7%)
Third income quintile	4,693 (20.2%)	8,793 (20.4%)
Fourth income quintile	4,367 (18.8%)	8,094 (18.7%)
Highest income quintile	3,710 (15.9%)	7,041 (16.3%)
Rural residence	2,123 (9.1%)	4,198 (9.7%)
Residence in a long-term care facility	483 (2.1%)	1,107 (2.6%)
Charlson co-morbidity index		
0	2,292 (9.8%)	1,204 (2.8%)
1	1,614 (6.9%)	3,183 (7.4%)
≥ 2	2,997 (12.9%)	7,396 (17.1%)
No hospitalization	16,388 (70.4%)	31,413 (72.7%)
Diabetes mellitus	8,974 (38.5%)	43,196 (100.0%)
Chronic kidney disease	2,569 (11.0%)	2,658 (6.2%)
End-stage renal disease	259 (1.1%)	–
Alcoholism	–	53 (0.12%)
Chronic liver disease	–	512 (1.2%)
Congestive heart failure	–	2,473 (5.7%)

"–" indicates that this variable was not assessed in the cohort specified.

TABLE 2. Patient and prescriber characteristics associated with the receipt of aliskiren prescriptions that do not conform to the therapeutic notes criteria

Risk factor	Unadjusted odds ratio (95% CI) (primary outcome)	Adjusted odds ratio (95% CI) (primary outcome)
Patient characteristic		
Increased age	1.01 (1.01 to 1.02)	1.01 (1.00 to 1.01)
Sex (female)	0.89 (0.85 to 0.94)	0.86 (0.81 to 0.91)
Rural residence	0.97 (0.88 to 1.07)	0.94 (0.83 to 1.08)
Residence in a long-term care facility	1.67 (1.36 to 2.05)	1.49 (1.19 to 1.89)
Diabetes mellitus	0.71 (0.67 to 0.75)	1.10 (0.92 to 1.30)
Chronic kidney disease	1.38 (1.24 to 1.52)	1.19 (1.04 to 1.37)
End-stage renal disease	2.22 (1.70 to 2.91)	1.52 (1.11 to 2.08)
Increased number of distinct drugs dispensed	0.98 (0.98 to 0.99)	0.96 (0.95 to 0.97)
Increased number of outpatient physician visits in last year	1.00 (1.00 to 1.01)	1.01 (1.01 to 1.01)
In-patient hospital admission in last year	1.33 (1.24 to 1.43)	0.95 (0.86 to 1.05)
Visit to outpatient endocrinologist in last year	0.82 (0.74 to 0.91)	0.93 (0.83 to 1.05)
Visit to outpatient nephrologist in last year	1.18 (1.06 to 1.32)	0.96 (0.83 to 1.11)
Visit to outpatient cardiologist in last year	1.06 (1.00 to 1.13)	1.02 (0.94 to 1.10)
Prescriber characteristic		
Sex (female)	0.99 (0.90 to 1.08)	1.08 (0.97 to 1.19)
Increased years of practice	1.00 (1.00 to 1.01)	1.00 (1.00 to 1.01)
Rural practice	1.00 (0.86 to 1.17)	1.01 (0.83 to 1.22)
Canadian medical graduate	0.97 (0.90 to 1.06)	0.97 (0.89 to 1.06)
Subspecialty		
Nephrologist	1.28 (1.10 to 1.49)	1.19 (0.98 to 1.43)
Endocrinologist	0.54 (0.41 to 0.72)	0.73 (0.53 to 1.01)
Cardiologist	0.84 (0.73 to 0.98)	0.83 (0.71 to 0.97)
Other specialist	1.03 (0.88 to 1.20)	1.03 (0.88 to 1.20)

Other variables included in the model: Charlson co-morbidity index, prescriptions for select drugs in last 120 days (beta-blocker, calcium channel blocker, loop diuretic, potassium-sparing diuretic, alpha-blocker, vasodilator, alpha-adrenergic agonist, acetylsalicylic acid, clopidogrel, digoxin, statin, oral antihyperglycaemic, insulin).

TABLE 3. Patient and prescriber characteristics associated with the receipt of sitagliptin prescriptions that do not conform to the therapeutic notes criteria

Risk factor	Unadjusted odds ratio (95% CI) (primary outcome)	Adjusted odds ratio (95% CI) (primary outcome)
Patient characteristic		
Increased age	1.03 (1.03 to 1.03)	1.03 (1.03 to 1.04)
Sex (female)	1.20 (1.16 to 1.24)	1.22 (1.18 to 1.27)
Rural residence	1.01 (0.94 to 1.08)	1.00 (0.91 to 1.09)
Residence in a long-term care facility	1.49 (1.31 to 1.69)	1.12 (0.96 to 1.30)
Chronic kidney disease	2.16 (1.98 to 2.37)	1.77 (1.56 to 2.01)
Alcoholism	1.29 (0.77 to 2.15)	1.12 (0.63 to 1.97)
Chronic liver disease	1.33 (1.12 to 1.59)	1.23 (1.02 to 1.48)
Congestive heart failure	1.44 (1.32 to 1.56)	1.25 (1.14 to 1.38)
Increased number of distinct drugs dispensed	0.98 (0.98 to 0.98)	0.99 (0.98 to 0.99)
Increased number of outpatient physician visits in last year	1.00 (1.00 to 1.00)	1.00 (1.00 to 1.01)
In-patient hospital admission in last year	1.30 (1.22 to 1.38)	1.02 (0.94 to 1.10)
Visit to outpatient endocrinologist in last year	0.80 (0.74 to 0.85)	0.88 (0.81 to 0.96)
Visit to outpatient nephrologist in last year	1.97 (1.80 to 2.15)	1.60 (1.41 to 1.81)
Visit to outpatient internal medicine specialist in last year	1.06 (1.00 to 1.12)	1.06 (0.99 to 1.14)
Prescriber characteristic		
Sex (female)	0.95 (0.90 to 1.01)	0.95 (0.89 to 1.01)
Increased years of practice	1.00 (1.00 to 1.00)	1.00 (1.00 to 1.00)
Rural practice	1.05 (0.95 to 1.15)	1.06 (0.94 to 1.20)
Canadian medical graduate	1.00 (0.94 to 1.05)	0.97 (0.92 to 1.03)
Subspecialty		
Nephrologist	1.66 (1.25 to 2.20)	0.98 (0.72 to 1.33)
Endocrinologist	0.75 (0.67 to 0.83)	0.96 (0.84 to 1.09)
Internal medicine specialist	0.86 (0.75 to 0.99)	0.88 (0.76 to 1.01)
Other specialist	1.06 (0.93 to 1.21)	1.03 (0.89 to 1.19)

Other variables included in the model: Charlson co-morbidity index, prescriptions for select drugs in last 120 days (sulfonylurea, insulin, alpha-glucosidase inhibitor, meglitinide, thiazolidinedione, acetylsalicylic acid, clopidogrel, statin).

Discussion

In this study of all older patients in Ontario initiating aliskiren and sitagliptin between December 1, 2008 and March 31, 2012, we found that approximately half of patients started on one of the two drugs did not meet the appropriateness criteria in the formulary, and less than one-quarter of physicians consistently followed these recommendations. These results suggest that therapeutic notes have a limited impact on physician prescribing behaviour and are in keeping with previous literature confirming that interventions relying solely on passive dissemination of information are generally ineffective (Grimshaw et al. 2001; Grindrod et al. 2006). The implication is that therapeutic notes should not be relied upon to promote safe or cost-effective prescribing.

There are several possible explanations for the lack of effectiveness of therapeutic notes demonstrated. These include vague or poorly written recommendations, lack of physician awareness of the presence of these recommendations on the provincial formulary, or absence of a requirement to attain approval for use of the drug according to the recommended clinical criteria. In cases where the desired outcome is that medications be prescribed only to patients who meet particular clinical criteria, other mechanisms such as prior authorization programs or reimbursement restriction would be more effective (Fischer et al. 2004; Grindrod et al. 2006; Wettermark et al. 2010). However, in cases where therapeutic notes simply serve to inform physicians of cost-effective and evidence-based prescribing, implementation of multifaceted interventions using computerized clinical decision support systems, prescriber feedback or educational outreach programs (also known as academic detailing) in conjunction with therapeutic notes may be more likely to improve compliance (Avorn and Soumerai 1983; Garg et al. 2005; Grimshaw et al. 2001; Grindrod et al. 2006; Hux et al. 1999; Solomon 2001). As primary care providers are initiating these drugs in over 80% of cases, interventions to modify prescribing behaviour should be specifically targeted at this group.

Given the complexity of clinical conditions and rapidly growing evidence base, physicians could conceivably rationalize use of these drugs outside of the therapeutic note recommendations based on clinical circumstances not accounted for by the notes or in response to new evidence, regardless of the strategy used to enforce them. The patient characteristics associated with the receipt of non-conforming prescriptions identified for aliskiren or sitagliptin, such as the presence of chronic kidney disease, highlight the importance of the clinical scenario. Preliminary data from the ALTITUDE (Aliskiren Trial in Type 2 Diabetes Using Cardio-Renal Endpoints) study indicating increased risk of adverse events (hypotension, hyperkalemia, non-fatal stroke) and lack of benefit among patients with type 2 diabetes and chronic kidney disease on dual renin-angiotensin system (RAS) blockade with aliskiren may have been responsible for non-conforming prescribing in the aliskiren cohort prior to its removal from the Ontario Drug Benefit Formulary in December 2012 (Novartis 2011; Ontario Public Drug Programs 2012; Parving et al. 2008). However, these new data likely had only a very small impact on our study given that the preliminary results of the trial became publicly known just three months before the end of our study period.

We were not able to identify any prescriber characteristics that were independently associated with non-conformance. While it is possible that these associations do not exist or are only weak, it is also possible that the lack of statistical significance is a result of the high degree of correlation among the predictor variables selected to include in the model, over-adjustment or insufficient statistical power. For this reason, these results should be viewed as exploratory in nature. The main limitation of our study is that we assessed only two drugs. It is possible that rates of non-conformance would be different for other medications. Another limitation of our study is that we relied on administrative data to assess drug prescribing and the use of health services. As we were not able to capture all components of the therapeutic note written in the Ontario Drug Benefit Formulary (such as blood pressure control, glycaemic control and medication intolerance), the true prevalence of non-conformance is almost certainly higher than we report.

Conclusion

Many publicly funded medications in Ontario are prescribed in a manner that is inconsistent with guidance published in the formulary. Policy makers should consider other mechanisms to promote cost-effective prescribing.

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RESEARCH PAPER

Full-Service Family Practice in British Columbia: Policy Interventions and Trends in Practice, 1991–2010

Cliniques familiales offrant des services intégraux en Colombie-Britannique : interventions politiques et tendances de la pratique, 1991–2010

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Abstract

Background: British Columbia's primary care reform (initiated in 2002) aims to promote "full-service family practice" through incentive payments and other practice support programs. Despite attention to policy, no longitudinal analysis has been conducted of the activities of BC primary care physicians.

Methods: This study employed linked administrative health data from 1991/92 through 2009/10 to describe dimensions of care from the definition of "full-service family practice" used in BC reform, grouped into four categories: access, continuity, coordination and comprehensiveness.

Results: Access, continuity and coordination of care fell over the study period ($p<0.001$). Some dimensions reflecting comprehensiveness of care declined (obstetrics and geriatric care), though the remainder did not change significantly. Overall declining trends were consistent across physician characteristics and remained significant when accounting for shifts to non–fee-for-service payment.

Conclusion: Findings suggest efforts are not achieving their intended aims. Rigorous evaluation of individual components of reform is needed.

Résumé

Contexte : La réforme des soins de santé primaires en Colombie-Britannique (amorcée en 2002) vise la promotion de « cliniques familiales offrant des services intégraux » par le biais de primes d'incitation et autres programmes de soutien aux cliniques. Malgré l'attention portée à la politique, il n'y a eu aucune analyse longitudinale sur les activités des médecins de première ligne en Colombie-Britannique.

Méthodes : Cette étude fait appel à des données administratives sur la santé de 1991/1992 à 2009/2010 afin de décrire les aspects des soins au regard de la définition des « cliniques familiales offrant des services intégraux » utilisée dans le cadre de la réforme en Colombie-Britannique, et ce, en fonction de quatre catégories : accès, continuité, coordination et intégralité.

Résultats : L'accès, la continuité et la coordination des soins ont diminué au cours de la période étudiée ($p<0{,}001$). Certains aspects liés à l'intégralité des soins ont décliné (soins obstétriques et gériatriques), bien que les autres n'aient pas connu de changements significatifs. Les tendances générales du déclin sont cohérentes par rapport aux caractéristiques des médecins et demeurent significatives si on tient compte des déplacements vers des méthodes de paiement qui ne fonctionnent pas à l'acte.

Conclusion : Les résultats laissent croire que les efforts ne permettent pas d'atteindre les objectifs visés. Il y a grand besoin d'une évaluation rigoureuse des diverses composantes de la réforme.

Primary care plays a fundamental role in the provision of healthcare and has been linked to better outcomes for patients, equity within populations and efficiency in health systems (Starfield et al. 2005). Despite this understanding, long-standing concerns persist about access to high-quality, comprehensive primary care in Canada (Starfield 2008). While the supply of general practice physicians per capita has been relatively stable (CIHI 2012), doctors report that they are providing fewer hours of direct patient care (Crossley et al. 2009; Watson et al. 2006); young doctors especially report seeking improved work–life balance (CMA Bulletin 2011). At the same time, the comprehensiveness of family practice appears to have declined as doctors abandon specific areas (such as obstetrics, anaesthesia or provision of services in hospitals, homes and long-term care facilities) (Chan 2002; Wong and Stewart 2010). The trend towards walk-in clinics has also aroused concern (Tregillus and Cavers 2011).

Provinces are taking varying approaches to improve provision of primary care. Reforms in several provinces emphasize changing the structure and organization of primary care, encouraging physicians to move to allied health teams or community clinic models of practice. Changes from fee-for-service to salaried, capitation or blended models of payment often accompany these structural reforms (Hutchison et al. 2011).

Reform in British Columbia has sought neither to introduce or support new models of care provision, nor to support an expanded role for non-physician care providers. Leaders of the reform efforts wrote: "At the heart [of the BC approach] was the conviction that the doctor–patient dyad – the trust-based long-term relationship forged over time – is the critical attribute of a successful primary healthcare system" (Tregillus and Cavers 2011). A team-based approach was rejected based on the rationale that practising GPs were not trained for this model, and that it may be difficult to apply in regions with sparse populations and shortages in healthcare human resources (Tregillus and Cavers 2011). Beginning in 2002, British Columbia introduced a number of programs to support family physicians in their existing practices, including a suite of incentive payments (Cavers et al. 2010). Fee-for-service remains the predominant payment model.

Reform is being led by the BC General Practice Services Committee, established in 2002 with a mandate "to support the provision of full-service family practice and improve patient care" (GPSC 2009). The GPSC is a joint committee of the BC Ministry of Health, the BC Medical Association and the Society of General Practitioners of British Columbia, with representatives from the province's health authorities attending meetings as guests. By far the largest investment as part of reform is the suite of new incentives for primary care physicians rolled out between 2003 and 2008, including payments for obstetrics, mental health, management of chronic and complex conditions, care for the frail and elderly and palliative care. It is estimated that these payments increased the annual incomes of participating GPs by $27,000 on average (GPSC 2012; Tregillus and Cavers 2011). In addition to incentive payments, the GPSC implemented programs aimed at improving support for physicians in their existing practices. Networks of community-based physicians are forming as Divisions of Family

Practice, intended to provide a strong collective voice, and forums for coordinated work on local healthcare priorities. The Practice Support Program, launched in April 2007, provides training and resources with learning modules on topics including practice management, mental healthcare and end-of-life care (Cavers et al. 2010; Mazowita and Cavers 2011; Tregillus and Cavers 2011).

British Columbia's approach to reform has been called "operational" rather than "structural" (Tregillus and Cavers 2011) in that it maintains the existing fee-for-service remuneration system without either forcing or encouraging structural change through new models of service provision or remuneration. Incentives are the most expensive component of this approach, but are not the only focus. The idea was that the whole suite of reforms the GPSC put in place would work together to increase the extent to which primary care physicians provide full-service care.

In documentation supporting the Full-Service Family Practice Incentive Program, the GPSC defines full-service family practice as a style of practice that includes most, if not all, of the dimensions outlined in Table 1 (GPSC and BC Ministry of Health 2010; Mazowita and Cavers 2011).

TABLE 1. Dimensions of full-service family practice as outlined by the GPSC

Dimension	Description
Health assessments*	Health and health-risk assessment
Coordination	Coordination of patient care across the spectrum of primary, secondary and tertiary care, including making referrals and acting upon consultative advice
Continuity	Longitudinal care of patients across the spectrum of their medical needs
Services for acute and chronic conditions	Diagnosis and management of acute ailments; chronic disease management, including implementation of BC guidelines
Reproductive care	Primary reproductive care, including the organization of appropriate screening
Maternity care	The provision of or the arrangement with another provider for prenatal, obstetrical, postnatal and newborn care
Mental healthcare	Primary mental healthcare
Palliative care*	Primary palliative care
Geriatric care	Care and support of the frail elderly
Services in alternative settings	Support for hospital, home, rehabilitation and long-term care facilities
Education and prevention	Patient education and preventive care
Record keeping*	The maintenance of a longitudinal patient record
Access outside office hours	An association with other practitioners that assigns patients a designated provider to contact for medical advice and/or care as appropriate, both during and outside office hours; an association that includes the use of call-group guidelines and protocols for patient follow-up
IT*	The future use of information technology systems as they become available to enhance the coordination and provision of patient care

* Not measured in this paper

At this time, we have no information on whether provision of care reflecting these dimensions changed over the period leading up to or encompassing the suite of reform efforts (beginning in 2002). In fact, despite considerable attention to primary care policy across Canada, little in the literature describes changes in the activities of primary care physicians over time. Research has described primary care physician practice cross-sectionally using surveys (Haggerty 2008; Hutten-Czapski et al. 2004; Wong and Stewart 2010) and administrative data (Glazier et al. 2009; Olatunde et al. 2007), and considerable progress has been made in the development of instruments to prospectively measure attributes of primary care (Burge et al. 2011; J. Haggerty et al. 2007). However, studies examining practice patterns over time have been more limited, using administrative data to measure comprehensiveness of services provided but not other important functions of primary care, namely, maintaining continuity and coordination of care (Chan 2002; Kazanjian et al. 2000).

This study begins to fill this gap. Using population-based and provider-specific administrative data, we operationalize dimensions of full-service family practice – the overarching target of the GPSC's reforms, as defined and promoted by the BC Medical Association and Ministry of Health Services (GPSC and BC Ministry of Health 2010). We then describe provision of healthcare services reflecting these dimensions before, during and after reform efforts, and by physician characteristics.

Methods

Conceptual framework for the analysis

Starfield describes primary care services as having four main features: first-contact access, long-term continuity (focused on the person, not disease), coordination of care among providers and comprehensiveness for most health needs (Starfield 1998). While the GPSC did not use Starfield's framework when defining the full-service family practice dimensions outlined in Table 1, there is a clear fit between the two. Because Starfield's framework has international acceptance as a way to describe primary care, we used it to help give context to the GPSC reforms and subsequently to measure these different aspects of primary care over time.

We determined that we could use British Columbia's administrative data for longitudinal measurement of 10 of the 14 dimensions outlined in Table 1. These 10 are outlined and organized into the Starfield framework in Table 2. The four dimensions not measured were health assessments, record keeping, information technology and palliative care. Providing health and health-risk assessments, including history taking, physical exam and diagnostic evaluation, are key activities of primary care physicians as first-contact care providers. While we assumed these activities to be a basic element of patient visits, we could not measure them directly. All practices keep records for billing purposes, but maintenance of a detailed and complete longitudinal record is likely variable and could not be evaluated using administrative data. Use of information technology is similarly variable and not captured in administrative data. Palliative care could not be measured because only a small subset of decedents receive specialized care that corresponds to unique fee codes, and these have changed over the study period. Finally, while prevention activities were measured using screening activities, patient

education could not be measured. The GPSC has introduced incentives to support risk assessment and education, but as these activities would previously have been billed as general visits or counselling, it is not possible to track them over time.

TABLE 2. Measurement of full-service family practice using BC administrative data

Dimensions*	Measurement using administrative data	Scoring
First-contact access for each new need		
Access outside office hours	Provision outside office hours is measured using specific fee codes. There are no data on call groups, but we assumed members of call groups would have some provision of service outside office hours.	Services outside office hours=100 No such services=0
Services in alternative settings	The number of different settings (hospital emergency department, other hospital, home, long-term care facilities) in which care was provided to any patients was recorded based on fee codes.	Office only=0, 25 per setting (All four=100)
Continuity – Long-term person-focused care		
Continuity	Percentage of total patients seen in the study year to whom the physician was major source of care (MSOC), providing 50% or more of primary care contacts	0–100
Coordination and referral		
Coordination	Percentage of total patients seen in the study year who saw fewer than four other individual GPs (for outpatient care only)	0–100
Comprehensive for most health needs		
Services for acute and chronic conditions	We classified care as acute or chronic using Johns Hopkins Aggregated Diagnosis Groups. We report the ratio of acute/chronic care (lower divided by higher, multiplied by 100). A score closer to 100 indicates more equal provision of acute and chronic care.	0–100
Reproductive care	Percentage of women aged 18–74 provided Pap testing in study year, based on fee codes (multiplied by 3, as not indicated annually)	0–100
Maternity care	We used fee codes to determine whether physicians provided pre- or postnatal care, or both provided such care and supported delivery	No maternity care=0, Pre/post only=50, Pre/post and delivery=100
Geriatric care	Physician provided two-thirds or more of primary care contacts to patients ages 75+ who received a minimum of 3 contacts	Yes=100, No=0
Mental healthcare	Provision of mental health services to any patients, as determined by ICD codes (290–319)	Yes=100, No=0
Education and prevention	Average percentage of adults aged 45+ receiving glucose and lipid testing, based on fee codes (multiplied by 3, as not indicated annually). Education could not be measured directly.	0–100

Note: Dimensions from the GPSC's definition of full-service family practice (GPSC and BC Ministry of Health 2010), organized using elements of primary care outlined by Starfield (1998). More details on measurement, including specific fee codes used, are in Lavergne et al. 2013.

All dimensions were measured on a scale from 0 through 100 (Table 2). We calculated a composite summary score with equal weighting (0.25) for each of Starfield's four features of primary care (first-contact access, long-term continuity, coordination of care among providers and comprehensiveness) in order to make comparisons across time and physician characteristics. Starfield provided a broader framework for measurement, as simply tallying scores across the 10 measures would mean that comprehensiveness of care would dominate

(because there are multiple dimensions), even though it is only one of four features of primary care. Resulting summary scores also range from 0 through 100, where 0 means the physician's practice included none of the dimensions of full-service family practice. Alternative weighting schemes were explored in sensitivity analysis, and observed changes in summary scores remained significant. Additional details on the measurement of each dimension, including specific fee codes used, are summarized in an online working paper (Lavergne et al. 2013).

Data sources and study population

We used British Columbia's Medical Services Plan (MSP) physician payment files for fiscal years 1991/92, 1996/97, 2001/02, 2004/05 and 2009/10, linked to patient registry files containing demographic information for all persons eligible to receive publicly funded healthcare services through MSP (British Columbia Ministry of Health 2012, 2013a, 2013b). The period begins with the earliest available consistently coded data (1991/92) and ends with the most recent available data. The study period also includes years before (1991/92 through 2001/02), during (2004/05) and after (2009/10) major reform efforts (2002–2008, though some changes are ongoing).

We obtained data on physician demographics, practice location, location of training and specialty from the College of Physicians and Surgeons of British Columbia. All files are maintained by the BC Ministry of Health and were linked and accessed through Population Data BC. Unique, study-specific codes for both patients and physicians enabled detailed analysis without the possibility of identification of specific individuals. Study variables were developed from patient-level data, but all analyses were conducted at the physician level. We removed the effect of fee changes over this period by valuing services provided in all years at the fee levels in effect on April 1, 2005, yielding fee-adjusted expenditures. The UBC Behavioural Research Ethics Board provided approval for this research.

We examined all family or general practice physicians registered with the BC College of Physicians and Surgeons in each of the study years (3,726 in 1991/92, increasing to 5,176 in 2009/10). Some of the analysis relies on counting contacts between patients and physicians. For our purposes, a "contact" is defined as a unique physician/patient/date combination, regardless of how many services were provided on that day. Telephone calls, completion of documentation/forms and other indirect patient care that would not involve an in-person meeting were not included when determining contacts (telemedicine consultations by primary care providers were not funded during the period of our study). Because British Columbia has no formal rostering of patients with physicians, we considered patient attachment to physicians in three ways. First, we counted all unique patients seen over the course of a year, regardless of number of times or the number of other physicians those patients saw. Counts of patients for whom a physician was the "majority source of care" (MSOC) required the physician to provide half or more of the primary care contacts received by the patient in question. Patients with only one contact are assigned an MSOC, but patients with an equal number of contacts from more than one physician cannot be assigned. Counts of patients for whom a

physician was the "usual provider of care" (UPC) required patients to have had a minimum of three contacts in the year and for that physician to have provided a minimum of two-thirds of those primary care contacts.

We excluded physicians without billings in every quarter (who may be entering or leaving practice, n=703 in 2009/10; see Appendix for complete counts), those with more than 15,000 annual patient contacts (corresponding to more than 60 patients per day, 250 days per year, n=53), those with more than 50% of contacts with known location in hospital (who may be hospitalists, n=569), those billing alternative payment plan shadow billing codes (for whom we are missing some amount of patient service activity in the fee-for-service data, n=57) and those with less than $50,000 in annual billings (which may include physicians receiving supplementary income through salary or sessional arrangements, n=355). We undertook sensitivity analyses to ensure that these exclusions did not account for changes observed over time (described below).

Analysis

We calculated scores by both year and physician characteristics. We report average annual change and the *p*-value for the trend over time (based on Pearson's correlation). We used ANOVA to determine whether scores varied according to physician characteristics (reported here for 2009/10 data only).

An increasing percentage of BC physicians are being paid through alternative payment plans (APPs). Exclusion criteria were designed to remove these individuals from analysis, as the services they provide are not fully captured in fee-for-service data. One possible threat to the validity of the findings is that "full-service" physicians have differentially moved to APPs, resulting in a decline in scores among physicians retained in analysis (but no actual change to the services received by BC residents). To investigate whether this factor might have influenced our results, we performed a simple but conservative sensitivity analysis. We re-calculated changes in scores with the very strong assumptions that (a) all physicians excluded with APP billings or low billings and (b) all physicians excluded for any reason would have had scores of 100 (see Appendix 1 at www.longwoods.com/content/23782).

Results

The total number of physicians included in the analysis increased from 2,732 in 1991/92 to 3,429 in 2009/10. Consistent with the introduction of incentives as part of reform, total (2005/06 constant-dollar) payments increased to $223,708 in 2009/10 from $204,503 in 2001/02, while the number of contacts fell slightly in 2009/10 (Table 3). The number of unique patients seen by each physician was highest in the most recent decade, though the number of patients to whom physicians were usual provider or majority source of care decreased over time. The proportion of female physicians increased, while the percentage of physicians aged 44 and under decreased. Graduates of international medical schools increased as a percentage of total primary care physicians.

TABLE 3. Characteristics of BC primary care physicians over the study period

	1991/92	1996/97	2001/02	2005/06	2009/10
n (# physicians included)	2,732	3,190	3,189	3,201	3,429
Physician practice characteristics (mean, SD)					
Total billings ($)	209,946 (82,717)	202,950 (79,733)	204,503 (85,117)	209,292 (90,927)	223,708 (105,002)
Total # of contacts	5,858 (2,417)	5,786 (2,471)	5,925 (2,627)	6,035 (2,832)	5,771 (2,837)
# unique patients	1,831 (867)	2,017 (1,112)	2,086 (1,184)	2,175 (1,305)	2,154 (1,321)
# patients receiving >50% of primary care (MSOC)†	754 (754)	718 (718)	716 (716)	698 (698)	673 (435)
# patients receiving >2/3 of primary care* (UPC)	467 (467)	427 (427)	428 (428)	417 (417)	399 (309)
Physician demographics (n, %)					
Female	629 (23.0)	897 (28.1)	956 (29.8)	1,018 (31.3)	1,178 (34.3)
Age group					
<40	1,081 (39.6)	1,110 (34.8)	815 (25.4)	570 (17.5)	507 (14.7)
40–44	546 (20.0)	591 (18.5)	583 (18.2)	556 (17.1)	386 (11.2)
45–49	444 (16.3)	570 (17.9)	563 (17.5)	583 (17.9)	598 (17.4)
50–54	218 (8.0)	437 (13.7)	529 (16.5)	537 (16.5)	591 (17.2)
55–59	201 (7.4)	197 (6.2)	392 (12.2)	494 (15.2)	530 (15.4)
60–64	143 (5.2)	161 (5.1)	162 (5.1)	307 (9.4)	453 (13.2)
65+	99 (3.6)	123 (3.9)	166 (5.2)	203 (6.2)	374 (10.9)
Years in practice					
<5	404 (14.8)	307 (9.6)	159 (5.0)	95 (3.0)	107 (3.1)
6–10	437 (16.0)	613 (19.2)	422 (13.1)	292 (9.1)	273 (7.9)
11–20	1,000 (36.6)	1,047 (32.8)	1,120 (34.9)	1,073 (33.5)	890 (25.9)
21–30	540 (19.8)	842 (26.4)	975 (30.4)	970 (30.2)	1,088 (31.6)
31+	350 (12.8)	379 (11.9)	534 (16.6)	777 (24.2)	1,081 (31.4)
Place of graduation					
UBC	936 (34.3)	1092 (34.2)	1097 (34.2)	1035 (32.3)	1,054 (31.2)
Other Canadian medical school	1,109 (40.6)	1,326 (41.6)	1,308 (40.8)	1,273 (39.7)	1,277 (37.8)
International medical school	687 (25.2)	771 (24.2)	805 (25.1)	900 (28.1)	1,049 (31.0)
Health authority					
Vancouver Coastal	462 (17.0)	549 (17.3)	562 (17.6)	613 (18.9)	661 (19.2)
Fraser Health	698 (25.7)	853 (26.9)	864 (27.1)	882 (27.2)	916 (26.7)
Vancouver Island	823 (30.3)	934 (29.5)	914 (28.7)	889 (27.5)	911 (26.5)
Interior	552 (20.3)	637 (20.1)	657 (20.6)	649 (20.0)	735 (21.4)
Northern	181 (6.7)	198 (6.2)	189 (5.9)	205 (6.3)	211 (6.1)

† Majority Source of Care (MSOC): Physician provided 50% or more of primary care contacts to the patient in question. Patients with an equal number of contacts from two or more physicians cannot be assigned.

* Usual Provider of Care (UPC): Physician provided two-thirds or more of primary care contacts. Patients must have a minimum of three contacts in the study year.

Note: Data were missing for some physician characteristics. Sex: 1 missing in 2009/10. Age: 1 missing in 2005/06. Years in practice: 1 missing in 1991/92 and 2001/02, 44 in 2005/06. Place of graduation: 43 missing in 2005/06, 59 in 2009/10. Health authority: 16 missing in 1991/92, 18 in 1996/97, 24 in 2001/02, 13 in 2005/06 and 5 in 2009/10.

TABLE 4. Change in dimensions of full-service family practice over time

Dimension	Score					Average annual % change		Total % change	*p*-value (trend)
	1991/92	1996/97	2001/02	2005/06	2009/10	1991–2002	2002–2010	1991–2010	2002–2010
First-contact care									
Access outside office hours									
% billing outside office hours	95.8	90.9	79.4	68.8	58.9	-2.1%	-3.7%	-38.5%	<0.001
Services in alternative settings									
% in homes	92.3	87.9	76.2	67.5	55.3				
% in nursing homes	74.7	71.5	69.8	64.9	57.7				
% in hospital (ER)	85.4	79.2	64.7	52.3	41.9				
% in hospital (non-ER)	99.3	98.4	91.7	86.5	82.6				
% in office only	0.5	0.9	4.9	8.0	10.5				
% in all four settings	64.6	58.7	45.8	34.7	22.6				
Mean score	87.9	84.2	75.6	67.8	59.4	-1.7%	-3.0%	-32.5%	<0.001
Long-term person-focused care									
Continuity									
% MSOC patients	45.8	41.2	40.2	38.1	36.6	-1.4%	-1.2%	-20.0%	<0.001
Coordinated care									
% patients seeing <4 physicians	67.6	63.0	61.2	58.0	55.8	-1.1%	-1.2%	-17.5%	<0.001
Comprehensive for most health needs									
Service for both acute and chronic conditions									
Mean % chronic contacts	23.7	24.5	27.2	29.0	30.8				
Mean % acute contacts	36.5	34.7	31.1	30.7	29.7				
Mean score	58.2	61.0	64.8	65.4	64.5	1.2%	-0.1%	10.9%	0.988
Maternity care									
% no obstetrical/maternity	13.3	16.7	26.0	33.5	39.3				
% pre-/postnatal and delivery	66.8	52.2	31.4	23.8	20.5				
Mean score	76.7	67.8	52.7	45.2	40.6	-4.1%	-3.2%	-47.1%	<0.001
Mental healthcare									
% with mental health contacts	98.0	97.8	98.1	98.3	98.9	0.0%	0.1%	1.0%	0.989
Geriatric care									
% with "usual patients" aged 75+	94.4	94.7	93.0	92.2	90.9	-0.2%	-0.3%	-3.7%	0.002
Reproductive care									
Female patients (aged 18–74) receiving pelvic exams	23.5	23.4	25.0	26.1	25.0	0.7%	0.0%	6.4%	0.959
Disease prevention									
Patients (aged 18–74) receiving screening tests	39.4	42.5	56.7	60.6	61.0	4.1%	0.9%	54.9%	0.998
Overall summary score*	67.6	64.1	61.0	57.2	53.7	-1.1%	-1.6%	-20.5%	<0.001

* Weighted average of individual dimension scores (equal weighting of 0.25 for each of first-contact care, long-term person-focused care, coordinated care and comprehensive for most health needs)

We found marked reductions in most dimensions of full-service family practice (Table 4). The overall summary score fell over 20% across the study years ($p<0.001$). The average annual percentage change between 2001/02 and 2009/10, the period of primary care investment, was slightly larger (-1.6%) than between 1991/92 and 2001/02 (1.1%).

The percentage of primary care physicians providing care outside of office hours fell from 95.8% in 1991/92 to 58.9% in 2009/10. Physicians providing care in all four out-of-office settings (emergency care in hospital, other hospital, home, long-term care facility) fell from 64.6% to 22.6%. The average percentage of patients for whom physicians were the majority source of care fell from 45.8% to 36.6%. The percentage of patients who received care from fewer than four unique primary care physicians fell from 67.6 to 55.8. All these declines were statistically significant at $p<0.001$ and persisted throughout the study period.

On dimensions reflecting comprehensiveness of care, trends were more varied (Table 4). The percentage of primary care physicians providing pre- and postnatal care and also performing deliveries fell from 66.8% to 20.5%, while the percentage performing no maternity care rose from 13.3% to 29.3%. There was a slight reduction in physicians acting as the usual provider of care to patients aged 75 and over (94.4% to 90.9%). Pap testing, glucose screening and lipids screening increased slightly over the study period, as did care for chronic relative to acute conditions. However, increases were greatest in the period preceding reform and did not reach statistical significance.

Summary scores varied significantly based on physician characteristics ($p<0.001$ for all examined variables; only 2009/10 significance tests reported (Table 5). On average, scores were higher among male physicians, though total percentage of change was almost equal for both sexes (-20.1% female, -20.0% male). While scores are lowest among the youngest and oldest physicians, declines were observed among all age groups. Physicians graduating from BC medical schools had slightly higher scores in all years, and a smaller total percentage change than graduates from elsewhere in Canada or international graduates (-18.7% for UBC graduates compared to -21.4% for other Canadian graduates, and -21.1% for international graduates). While in 1991/92 scores were fairly constant across health authorities (if anything, higher in more urban Vancouver Coastal, Fraser Valley and Vancouver Island health authorities), declines were more rapid in these more urbanized areas, and so by 2009/10 the predominantly rural Interior and Northern health authorities had higher average scores.

TABLE 5. Mean full-service family practice score by physician characteristics

	Summary score					Total % change	p-value (trend)	p-value (ANOVA across groups)
	1991/92	1996/97	2001/02	2005/06	2009/10	1991/92–2009/10	1991/92–2009/10	2009/10
Gender								
Female	65.4	62.8	59.2	55.3	52.2	-20.1%	<0.001	<0.001
Male	68.2	64.6	61.7	58.1	54.6	-20.0%	<0.001	
Age group								
39 and under	63.9	60.0	56.5	52.4	50.6	-20.9%	<0.001	<0.001
40–44	69.3	65.5	61.3	57.6	52.7	-23.9%	<0.001	
45–49	69.5	67.1	63.0	58.2	55.2	-20.5%	<0.001	
50–54	70.8	66.9	64.4	59.9	55.2	-22.0%	<0.001	
55–59	71.4	66.9	63.9	59.7	56.8	-20.5%	<0.001	
60–64	71.6	67.6	61.4	58.4	54.0	-24.6%	<0.001	
65+	68.3	61.1	57.1	52.3	49.8	-27.2%	<0.001	
Years in practice								
<5	59.2	55.7	50.7	49.2	47.3	-20.0%	<0.001	<0.001
6–10	66.1	61.0	56.8	53.3	51.1	-22.6%	<0.001	
11–20	69.1	65.4	61.4	56.9	52.7	-23.7%	<0.001	
21–30	70.0	66.9	63.6	59.6	55.9	-20.2%	<0.001	
31+	70.9	65.9	61.8	57.7	53.7	-24.2%	<0.001	
Place of graduation								
UBC	68.4	65.3	62.7	59.4	55.6	-18.7%	<0.001	<0.001
Other Canadian school	66.4	62.9	59.6	55.5	52.2	-21.4%	<0.001	
International	68.2	64.5	60.9	57.6	53.8	-21.1%	<0.001	
Health authority								
Vancouver Coastal	68.3	64.3	60.6	57.1	52.6	-23.1%	<0.001	<0.001
Fraser Valley	67.8	62.7	59.2	55.1	51.7	-23.8%	<0.001	
Vancouver Island	67.5	65.2	62.0	57.6	53.2	-21.2%	<0.001	
Interior	66.9	64.6	62.3	58.8	57.2	-14.5%	<0.001	
Northern	66.1	64.0	63.7	61.7	59.0	-10.8%	<0.001	

Note: Data were missing for some physician characteristics. Gender: 1 missing in 2009/10. Age: 1 missing in 2005/06. Years in practice: 1 missing in 1991/92 and 2001/02, 44 in 2005/06. Place of graduation: 43 missing in 2005/06, 59 in 2009/10. Health authority: 16 missing in 1991/92, 18 in 1996/97, 24 in 2001/02, 13 in 2005/06 and 5 in 2009/10.

In both scenarios of sensitivity analyses (first assuming that all physicians excluded with APP billings or low billings would have had scores of 100, and then that all physicians excluded for any reason would have had scores of 100), significant declines were still observed (see Appendix). As expected, the magnitude was smaller (-15.8%, $p<0.001$ with low/APP billers=100; -9.1%, $p=0.001$ with all excluded=100).

Discussion

Over the past decade, Canadian provinces have implemented major reforms in primary care policy. It is estimated that more than $1 billion has been invested in primary care reform in British Columbia (GPSC 2012). Pre-existing trends in practice patterns in the province have not changed following these investments, though we do not know what would have happened in the absence of reform. We found major declines in most dimensions of "full-service family practice." Significant declines are seen among all physician groups, but differences in practice patterns remain across age groups, sex of practitioner and health authority, findings consistent with previous studies (Glazier et al. 2009; Hutten-Czapski et al. 2004). This lack of change coincides with an approximately $20,000 increase in average (fee-adjusted) billings observed between 2001/02 and 2009/10, the period during which incentive payments were introduced.

As with any analysis of administrative claims data, our study has limitations, especially pertaining to the measurement of practice patterns (and given the need to find comparable measures across study years). For example, we could measure only relational continuity with an individual provider (Haggerty et al. 2003) and the provision of services in the context of individual physician–patient pairs. Some (an unknown number of) BC primary care physicians do practise in groups and share in the care of patients. The individual patient–physician dyads, however, are the focus of British Columbia's reform efforts. While relevant to the province's policy environment, this focus does limit generalizability. We could also examine only the presence or absence of care as indicated in fee-for-service records (care outside office hours, in alternative settings, maternity, mental health, reproductive care and preventive screening). We could not assess quality, nor could we examine health-risk assessment, patient education, record keeping or use of information technology.

A threat to the validity of our findings is that fee-for-service data do not completely capture services provided. Our sensitivity analysis is extremely conservative, and we do not believe it is possible that a shift to alternative payment schemes can account for the changes we observed. While in other provinces primary care reform was accompanied by new funding models implemented provincewide, this is not the case in British Columbia. A small subset of physicians do not bill fee-for-service, but these are unique instances, often with special populations (e.g., Vancouver's Downtown Eastside) or specific geographic areas (e.g., some northern communities), and these physicians would not be providing care to patients who normally see doctors on a fee-for-service basis. No policy developments or funding arrangements have arisen that would have offset the fee-for-service declines observed, nor has there been support for other health professionals to provide primary care services previously provided by fee-for-service physicians.

We also examined the BC results of the National Physician Survey (NPS 2004, 2010). Consistent with our findings, the percentage of physicians reporting they work in hospitals, emergency departments and nursing homes fell between 2004 (the earliest year available) and 2010 (56.7% to 54.7% for hospitals, 23.1% to 21.2% for emergency departments and 32.9% to

23.6% for nursing homes). The percentage providing intrapartum care also fell between 2004 and 2010, from 18% to 12.9%. For all dimensions where there were comparable measures on the 2010 NPS (provision of services in hospitals, emergency departments and nursing homes; provision of intrapartum care; provision of care for patients aged 75+; provision of care for patients with mental illness), we found higher percentages based on 2009/10 administrative data. This finding may be due in part to our exclusion criteria, which removed from analysis physicians who were not likely to be in regular community practice, but it provides reassurance that we have not systematically undercaptured service provision. Differences may be present also because the NPS has a low and declining response rate of 35.2% in 2004 and 17.8% in 2010. In addition, the NPS provides some information on dimensions we were unable to capture administratively. In 2010, 50.5% of NPS reported offering palliative medicine, up from 41.4% in 2004. Also in 2010, 54.2% reported using electronic records (either alone or in combination with paper), though comparable data were not available in 2004.

The construction of the scoring and index used in this analysis is, by definition, arbitrary. We used Starfield's accepted definition of care to frame our approach but still made many decisions about measurement and scoring. Whatever limitations exist in this approach, they were at the very least consistently applied across all years and therefore cannot explain the trends observed.

British Columbia's primary care reform efforts were predicated on the idea that the doctor–patient dyad is central to the provision of primary care, and that improvements could be made through "operational" modifications to the existing fee-for-service payment system. The full rationale for this policy direction is uncertain and has not been defended. Cited reasons for discarding team-based models, namely, the fact that physicians were not trained to work in teams and that these models may not be well suited to sparsely populated areas (Mazowita and Cavers 2011; Tregillus and Cavers 2011), are neither unique to British Columbia nor insurmountable. It is perhaps also worth noting that reform efforts were managed, in large part, by the BC Medical Association (now Doctors BC), which may explain the physician focus.

Trends should give policy makers pause that the overarching objective of promoting full-service family practice has not been achieved. The present analysis reveals that the full range of services outlined as part of full-service family practice is no longer being provided within the context of the doctor–patient dyad. Reform efforts did not forestall or reverse these changes (as of 2009/10), calling into question whether this "operational" approach has achieved the transformative change that has been claimed elsewhere (Cavers et al. 2010; Mazowita and Cavers 2011). More focused examination of the impact of individual components of British Columbia's primary care reform on relevant patient-level outcomes is still needed. This should include incentive payments as well as other features of reform, the effects of which might only now be visible.

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RESEARCH PAPER

A Scoping Review of Appropriateness of Care Research Activity in Canada from a Health System-Level Perspective

Étude de la portée des activités de recherche sur la pertinence des soins au Canada, du point de vue du système

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Abstract

Introduction: Jurisdictions are increasingly focusing on appropriate use of healthcare services and interventions as a means to improve health system performance. Our objectives were to conduct a scoping review to (a) map Canadian research and related activity on system-level appropriateness of care and (b) create a resource database that could be used to inform evidence-based decision-making and future research priorities in this area.

Methods: We searched Medline, EMBASE and CINAHL databases between 2003–2013 using terms including "appropriate," "inappropriate," "health technology assessment" and "cost-effectiveness." Articles were included if they were Canadian-based and relevant to our definition. The database search was complemented by a website search of relevant Canadian organizations.

Results: 4,979 articles were identified through the literature search, and 103 articles relevant to system-level appropriateness of care across Canada were charted. Of these, 64 contained an evaluation of appropriateness, 30 used a method of cost-effectiveness or total cost impact analysis and 9 involved another methodology. The most common health service categories included drug therapy (n=40) and health service utilization (n=33). Fifty-eight websites were summarized containing material relevant to system-level appropriateness of care.

Conclusion: Our review identifies Canadian research and related activity pertaining to appropriateness of healthcare from a system-level perspective and provides a useful resource both to support evidence-based decision-making and to guide future appropriateness research.

Résumé

Introduction : Les autorités compétentes se penchent de plus en plus sur un usage approprié des services et interventions de santé pour améliorer le rendement du système de santé. Nous avons effectué cette étude afin de (a) cartographier la recherche et les activités connexes sur la pertinence des soins au niveau du système au Canada et (b) créer une base de données des ressources qui pourraient servir à éclairer la prise de décision fondée sur les données probantes et à déterminer les priorités de recherche dans ce domaine.

Méthodes : Nous avons consulté les bases de données Medline, EMBASE et CINAHL, entre 2003 et 2013, à l'aide des termes « approprié », « inapproprié », « évaluation des technologies de la santé » et « coût-avantage ». Nous avons retenu les articles portant sur le Canada et correspondant à notre définition. Pour compléter la consultation des bases de données, nous avons effectué une recherche sur les sites Web d'organisations canadiennes pertinentes.

Résultats : La recherche documentaire a permis de répertorier 4979 articles, dont 103 sur la question de la pertinence des soins au Canada. Parmi ceux-ci, 64 comprenaient une évaluation de la pertinence, 30 faisaient appel à la méthode coût-efficacité ou à l'analyse de l'impact du coût total et 9 employaient une autre méthodologie. Les catégories de services les plus abordées sont la pharmacothérapie (n=40) et l'utilisation des services de santé (n=33). Nous avons regroupé 58 sites Web comprenant du matériel sur la pertinence des soins au niveau du système.

Conclusion : Notre étude a permis de répertorier la recherche et les activités connexes qui portent sur la pertinence des soins du point de vue du système au Canada. Elle fournit également une ressource utile pour appuyer la prise de décision fondée sur les données probantes et pour orienter d'éventuelles recherches sur la pertinence des soins.

In an era of fiscal restraint and rising healthcare costs, most large health systems and third-party payers, including governments, are interested in the evaluation of the appropriateness of healthcare services. That is, are the right services being delivered to the right people, at the right time, by the right complement of healthcare providers and in the right healthcare setting? Although a common consideration in current discussions of healthcare delivery and sustainability, this concept of appropriate healthcare is not new (Brook 2004). More than 15 years ago, an Institute of Medicine national roundtable categorized healthcare quality problems based on appropriateness considerations (i.e., underuse, overuse or misuse), emphasizing the inherent relationship between quality and cost (Chassin et al. 1998). However, despite considerable interest in evaluating the appropriate use of healthcare, a consistent, operational definition of this concept has not emerged.

A 2008 scoping review by Sanmartin and colleagues explored the existing conceptual frameworks of appropriateness of care and summarized several components, including the key elements of the definition, and importantly, noted the perspective taken. In general, the definitions were clinically focused and were only from the patient and provider perspectives. Based on their review, these authors recommended that the concept of appropriate care be expanded to consider societal values and resource availability.

After a decade of steady and substantial annual increases in healthcare funding, health systems in Canada have abruptly shifted to slow healthcare spending increases. In 2003, Canadian total healthcare expenditures, in current dollars, were $124 billion and were projected to increase to $211 billion in 2013. The major cost drivers of this increase were compensation of healthcare providers, increased service utilization and an evolution in the types of services provided and used (CIHI 2013). In an attempt to rein in spending while not compromising the quality of healthcare being delivered, provincial and territorial health systems are now beginning to focus on how to assess and improve the appropriateness of care. Therefore, it is a critical time to ensure that consideration is given to the broader context for what constitutes appropriate care.

Encouragingly, we are seeing more system-level focus on appropriateness of care, particularly in Canada, by several stakeholder groups. The Council of the Federation's Health Care Innovation Working Group has repeatedly emphasized the importance of appropriateness of care in its initial work, while provincial and territorial health ministers have recently discussed appropriateness of care as relating to the proper or correct use of health services, products and resources. Appropriate use is primarily determined by analyses of evidence of clinical

effectiveness, safety and economic implications and other health system impacts (Provincial–Territorial Health Ministers' Collaboration 2013). Aligned with this expanded perspective, the Canadian Medical Association also incorporated consideration of the optimal use of resources in a recent definition of appropriateness of care (Shortt 2013).

Although many groups internationally are involved in appropriateness of care research and activity, the emerging interest in the broader contextual aspects of appropriate care necessitates country-specific perspectives and understanding of system features. With the growing appreciation in Canada for considering appropriateness of care from a system-level perspective, there is a corresponding need to understand the extent of research and related activity underway in Canada. The objectives of this scoping review were to (a) identify Canadian research and related activity on system-level appropriateness of care and (b) create a resource database that could be used to inform evidence-based decision-making and future research priorities in this area.

Methods

We conducted a scoping review (Arksey and O'Malley 2005; Brien et al. 2010) to evaluate the following research question: "What is the extent of system-level appropriateness of healthcare research and related activity in Canada between 2003 and 2013?" At the outset, we engaged experts and stakeholders for advice on defining system-level appropriateness of care, review approach and sources. Methodological details of our scoping review approach are presented below.

Stakeholder consultation

For this preliminary phase of the review, we engaged subject matter experts and other stakeholders. We identified an initial set of stakeholders through the research team's background knowledge of appropriateness of care activity in Canada and identified additional stakeholders through snowball sampling. Stakeholders were engaged in an e-mail dialogue, and some participated in telephone interviews to discuss concepts related to our review of system-level appropriateness of healthcare research and related activity in Canada.

Following the consultations, we formulated a guiding definition of system-level appropriateness of healthcare, and outlined a scoping review approach targeting peer-reviewed literature and web-based material that would best capture relevant research and related activity in Canada.

Guiding definition

Drawing on a preliminary review of the literature and our consultations with stakeholders, we defined system-level appropriateness of care as that relating to the use or non-use of a health service or intervention based on the evaluation of (a) evidence of effectiveness (including net individual health benefit and/or population net health benefit); and/or (b) economic

implications (e.g., cost-effectiveness, resource availability, sustainability); and/or (c) other health system impacts (e.g., small area variation); and/or (d) consideration of ethical implications and societal values.

Peer-reviewed literature search

We searched Medline, EMBASE and CINAHL databases using variations of the following terms: appropriate, inappropriate, healthcare delivery, health technology assessment and Canada (see Appendix 1 at www.longwoods.com/content/23773 for detailed search strategy.) Results were downloaded to Endnote (Thomson Reuters 2010) and duplicates removed.

We reviewed material for the time period 2003–2013 that aligned with federal, provincial and territorial governments' agreements on a broad set of health policy objectives and funding contributions through the 2003 First Ministers' Accord on Health Care Renewal and the 2004 10-Year Plan to Strengthen Health Care (Health Canada 2003, 2004).

SCREENING PROCESS

A two-step screening process was conducted: (a) title/abstract screening, followed by (b) screening of full-text articles. Inclusion and exclusion criteria (see below) for the title abstract screening and full-text review were similar and based on our guiding definition of system-level appropriateness of care, with additional criteria added for the full-text screening process.

Abstracts were included for a full-text review if one or more of the inclusion criteria were respected: (a) there was mention of the evaluation or impact of appropriate or inappropriate use of a health service or intervention; (b) there was mention of an analysis of effectiveness, cost-effectiveness or economic impact of a health service or intervention; and (c) there was mention of topics relevant to system-level appropriateness, including health technology assessment, small-area variation, ethical and societal implications or the names of relevant organizations. Articles were also included where the scope or focus could not be determined from the title/abstract alone and further information was required.

Studies were excluded if (a) the major jurisdiction under examination was not within Canada, (b) none of the authors were based at a Canadian institution or (c) it was apparent that key terms used in the article or the focus of the article was not related to system-level appropriateness as defined in this review. As is common with scoping reviews, we refined our inclusion and exclusion criteria as we gained familiarity with the material (Arksey and O'Malley 2005; Brien et al. 2010). In certain cases, the inclusion or exclusion criteria were modified as new themes and additional topics emerged during the screening process.

The full text of articles included in the title and abstract screening phase were retrieved by two team members (GG and YT) and reviewed in greater depth according to the inclusion/exclusion criteria. Studies that fell outside the scope of system-level appropriateness as defined in this review, or where the principal focus lay outside of Canada, were excluded. Additionally,

commentaries were excluded at this stage. Any articles that could not be retrieved electronically (following a search of two academic library electronic journal databases) were also excluded.

CHARTING

Information from the full-text screening was charted according to broad categories that were identified through the expert and stakeholder consultation and that evolved as the full-text screening proceeded. We were interested in information related to the type of health service or intervention being evaluated (e.g., was it a drug therapy, use of a health service provider, a particular procedure, a specific healthcare delivery setting such as primary care or emergency department), the type of analysis used in the evaluation (e.g., what type of appropriateness evaluation was used, what type of economic evaluation was used) and the clinical areas represented (e.g., cardiovascular care, chronic disease, mental health) or populations subjected to the intervention (e.g., primary care, paediatrics, seniors). We also wanted to know the type of system that was the setting for the evaluation: was it a hospital system, health region, province or pan-Canadian?

GREY LITERATURE SEARCH

To complement the search of peer-reviewed literature, a targeted search of websites of relevant organizations (e.g., health technology assessment agencies, provincial quality councils) was conducted. We focused on Canadian-based organizations and did systematic keyword or direct webpage searches for materials pertaining to system-level appropriateness of healthcare.

An initial list of relevant Canadian organizations and government units was drawn from Health Technology Assessment on the Net International: 2013 (Institute of Health Economics, Osteba: Basque Agency for Health Technology Assessment, and Agencias y Unidades de Evaluación de Tecnologías Sanitarias 2013). Additional organizations were searched as they appeared in the results of the initial website review, such as other Canadian organizations and networks or collaborative groups. Furthermore, we included the websites of provincial and federal departments or ministries of health, as well as other organizations recommended during our initial stakeholder consultations. Members of the research team reviewed the list and made suggestions about entities to add or delete, based on alignment of the entity's activities and the guiding definition of system-level appropriateness of healthcare.

SCREENING PROCESS

The website searching took place over the period of August to December 2013, with a minor update made in April 2014. Websites in English and French were reviewed. Two strategies for searching websites were used: (a) utilizing the websites' own search functionality (when available) to search for a standard set of terms and (b) systematically navigating for content on the website.

For the first search strategy, a pilot search was performed in which a subset of websites was reviewed using a set of keyword search terms: "appropriateness," "inappropriate," "inappropriateness," "cost-effective," "health technology assessment," "small-area analysis," "health services utilization" and "disinvestment." The terms were searched using each website's own search functionality, and search results were reviewed for the following material: publications, resource lists, resource types, initiatives, priorities, partnerships and affiliations.

Only websites with existing search functionality were subject to the first search strategy. The second strategy allowed for searching of websites without search functionality. For this approach, main pages of websites were reviewed for sub-pages related to publications, resources, activities and so on. Relevant sub-pages were reviewed for material related to system-level appropriateness of care as described by our guiding definition.

Websites were excluded from the search if they were not deemed to be Canadian organizations or did not have relevant Canadian material.

CHARTING

For charting, we used similar inclusion criteria as outlined for the peer-reviewed literature search that were based on our guiding definition of appropriateness of healthcare. The relevant material contained within the websites was summarized. Main activities related to system-level appropriateness of healthcare were noted, as were any resources available related to the topic. Demographic information such as organization name and web address was also charted.

Results

Search results

A total of 4,979 peer-reviewed articles identified through the database search went through title/abstract screening; 604 were identified for full-text screening, and 103 articles were charted as relevant Canadian academic literature pertaining to system-level appropriateness of care (Figure 1).

Overall, 73 organizations were included in our initial web-search list. Of these, 15 were excluded: 11 were excluded at the outset as not being Canadian organizations or containing any Canadian activity related to system-level appropriateness of healthcare, while the remaining four were not searched for other reasons (website not available, a duplicate link or organization folded into another organization). In total, 58 websites were searched and charted (Figure 2).

Charting results

Common themes began to emerge as charting of peer-reviewed articles evolved. These included the type of analysis used in the evaluation, the type of health service or intervention being evaluated, the clinical area or population receiving the health service or intervention and the

scope of the evaluation. These themes formed the main categories used to chart the data in this scoping review. We also charted demographic information (e.g., primary author, year, title) and a brief description of the rationale for the study. Web Appendix 2 (at www.longwoods.com/content/23773) contains the complete database of academic literature charted.

FIGURE 1. Flow chart of literature screening and full-text review

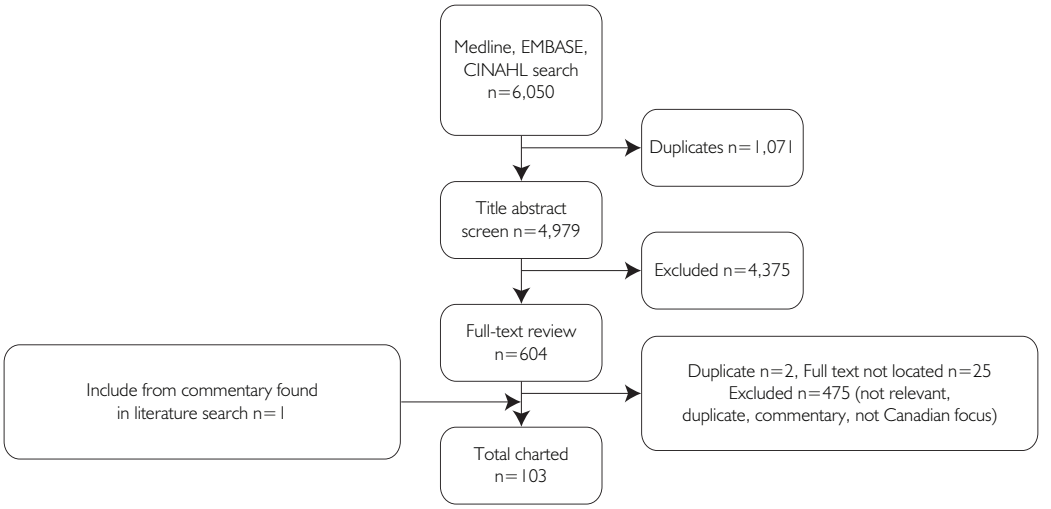
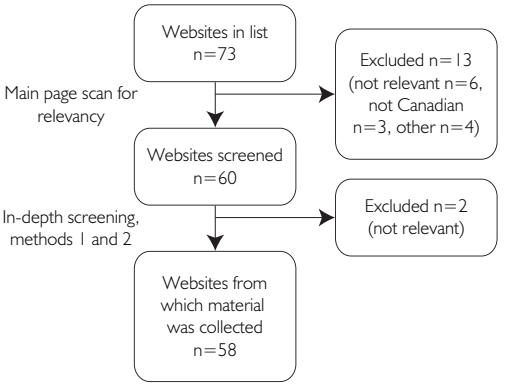


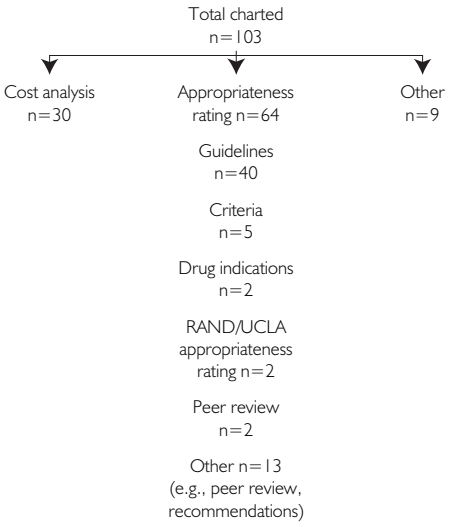
FIGURE 2. Flow chart of website searching



Of the 103 articles charted, 64 contained an evaluation of appropriateness, 30 used a method of cost analysis and the remaining nine articles used other methodologies (Figure 3). Appropriateness of care in these studies was determined using a variety of methods, including comparisons of practice to guidelines (n=40), a set of appropriateness criteria (e.g., Beers criteria, consensus statements) (n=5), comparisons of prescription patterns to drug indications (n=2), use of the RAND/UCLA appropriateness rating method (Fitch et al. 2001; Shekelle 2004) (n=2), peer review (n=2) and a combination of other methodologies such as peer review or consensus recommendations (n=13). Markov modelling was the most common

method of cost analysis used among those articles examining cost-effectiveness or cost impacts of health interventions (n=6).

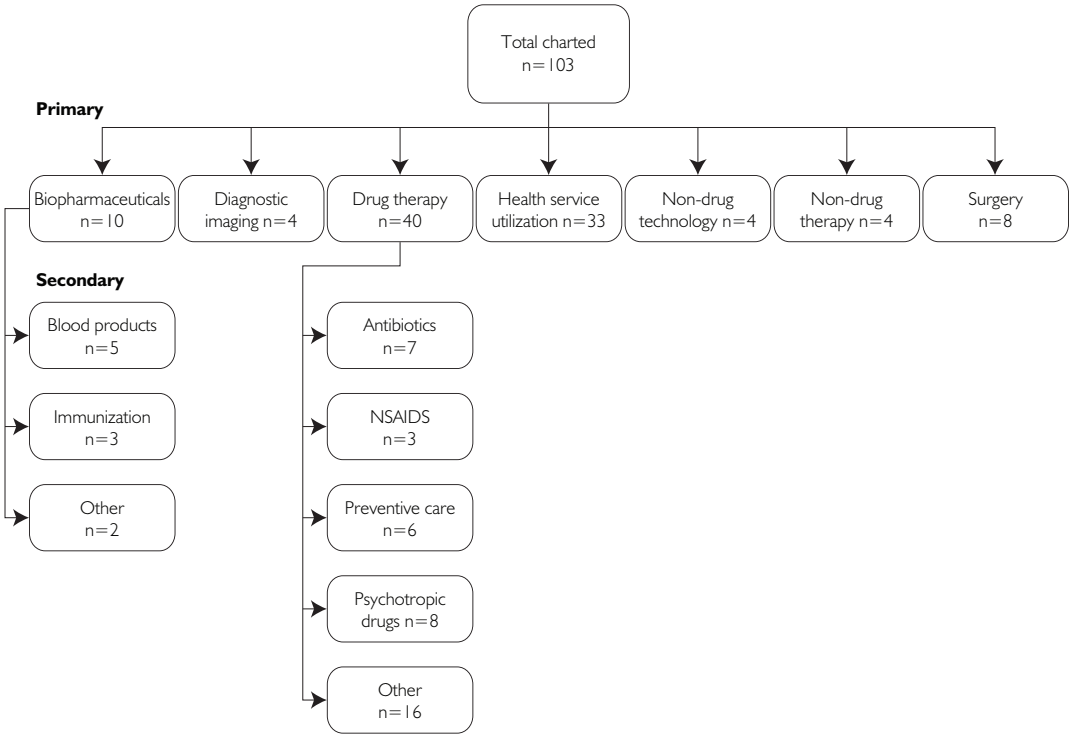
FIGURE 3. Results: sorted by analysis type



With respect to the health service or intervention being evaluated for system-level appropriateness of care (Figure 4), the two most common categories were drug therapy (n=40) and health service utilization (e.g., use of emergency departments, preventive care) (n=33). There were 14 common clinical areas identified in the included articles (Figure 5), with cardiovascular care being the clinical area with the most articles related to system-level appropriateness (n=21). A 15th category of "other," which includes a variety of clinical areas, was also identified (n=20).

In contrast, there was considerable variation in the amount of material available on the websites searched. We identified information noting considerable activity, interest and awareness in system-level appropriateness of healthcare that extended beyond traditional sources of grey literature (e.g., reports, briefing notes, slide presentations). Therefore, to fully capture the large volume and diversity of information identified during the web search, we created a database of organizations in Canada that are involved with system-level appropriateness research and related activity rather than documenting specific system-level research activities underway, which were inconsistently described. We charted the information according to the type of activity underway at the organization and the types of resources available on the websites searched. In many cases there were multiple activities underway and tools available, and this is captured in the numbers below. Web Appendix 3 contains a complete database of web-search results.

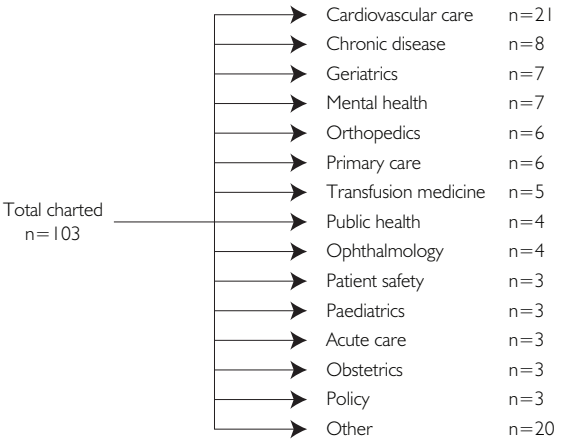
FIGURE 4. Results: sorted by health service or intervention (primary and secondary)



We categorized the activity into the following, noting numbers and definitions: health technology assessment (n=12), reviews (e.g., systematic reviews, meta-analyses or rapid reviews) (n=6), drug reviews (e.g., evaluation of evidence for inclusion or exclusion from a formulary) (n=12), non-scientific evaluations (e.g., commentaries, policy reviews or position papers) (n=14), committees/networks (e.g., groups assembled to produce reviews, or network collaborations) (n=25), methods development and/or training (e.g., for reviewing appropriateness, scientific training) (n=12), funding agency (e.g., provides research funding with targeted funding for appropriateness of healthcare research) (n=3) and quality measurement (e.g., measures healthcare quality and performance, with appropriateness of healthcare as a dimension of quality) (n=8).

Resources were categorized as reports or tools, and instances where limited information was available were noted. Reports included white papers, reports to governments, peer-reviewed publications; these could include recommendations, decisions or new methods. Tools included guidelines, performance measurement or quality frameworks, training tools or searchable databases of material pertaining to appropriateness of healthcare. In some cases the websites contained limited resources, and this was noted. Overall, 15 websites contained reports only, 14 contained tools only, 27 contained both tools and reports, and two had limited information.

FIGURE 5. Results sorted by clinical area, healthcare setting or population



Discussion

Based on a novel definition for appropriateness of healthcare that incorporates broader contextual features of the healthcare system, our scoping review mapped research and related activities on system-level appropriateness of healthcare conducted by researchers and health services organizations in Canada. This endeavour has resulted in two detailed databases that can be used to inform research, policy and decision-making for healthcare in Canada. The first database (Web Appendix 2) contains peer-reviewed research completed to date that evaluates aspects of system-level appropriateness of care in Canada. The second database (Web Appendix 3) contains a list of health services organizations involved in funding, evaluating or supporting system-level appropriateness of care research and related activities in Canada.

Some interesting themes emerged. First, the academic literature pertaining to this topic to date has focused mainly on health services utilization or drug therapies, with use in accordance to guidelines and cost-effectiveness being the most commonly used evaluations. Furthermore, cardiovascular services or interventions are currently the most commonly evaluated area from a system-level perspective. In contrast, recent focus of governments and policy makers has been on appropriate use of diagnostic imaging as a means of reducing healthcare costs (Busse et al. 2013; Canadian Foundation for Healthcare Improvement 2013; Medical Imaging Team Day Sponsor Organizations 2012). While we did identify some research related to system-level appropriate use of diagnostic imaging (Alter et al. 2006; Butler and Stolberg 2004; Kent et al. 2004; Landry et al. 2011), many related articles were excluded as they were clinically focused and did not capture the broader elements of system-level appropriateness of care as defined in this study (Butler and Stolberg 2004), may have evaluated variations in use but did not evaluate appropriateness (You et al. 2008) or were commentaries (Laupacis and Evans 2005; You 2009).

Secondly, of the academic literature reviewed that contained evaluations of appropriateness, the methods of determining appropriate care most commonly used were comparison of the care provided versus guidelines for care or other pre-determined criteria (e.g., Beers

criteria). This is in contrast to the scoping review published by Sanmartin and colleagues (2008) that found the most commonly used method of determining appropriateness was the RAND/UCLA model (Fitch et al. 2001; Shekelle 2004). This model is based on a type of group consensus, where clinical experts decide on the relative weighting of risk to benefit in a given clinical scenario. Furthermore, several limitations of this model were discussed in the scoping review of Sanmartin and colleagues (2008), including the focus of this method on clinicians' opinions and the lack of consideration of the patient or societal perspective. Given that we were focused on a system-level perspective of appropriateness of care, it is not surprising that we found limited use of this clinically focused method in our review.

Finally, from our review of web-based material, we were able to determine that many health services and related organizations in Canada note appropriateness of care as an activity of interest, whether this be conducting research, funding research, or providing recommendations or summaries. Given the volume and diversity of information identified, it is clear that there is considerable interest but also disparate and often nascent approaches to assessing appropriateness of care in Canada. This finding raises the question of whether there is opportunity for alignment of this work to reduce duplication and focus efforts on common themes that arise across the country. One promising activity that is gaining momentum in Canada is the Choosing Wisely Campaign that launched in April 2014, and which may provide a foundation for alignment.

This scoping review has several limitations that should be taken into consideration. First, scoping reviews, by their nature, do not evaluate the quality of material gathered or the rigour with which evaluations are conducted (Arksey and O'Malley 2005). Therefore, it is beyond the scope of this study to evaluate the quality of the research in Canada related to system-level appropriateness of care. Second, our guiding definition of system-level appropriateness of care focused on a specific level (i.e., the health system) of appropriateness activity, and therefore we excluded those studies that were more clinically focused. Third, our search for grey literature turned up an abundance of information and activity related to appropriateness of healthcare in Canada. However, it is likely that we missed other important sources of information, and we therefore have not fully represented the extent of system-level appropriateness of healthcare research and related activity in Canada. Finally, we chose to focus our review on work that was based in Canada; therefore, we excluded international work that can also be used to inform appropriateness work in Canada. However, aspects such as funding and geography make the Canadian healthcare system distinct from those of other countries. Thus, a focus on appropriateness research and related activity in the Canadian context is warranted.

In conclusion, system-level appropriateness of care research is underway in Canada, and many health services and related organizations are interested in studying this aspect of healthcare. At the same time, governments and policy makers across Canada are increasingly interested in delivering more appropriate healthcare in order to curb rising healthcare costs and improve the overall quality of healthcare. As such, considerable opportunities exist for more focused appropriateness of care research and related activity to meet these needs. The databases created from our scoping review can be used as resources for identifying both the

locus of relevant expertise and the key gaps in our knowledge of system-level appropriateness of care. Importantly, the information therein can facilitate the development of more collaborative efforts among groups of Canadian researchers and decision-makers to pursue needed advancements in this area.

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RESEARCH PAPER

Income and Regional Gradients in Being without a Regular Doctor: Does the Slope of Gradients Decrease for Those with Greater Health Needs?

Gradient des revenus et gradient régional liés au fait de ne pas avoir de médecin régulier : la pente des gradients est-elle moins inclinée pour ceux qui ont le plus besoin de services de santé?

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Abstract

Objective: Income and regional gradients in being without a regular family doctor have been reported. The study objective was to assess the extent to which the slopes of both income and regional gradients vary by individuals' health needs.

Method: Using the Canadian Community Health Survey and multivariate regression analyses, the study examined the income and interprovincial variations in potential access among the healthy and less healthy populations.

Results: The presence of chronic conditions was associated with lower variations in income-related potential access, with the income gradient flattening at the second-lowest income category. Similarly, the presence of two or more chronic conditions flattened interprovincial variations in potential access.

Conclusions: The results suggest a greater equity in having a regular doctor on the basis of need. Systemic changes might be needed to enhance potential access among the vulnerable segment of the population.

Résumé

Objectif : Le gradient des revenus et le gradient régional liés au fait de ne pas avoir de médecin de famille régulier ont été documentés. L'objectif de l'étude était d'évaluer à quel point la pente de ces deux gradients varie selon les besoins en services de santé des individus.

Méthode : L'Enquête sur la santé dans les collectivités canadiennes et des analyses de régression multivariable ont servi à étudier les variations de revenu et interprovinciales dans le potentiel d'accès pour des populations saines et moins saines.

Résultats : La présence d'état chronique était associée à de plus faibles variations du potentiel d'accès en fonction du revenu; le gradient des revenus est moins accentué dès la deuxième plus basse catégorie de revenus. Semblablement, la présence de deux états chroniques ou plus réduit les variations interprovinciales quant au potentiel d'accès.

Conclusions : Les résultats font voir qu'il y a plus d'équité liée au fait d'avoir un médecin régulier en fonction des besoins. Des changements systémiques pourraient être nécessaires pour accroître le potentiel d'accès parmi les segments vulnérables de la population.

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Benefits of having an established physician–patient relationship have been documented extensively. Having a regular doctor contributes to better continuity and improved patient satisfaction, improves the timeliness and comprehensiveness of preventive care, enhances adherence to treatment and averts inappropriate use of emergency departments for non-urgent conditions (Bindman et al. 1996; Ettner 1999; Gill et al. 2000; Hjortdahl and Laerum 1992; Schoen et al. 2004). By ensuring continuity of care, having a primary care provider is also associated with better management of chronic disease, better population health, fewer physician visits and hospitalizations, lower medical costs during hospitalization and lower total healthcare costs (DeVoe et al. 2003; Engstrom et al. 2001; Gill and Mainous 1998; Lambrew et al. 1996; McIsaac et al. 2001; Saultz and Lochner 2005; Xu 2002).

There is a small but growing empirical literature on the socio-demographic covariates associated with having no regular doctor (Hay et al. 2010; McIsaac et al. 2001; Nabalamba and Millar 2007; Reid et al. 2009; Talbot et al. 2001; Viera et al. 2006). Being male, a young adult, single, healthy, a recent immigrant and poor are associated with higher odds of being without a regular doctor. Regional differences are also found to be the most powerful predictors of reporting no regular physician (Talbot et al. 2001). Implicit in these studies is the assumption that the healthy and less healthy populations are homogeneous in terms of the association between socio-demographic characteristics and not having a regular doctor. More specifically, it is assumed that the slope of income gradient in lacking a regular doctor does not vary by individual health needs, i.e., patients with greater health needs are assumed to be equally less likely to have no regular doctor than the healthy subpopulation, regardless of whether these individuals are poor or non-poor. Similarly, the association between the

province of residence and being without a regular doctor is assumed to be invariant to individual health needs, with the less healthy being equally less likely to have no regular doctor than the healthy patients, regardless of the province in which they reside. Such assumptions may not hold if the perceived need for having a regular doctor varies by household income and if the delivery of healthcare services varies across provinces. Healthcare delivery and planning in Canada occur largely at the provincial level, and supply-side barriers (e.g., wait times, geographic location and hours of operation) continue to shape access to care (Sibley and Glazier 2009; Wellstood et al. 2006).

Using the 2010 Canadian Community Health Survey and an appropriate multivariate regression model, this study assessed the extent to which the strength of association between having no regular doctor, household income and province of residence was influenced by individual health needs, as measured by the number of chronic conditions while controlling for a wide range of individual-, household- and community-level factors. An examination of the income and interprovincial variations in access to physicians by the healthy and less healthy populations provides health researchers and policy makers with a more accurate picture of the population lacking a regular doctor. It also highlights the extent to which Canada's universal public health insurance system has been successful in achieving vertical equity, with those with greater health needs having greater potential access to regular primary care providers.

Methods

Data

This study utilized the Canadian Community Health Survey (CCHS 2010) data set conducted by Statistics Canada (2011a). The CCHS is a comprehensive national population survey with a cross-sectional design covering the household population aged 12 or older who lived in private dwellings in the 10 provinces and three territories, except individuals living on Indian reserves and on Crown lands, institutional residents, full-time members of the Canadian forces and residents of certain remote regions (Bland 2002). Details about the design and methods of the CCHS can be found elsewhere (Statistics Canada 2011b).

Analysis

Being without a regular doctor is influenced by a wide range of individual-, household- and community-specific factors related to (potential) access to healthcare services in the categories of contextual characteristics, needs and predisposing and enabling factors (Andersen 1995; Hay et al. 2010; Lambrew et al. 1996; Talbot et al. 2001). A multivariate logistic regression model was used as a base model to assess the association between socio-demographic and health profiles of individuals and their being without a regular physician. To assess whether income and interprovincial variations in lacking a regular doctor vary in strength across the less healthy and healthy subpopulations, the base model was extended by including two sets of interaction terms: one between income and health needs markers, and one between the

province of residence and health needs markers. Taking advantage of the comprehensive information collected by the CCHS on chronic conditions, we chose to use the number of chronic conditions rather than self-reported general health status or body mass index (BMI) as a health needs marker in our extended models. To test for the robustness of our results, BMI and self-reported health status were also correlated with income and the province of residence. Differences between point estimates on the interaction terms were tested using chi-square tests. Inserting the province of residence and shortages of physicians as region- and subregion-specific variables, respectively, into the analysis is equivalent to using a fixed-effects model, with region- and subregion-specific variables capturing variations in healthcare utilization across provinces as well as across health regions (Gravelle et al. 2003). The analysis focused on Canada's 10 provinces.

To account for the complex sampling design, data were weighted using weights constructed by the CCHS to adjust for the unequal probabilities of selection. Although the reported standard errors were estimated with robust methods, they do not fully account for the complex sampling design. The public-use version of the CCHS does not contain the information necessary to obtain bootstrapped standard error. All analyses were conducted using the statistical software Stata (version 12.0).

Measures

Access (the dependent variable) is measured by the variable "being without a family doctor." Consistent with the previous literature on the determinants of access to healthcare services, the main predictors of being without a regular doctor were identified as components of needs, predisposing characteristics and enabling factors (Andersen 1995). Three measures of needs in this study were the presence of chronic conditions, self-reported BMI and self-rated general health status. Predisposing characteristics include demographic factors such as sex, marital status, age, educational attainment and ethnic origin. Enabling factors include household income, as reported by the most knowledgeable household member, employment status and the availability of physicians. Because of the small number of observations, Canada's four Atlantic provinces were grouped into one category. Total number of individuals reported as having no regular doctor varies from as low as 72 in Prince Edward Island and 136 in Nova Scotia to as high as 235 in Newfoundland and Labrador. Because the CCHS does not provide information on resources or organization of health services systems across provinces, we used two sets of proxies for inter- and intraprovincial variations in services delivery: one for the respondent's province of residence, and one for the shortage of physicians at a health region within each province. The latter was constructed by the author from the responses given by the respondents without a regular doctor to the question of "Why no regular doctor?": "no one available in area," "not taking new patients," "doctor left or retired" or "not looked for one." Because each province is divided into health regions for administrative purposes, taking the mean of the respondents' responses to the first three parts of the question at a health region provided us with a proxy for the unavailability of physicians in health regions.

Table 1 describes and presents the summary statistics of dependent and independent variables used in the study (see Table 1 at www.longwoods.com/content/23783).

Incomplete responses, "do not know" or "refused to answer" were excluded from the analysis, reducing the sample size to 47,118. These missing observations accounted for less than 6% of the responses for each item with the exception of household income, where missing observations accounted for 17% of the sample population. A comparison of the cases included in the analysis with those excluded cases revealed few differences between the two groups in terms of their socio-demographic and health profiles in most cases. However, age differences were more noticeable for the missing data on income, with younger respondents (aged 12–19 years) being more likely to have missing data. Excluding these missing observations from the analysis is likely to bias our results if these cases are not missing randomly. To test for the robustness of our results, an additional missing category for household income was also created for respondents who did not report their household income, and it was used in the analysis.

Results

Descriptive analysis

The presence of chronic conditions was associated with variations in access related to lower income (Figure 1). For individuals reporting two or more chronic conditions, the income gradient flattened at the second-lowest income category ($20,000–<$40,000). The difference in the proportion of residents without a regular doctor between the lowest and second income categories was statistically significant at the level of 1%, using chi-square tests. The presence of chronic conditions was also associated with lower interprovincial variations in the proportion of residents without a regular doctor (Figure 2). The reduction in the likelihood of being without a regular doctor was particularly pronounced for residents of Quebec and Alberta who reported two or more chronic conditions. Residents of Ontario with two or more chronic conditions were less likely to report having no regular doctor than residents of Quebec and Alberta. Similarly, residents of the Atlantic provinces were less likely to be without a regular doctor than those in Quebec, Alberta and British Columbia. These interprovincial differences were all statistically significant at the 1% level.

FIGURE 1. Residents without a regular doctor by number of chronic conditions and household income (%)

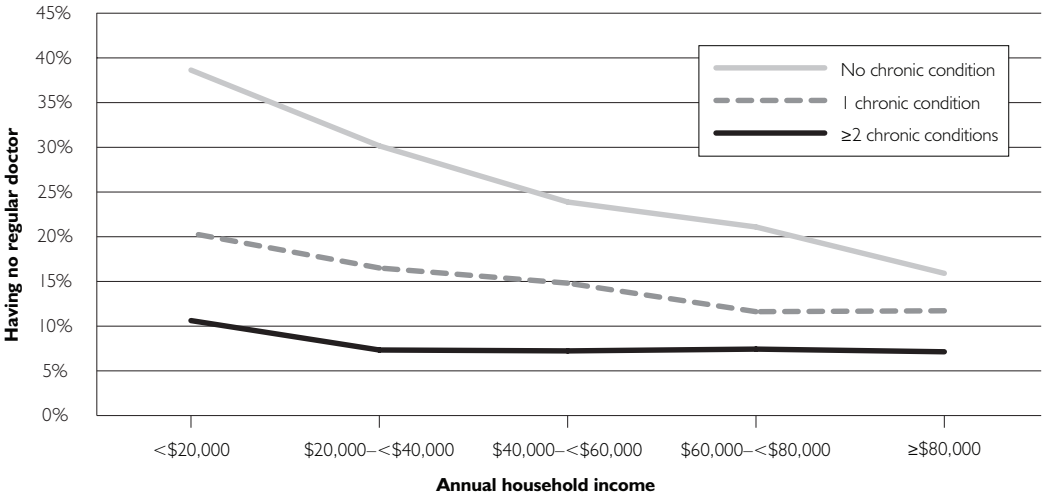
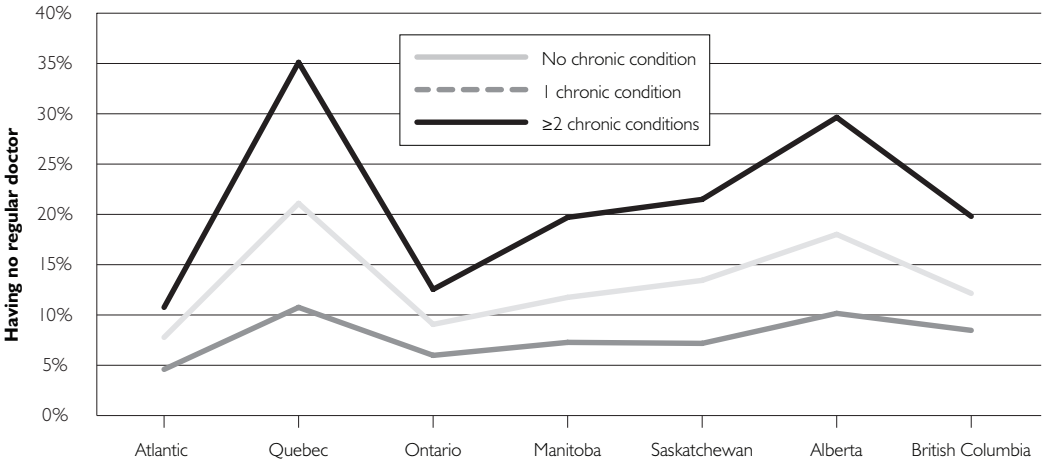


FIGURE 2. Residents without a regular doctor by number of chronic conditions and province of residence (%)



Econometric results

The regression results for having no regular doctor are presented in Table 2 (see Table 2 at www.longwoods.com/content/23783).

Being male, a young adult, single, employed, healthy and a recent immigrant increased the odds of being without a regular doctor. Larger household size and the presence of young children (aged six and younger) reduced the odds of being without a regular doctor. The estimated coefficients for household annual income and the province of residence indicated a strong income and regional gradient. The odds of reporting no regular doctor were 2.2 and 1.7 times, respectively, greater for those in the lowest and second-lowest income categories than those in the richest income category. The odds of having no regular doctor were more pronounced for Alberta, with the residents of Alberta twice as likely to be without a regular doctor than the residents of Ontario.

The results for the interaction terms are reported in Table 3. (Detailed results are available from the author upon request.)

TABLE 3. Results for interaction terms between the number of chronic conditions and income and between the number of chronic conditions and provinces

	No. chronic conditions		One chronic condition		Two or more chronic conditions	
	Odds ratios	**95% CI**	**Odds ratios**	**95% CI**	**Odds ratios**	**95% CI**
No. of chronic conditions* income (ref category: ≥$80,000)						
Income						
<$20,000	2.43**	1.79, 3.29	1.90**	1.22, 2.96	1.66*	1.13, 2.45
$20,000–<$40,000	1.94**	1.56, 2.41	1.55**	1.14, 2.10	1.23	0.87, 1.74
$40,000–<$60,000	1.50**	1.25, 1.80	1.26	0.94, 1.70	1.03	0.71, 1.48
$60,000–<$80,000	1.26*	1.04, 1.53	0.95	0.70, 1.29	1.06	0.72, 1.55
No. of chronic conditions* province (ref category: Ontario)						
Province of residence						
Atlantic	0.86	0.68, 1.103	0.88	0.57, 1.34	0.74	0.52, 1.04
Quebec	1.98**	1.62, 2.42	1.43*	1.06, 1.92	0.89	0.65, 1.21
Manitoba	1.74**	1.27, 2.39	1.20	0.77, 1.87	1.00	0.61, 1.66
Saskatchewan	1.61**	1.17, 2.24	1.31	0.84, 2.04	1.01	0.67, 1.51
Alberta	2.41**	1.88, 3.09	1.92**	1.35, 2.73	1.35	0.93, 1.94
British Columbia	1.54**	1.22, 1.93	1.42	1.00, 2.00	1.30	0.89, 1.92

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

The upper panel of Table 3 presents the estimated odds ratios for the interaction terms between household annual income and the number of chronic conditions while using the highest income group (≥$80,000) as a reference category. The results for the interaction terms between household income and no chronic condition (column 1) indicated a negative and steep income gradient, with the healthy individuals in the lowest and second-lowest income categories 2.4 and 1.9 times more likely to be without a regular doctor, respectively, than those in the highest income category. The results for the less healthy subpopulations, i.e., those with one chronic condition and those with two or more chronic conditions (columns 2 and 3), indicated that the negative association between income and being without a regular doctor became less pronounced and statistically insignificant for individuals in the middle and upper-middle income categories ($40,000–<$60,000; $60,000–<$80,000). By contrast, the estimated odds ratios remained statistically significant for those in the lowest income category, with those reporting one chronic and those reporting two or more chronic conditions 1.9

and 1.7 times, respectively, more likely to have no regular doctor than their counterparts in the richest income category. When we tested the hypothesis of the equality of the interaction terms involving no chronic condition and two or more chronic conditions, we found the differences in estimates to be statistically significant for those in the middle income categories, suggesting that the reduction in the likelihood of being without a regular doctor is greater for the residents in the middle income categories than those in the lowest income category.

The results for the interaction terms between the province of residence and the number of chronic conditions are presented in the lower panel of Table 3. The estimated odds ratios of the interaction terms between no chronic conditions and the province of residence (column 1) were statistically significant for all but the Atlantic provinces, with the residents of Alberta more than twice as likely to report having no regular doctor compared to their counterparts in Ontario (reference category). By contrast, none of the estimated odds ratios for those reporting two or more chronic conditions were statistically significant. Differences in estimates for the interaction terms involving no chronic conditions and two or more chronic conditions were statistically significant for the residents of Quebec and Alberta at the 1% level. The results were found to be robust to the use of alternative measures of health needs (self-rated BMI or general health status). All analyses were also run with the full sample using an additional income category for missing observations, and the results were all substantially the same (results available from the author upon request).

Discussion and Conclusion

This study assessed the relationship between socio-demographic and health status profiles and being without a regular doctor in Canada. Consistent with previous findings, econometric results suggest that individuals with no regular doctor were more likely to be male, younger, poor, a recent immigrant and healthy (Hay et al. 2010; McIsaac et al. 2001; Nabalamba and Millar 2007; Reid et al. 2009; Sibley and Weiner 2011; Talbot et al. 2001; Viera et al. 2006). The presence of chronic conditions reduced the odds of having no regular doctor by 32% for those with one chronic condition and by as much as 53% for those with two or more chronic conditions.

Province of residence was also a strong predictor of having no regular doctor, with the odds being particularly pronounced for residents of Alberta and Quebec. This result is also consistent with previous studies (Sanmartin et al. 2004; Sibley and Weiner 2011; Talbot et al. 2001).

However, the results for the interaction terms suggest that estimated income and regional gradients mask wide variations in these factors across the healthy and less healthy subpopulations. The presence of chronic conditions lowered considerably the slope of the income gradient in having no regular doctor, with the income gradient flattened at the second-lowest income category for those reporting two or more chronic conditions. Similarly, the slope of the regional gradient flattened for those reporting two or more chronic conditions.

These findings suggest a greater equity in having a regular doctor on the basis of the need for healthcare. However, the differential lack of potential access by those in the lowest income group suggests that universal public health insurance may not be sufficient to eliminate the gaps related to socio-economic status in potential access to healthcare. A study in the United Kingdom found that individuals in the lower income bracket were more likely to lack a regular doctor (Sweeney and Gray 1995). Socio-economic differentials in access were also reported for the use of physician services in Canada (Asada and Kephart 2007; Dunlop et al. 2000; McIsaac et al. 2001; Sanmartin et al. 2004). A multitude of financial and non-financial barriers, such as rigid work schedules and lack of child care or transportation, may inhibit access to and use of health services by lower-income families and encourage them to turn to walk-in clinics or emergency departments (Dunlop et al. 2000; Talbot et al. 2001). Given the higher prevalence of multiple chronic conditions among lower-income individuals (46% of the respondents in the lowest income group reported two or more chronic conditions versus 21% for those in the highest income group), further research is needed to examine the precise nature of barriers to access to physicians by this vulnerable population.

Some caveats are in order. The regression models do not adequately control for the supply of providers and their density, although inclusion of the province of residence and the proportion of the respondents who reported the unavailability of family physicians in the health region as a main reason for not having a regular doctor may act as a proxy for the availability of family physicians. The cross-section survey data do not allow us to control for unobserved individual heterogeneity, nor do they allow causal relationships between variables to be inferred. Finally, the outcome variable was derived from the question, "Do you have a regular medical doctor?" Some respondents with a regular site of care where they see various providers might have reported being without a regular doctor. For example, it has been suggested that residents of Quebec, where community health movements are more prevalent than in other jurisdictions, receive more care from community health clinics and so do not report having a regular doctor (Talbot et al. 2001). Similarly, some of the rural residents of the Prairie provinces who reported having no regular doctor might use small cottage hospitals and community health centres as a regular site of care (Talbot et al. 2001).

In conclusion, the results of this study provide valuable insights into income and interprovincial variations in lacking a regular doctor across the healthy and less healthy subpopulations. The observed variations across income groups and provinces become less pronounced once health needs are taken into account. However, the finding that low-income individuals with chronic conditions are less likely to have a regular doctor than their counterparts in the richest income category suggests that future primary care programs could be targeted to enhance potential access to primary care providers, particularly for vulnerable segments of the population. Some jurisdictions, such as Ontario, have already taken measures to address timely access to primary care by shifting the policy emphasis from physician supply to strategies for shared care or flexible hours, and helping those with no regular doctor to find healthcare providers (Hay et al. 2010).

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RESEARCH PAPER

"Where Do We Go from Here?" Health System Frustrations Expressed by Patients with Multimorbidity, Their Caregivers and Family Physicians

« Où va-t-on maintenant? » la frustration face au système de santé telle que décrite par les patients en situation de multimorbidité, leurs aidants naturels et leurs médecins de famille

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Abstract

Objectives: This study explored the care challenges experienced by older patients with multimorbidity, their informal caregivers and family physicians.

Approach: Semi-structured interviews were conducted with 27 patients, their informal caregivers and family physicians. Qualitative description was used to identify key themes in the interview transcripts.

Results: Participants experienced many common challenges when managing multimorbidity, including a lack of decision-making support, poor communication and uncoordinated health services. Within these themes, unique perspectives specific to the role of being a patient, caregiver or family physician emerged.

Conclusion: The study adds to a limited evidence base on the experience of patients with multimorbidity. By including the perspectives of their family caregivers and physicians, we provide important insight into the management of multimorbidity and recommend the uptake of specific strategies to address them.

Résumé

Objectif : Cette étude explore les défis vécus par les patients aînés en situation de multimorbidité, leurs aidants naturels et leurs médecins de famille.

Démarche : Des entrevues semi-dirigées ont été menées auprès de 27 patients, de leurs aidants naturels et de leurs médecins de famille. Les principaux thèmes des transcriptions des entrevues ont été dégagés à l'aide d'une description qualitative.

Résultats : Les participants éprouvent plusieurs défis communs dans la gestion de la multimorbidité, notamment un manque de soutien pour la prise de décision, de mauvaises communications et des services de santé non coordonnés. Parmi ces thèmes, il y a émergence de points de vue uniques propres aux rôles du patient, de l'aidant ou du médecin.

Conclusion : L'étude s'ajoute au peu de données fondées sur l'expérience des patients en situation de multimorbidité. En incluant les points de vue des aidants naturels et des médecins, nous apportons des pistes importantes pour la gestion de la multimorbidité et nous recommandons l'adoption de stratégies particulières pour aborder la question.

Over the last 25 years, the prevalence of chronic disease has doubled, while the proportion of individuals with four or more conditions has tripled (Uijen and van de Lisdonk 2008). With increasing age, the likelihood of being diagnosed with a chronic condition increases, as well as the number of functional limitations (Denton and Spencer 2010). Furthermore, the use of healthcare services and the number of chronic diagnoses also increase with age (Broemeling et al. 2008; Muggah et al. 2012).

Patients with multimorbidity typically require input from multiple providers across many care settings. If care is not properly coordinated, the quality of the care experience for patients

and their families can be frustrating at best and harmful at worst (Corser and Dontje 2011). Healthcare providers also experience challenges when providing care to persons with multimorbidity, given the lack of clinical practice guidelines that are available (Upshur and Tracy 2008). Much of the burden of day-to-day patient care falls to family caregivers as they engage in decision-making, monitor treatment adherence and coordinate care (Wolff 2012).

It is clear that healthcare system reform is needed, in particular, a shift from the current acute-focused model to one that encompasses chronic disease management and support for patients, their caregivers and care providers. Few studies have focused on the experience of persons with multimorbidity; the few that have tend to focus on the patient alone (Bayliss et al. 2008; Boyd et al. 2005; Loeb et al. 2003; Morris et al. 2011; Sinnott et al. 2013). Our team could identify no studies that compared and explored the challenges experienced by patients with multimorbidity, their informal caregivers and family physicians. Such a study would need to include all perspectives from the patient's circle of care to garner a full understanding of the management issues and appropriately address them. When creating primary care interventions for patients with complex chronic illnesses, a first step towards policy reform should be to understand the "core" of a patient's care team, which we define in this paper as the patient, the patient's informal caregiver and the family physician.

The objective of this study was to explore the challenges experienced by 27 patient–caregiver–family physician triads in an attempt to capture a full understanding of their health system experience and to illuminate where system improvements are most needed for managing multimorbidity.

Methods

Data collection

Eligible participants were recruited from a family health team within a tertiary academic health centre in Toronto, Ontario. Eligible patients were identified by their family physician by purposive sampling with the following inclusion criteria: 65 years of age or older, diagnosed with two or more chronic conditions, had an informal caregiver who participated in the patient's healthcare, spoke English as a first language and was able to provide informed consent. Within the family health team, a single family practice participated in the study, and consisted of four family physicians.

Two methods of patient recruitment were employed. Patients were first identified by the participating physicians during their team rounds from their patient rosters and using the study's inclusion criteria. If a patient had an upcoming clinic appointment, research associates (AG, GN) were notified to attend the clinic to identify patients who might be interested in participating. After a patient's clinic visit, the primary care physician introduced the research study if the patient met the inclusion criteria, and was in good health to manage an interview. Once patients consented for participation, their informal caregivers and family physicians were also approached for participation.

All members of the patient–caregiver–physician team had to agree to participate in order to be included in the study. If the primary care physician identified an eligible patient who was not being seen in clinic within the next month, administrative assistants phoned the patient at home, explained the research study and asked whether he or she would like to be contacted by a research associate to confirm his or her participation. The administrative assistants managed patient appointment scheduling and were considered a part of the clinical team.

Two research associates/co-authors (AG and GN) conducted the study interviews, either at a research office at the academic health centre or the patient's home, depending upon the patient's preference and ease of transportation. Interviews were conducted in English and took approximately 1.5 hours to complete. The physician and caregiver interviews took approximately 30 minutes to complete as their interview guides were shorter than the patient version. Only the interviewer and interviewee were present during the interviews. All interviews were conducted separately to ensure confidentiality of responses. The research associate read from a script prior to asking the interview questions, which consisted of an introduction of herself, a description of the study objectives and details about the informed consent process. The research associates took notes during and after the interviews, which served as secondary information if questions arose during thematic coding of the transcripts. Given the short time period for the study, transcripts were not returned to participants for comment. Interviews were digitally recorded, transcribed verbatim by an external source and checked for accuracy by the two research associates.

Semistructured interviews were conducted with all participants using an interview guide, designed by the Bridgepoint Collaboratory for Research and Innovation (Kuluski et al. 2013a), that consisted of both open- and closed-ended questions. This guide was piloted and adapted until deemed feasible for use with a complex patient population (Kuluski et al. 2013b; Kuluski et al. in press). The interview guide was adapted by the research team to include questions on care experiences within primary care, and more specifically, goals of care and frustrations experienced while managing multimorbidity.

This paper describes the themes of frustration experienced by patients with multimorbidity, their caregivers and family physicians when accessing care and meeting care goals. These themes were elicited by the questions, "Please describe any challenges you have had with accessing services in the past," and "Do you experience any frustration in achieving your health goals of care?"

Data analysis

Qualitative description was used to generate general summaries and emerging themes from participant interviews (Sandelowski 2000). Because the study was intended to capture the experiences of patients, caregivers and physicians, this approach was the most ideal for low-inference interpretation, as generating theory was not the purpose of analysis (Sandelowski 2000). Themes were derived inductively from the data and not identified in advance. Furthermore, transparency of methods and confirmability of themes were achieved by

frequent meetings and discussion of the themes until consensus was reached among three of the authors (AG, GN and KK). A detailed protocol and an audit trail of all decisions (Green and Thorogood 2009) were managed by the same three authors.

To ensure methodological rigour during data collection and analysis, the lead author (AG) consistently familiarized herself with the interview data by reading transcripts in their entirety for an initial understanding of key concepts and themes (Lathlean 2010). An initial coding scheme was developed by AG and verified by GN and KK after each researcher reviewed the first interview transcript in its entirety. Following that, data analysis was conducted simultaneously with data collection until saturation of themes occurred (i.e., when themes became repetitive within each of the patient, caregiver and physician groups). After 14 patient–caregiver–physician triads were interviewed, data were reviewed to develop an initial coding scheme. A final coding scheme was then developed for all patient, caregiver and physician transcripts after 28 triads were interviewed, as no new themes emerged.

Results

A total of 28 patient, informal caregiver and family physician triads were interviewed; however, only 27 triads were included for qualitative analysis, as one interview was incomplete (Table 1). Patients were on average 82.3 years of age (±7.7 years), mostly male (56%) and diagnosed with a median of five chronic conditions (SD=2.43). Informal caregivers were on average 70.5 years of age (±11.3 years) and mostly female (79%) spousal caregivers (82%). Most patients and caregivers had more than high school education and lived in a single-family home.

TABLE 1. Participant characteristics

Patient	Age (years)	Sex	Number of reported health conditions*	Caregiver	Caregiver relationship to patient	Caregiver age in years	Family physician
001P	86	Male	1	001C	Wife	77	001M
002P	79	Male	5	002C	Wife	77	001M
003P	79	Female	4	003C	Daughter	53	001M
004P	91	Female	4	004C	Daughter	59	001M
005P	77	Male	3	005C	Wife	74	001M
007P	85	Female	6	005C	Daughter	56	002M
008P	77	Female	12	008C	Husband	80	003M
009P	82	Male	7	009C	Wife	77	003M
010P	70	Female	5	010C	Sister	75	003M
011P	88	Female	2	011C	Friend	80	003M
012P	83	Female	2	012C	Daughter	50	001M
013P	68	Male	2	013C	Wife	68	001M

TABLE 1. Continued

Patient	Age (years)	Sex	Number of reported health conditions*	Caregiver	Caregiver relationship to patient	Caregiver age in years	Family physician
014P	79	Male	4	014C	Wife	58	004M
016P	85	Male	2	016C	Wife	91	004M
017P	84	Male	3	017C	Wife	84	004M
019P	75	Female	8	019C	Husband	73	004M
020P	93	Female	5	020C	Daughter	58	004M
023P	91	Female	4	023C	Son	62	003M
024P	88	Male	1	024C	Wife	88	001M
025P	80	Male	4	025C	Wife	74	001M
026P	67	Male	4	026C	Wife	65	001M
027P	73	Female	5	027C	Husband	77	001M
028P	81	Female	6	028C	Husband	71	001M
030P	83	Male	5	030C	Wife	79	004M
032P	87	Male	8	032C	Wife	87	004M
033P	94	Male	4	033C	Daughter	61	002M
034P	96	Male	8	034C	Daughter	63	004M
035P	84	Male	5	035C	Daughter	58	002M

* As a part of the inclusion criteria, patients with more than one health condition were identified by physicians or administrators. However, two of the patients reported only one health problem during the interview and were still included in the study.

Patients, their informal caregivers and family physicians expressed both system- and patient-level frustrations (Table 2). System-level challenges identified by participants included lack of efficient and timely information from healthcare providers and poor communication between care providers. Patient-level frustrations included challenges with managing multiple diseases and symptoms, and adherence to treatment recommendations. Table 2 outlines each of the system- and patient-level challenges and the participant who identified them.

TABLE 2. Patient, caregiver and physician themes

	System-level challenges					Patient-level challenges		
	Poor communication	Lack of care coordination	Rotation of medical trainees	Long wait times	Access to care	Care management	Lack of adherence	No frustration
Patient	✓	✓	✓	✓		✓		
Informal caregiver	✓	✓		✓		✓	✓	
Physician	✓	✓		✓	✓	✓	✓	✓

Frustrations expressed by patients

Patients identified both system- and individual-level challenges: long wait times, poor communication, lack of care coordination, the rotation of medical trainees and personal care management.

LONG WAIT TIMES

Patients experienced long waits for appointments, which complicated their ability to manage their illnesses. For example, a patient who was managing high blood pressure, diabetes, arthritis, spinal stenosis and osteopoenia was challenged with long wait times for diagnostic testing:

> I had to wait a long time for the MRI. Almost three-quarters of a year. Which I thought was excessive. And I had to wait about four months for the orthopaedic surgeon, who I found very gruff and not particularly helpful. [P027]

As patients waited for services and feedback, they had to contend with distressing symptoms.

POOR COMMUNICATION

Patients experienced poor communication with health providers and also witnessed poor communication between providers. A patient diagnosed with Crohn's disease, bladder cancer, hypertension and chronic obstructive pulmonary disease had difficulty obtaining feedback about the coordination of a specific procedure:

> Well, it's not with the GI, it's with (specialist's name) and the GI guy. Like I need to know whether I can do this procedure. I think I can. So I'm going to try and nail (specialist MD's name) down as to the dates for it. [P013]

Similarly, a patient with cardiovascular disease, arthritis, depression and emphysema stated:

> Well, I have frustrations if they don't follow up on tests. Because I think that if you go and have tests, … someone should let you know if things are okay. [P008]

Another patient who was prone to seizures and diagnosed with diabetes, hypertension, prostatic hypertrophy and mild dementia noted that his specialists were failing to communicate with each other about a specific, distressing symptom:

> And I've always thought of a cardiologist as being a person who doesn't worry just about your heart pressures but also about the swelling in my feet. … I just found out last fall that he thinks it's the problem of my family physician. … Anyway, these silos are almost like people are hard-wired into them. [P002]

Not only did patients have to actively seek answers from their care providers; communication often broke down because providers did not communicate well with each other.

LACK OF CARE COORDINATION

Patients also noted poor coordination among providers when multiple medications had to be prescribed and various tests and procedures had to be coordinated. One patient attempted to schedule two imaging appointments from two different providers, but was hindered by the system's inability to coordinate the scans:

> I tried to get the system to put the two scans together because they were the bladder and the aneurism. I was trying to eliminate two scans and have one do the job of both. First of all, (specialist MD's name) wouldn't do it. He wouldn't return my call, even. And then when I got on the table, when I went to the room that morning to get the CT scan, they said that they couldn't do it because it hadn't been asked for. [P002]

This example demonstrates that even when a patient is willing to coordinate his or her own care, and recognizes what is needed, the patient still falls victim to a fragmented system.

ROTATION OF MEDICAL TRAINEES

Communication and coordination were further hindered by the rotation of medical trainees within the family health team. Although patients understood that they were receiving care in a teaching hospital and there would be some interaction with trainees, they felt that there was too little oversight from their family physician. A patient who was recovering from surgery and had visual and auditory impairments, arthritis, and poorly controlled lipids shared the following:

> I never have a problem getting in to see my GP (general practitioner) or getting an appointment to see a doctor, except that the doctor was often the resident. … They do not consult a doctor, you know, their superior when they should. So the frustration is with the residents taking on too much responsibility when they're not equipped to do so. But it's a teaching hospital, and this is part of being a patient there. [P007]

CARE MANAGEMENT

Patients experienced difficulties making decisions about their care, and were unsure how to prioritize and address competing health issues. A patient described earlier stated:

> So I put the plan together: … I've got to do the carotid artery first. I've got to do whatever I can about my lungs. … It was (specialist's name) that I said this to, and he said that he had a plan. But I never thought he had a plan. [P002]

This example demonstrates that patients may feel alone when making decisions about their care. Furthermore, patients expressed uncertainty regarding their conditions, and were challenged to understand what was going on:

> It's because I don't know what the answer is. I don't know what the problem is. And let's say that traditionally if there's a problem, I've always been geared to try and find out what's wrong and take corrective action. That's how I've lasted 88 years. [P024]

Frustrations expressed by caregivers

Caregivers also expressed challenges at the system level (long wait times, poor communication, lack of care coordination) and the patient level (care management).

LONG WAIT TIMES

Caregivers were often balancing their caregiving duties with full-time employment. Thus, long wait times even after an appointment was scheduled were frustrating for caregivers. Long waits also had a physical impact on patients:

> She's 93, you know. So to go down and then sit in a waiting room for the doctor – but it's a morning out of your life or an afternoon out of your week, [and] that is very tiring for her. [020C]

Similar to patients, caregivers expressed their frustration over long waiting periods for results and between appointments:

> Usually it's just the waiting and waiting and waiting for the next appointment or results. … So, like, nothing is happening. Whether they're attempting to communicate or not. … They had phoned him [husband] for the procedure and he said, no, you [patient/caregiver] have to talk to the other doctor because [husband] wasn't sure if he should have it. So silence as of now. And he's waiting for them to get coordinated and call him for the procedure. And I said good luck with that. [CG013]

Long wait times and lack of coordination between care providers made the organization of care challenging for caregivers.

POOR COMMUNICATION AND LACK OF CARE COORDINATION

Most caregivers were the primary organizers of care for the patient. They emphasized the need for a "point person" or single provider to manage the patient's care and to support communication and decision-making across the various specialties:

> You want the expert in a given area to be addressing a certain thing. You want the person that is best trained in that area. And there's no question about that. But somehow you want them also to look at the other aspects. … And that's hard to achieve because we do need the specialities. [CG020]

Caregivers recognized that family or specialist physicians did not always have up-to-date information, or were unaware of the patient's complete health history.

CARE MANAGEMENT CHALLENGES AND LACK OF ADHERENCE

Caregivers had the added challenge of managing patients who would not adhere to treatment recommendations. One caregiver noted:

> No, not the system because it's mostly around his lack of – I think it's from depression, his lack of willingness to do these things that might have helped him along the road. His attitude is very negative, and that's frustrating to deal with. [CG009]

Noncompliance was often due to the patient's disease complexity and the difficulty of managing multimorbidity. A caregiver who managed all of her mother's care was struggling to address a particular distressing symptom:

> Yes, there are some frustrations, but it's more to do with us knowing we can't achieve her goals 100%. Like she needs better pain control, but we can't find a drug that won't give her side effects that will achieve the pain control she needs. Right? So she is choosing to have less pain control so that she can avoid the side effects that she doesn't like. … it's more the limitations of the medications that we currently have. That's my biggest frustration. [CG003]

Caregivers were also faced with making challenging decisions about whether a patient should undergo high-risk procedures such as an aneurism repair. Similar to patients, caregivers were frustrated about (and felt pressured) making the appropriate decisions; at times, they felt helpless upon recognizing that the situation was beyond their control.

Frustrations expressed by family physicians

Physician frustrations also fell into system- and patient-level themes. The system-level themes included lack of access to appropriate care, poor communication, long wait times and lack of care coordination. The patient-level themes included care management challenges and lack of adherence.

LACK OF ACCESS TO APPROPRIATE CARE

Family physicians noted that services were not always accessible to patients, resulting in unmet needs. For example, one family physician was frustrated about managing a patient with congestive heart failure as an outpatient:

> When you have a patient in heart failure, it's incredibly frustrating to try to manage them as an outpatient. … It's a huge health system issue. Like, she shouldn't have to go to the emergency department. … When you know that somebody is heading to emergency, there's a point where you could intervene before. And if there was a way to consult … urgently, I think you could avoid a lot of hospitalizations. [004M_020P]

The same physician also struggled with how best to provide community care that would fulfill the patient's medical and social needs:

> In general, it's probably true of everyone, that once they need CCAC, they don't seem to get as much as they really need. I mean that's true across the board. They'll come in for an hour a week and help you with a bath. And if you don't need help with a bath, they don't come in. So it's the patients who can bathe no problem, they can manage all their I(A)DLs, other ADLs, but they need help with their IADLs. They may need help with the food shopping. They may need help with food prep. That stuff is hard to get support for. [004M_035P]

It appears in these examples that family physicians were challenged with providing care and meeting patient needs in a timely way because of the organization of the healthcare system.

POOR COMMUNICATION, LONG WAIT TIMES AND LACK OF CARE COORDINATION

Similar to patients and caregivers, family physicians received little feedback from other healthcare providers involved in their patient's care and had to filter communication from multiple sources. Like patients and caregivers, family physicians also experienced delayed feedback from specialists:

> Yes, thinking about her eyes, I actually don't think I get anything from her ophthalmologist. … So I don't really know what's going on with her eyes and what's going on with her driving. And I have to rely on her [patient]. [002M_007P]

The involvement of multiple specialists was a challenge for developing a care plan:

> I think with her, like I said, too many cooks in the kitchen is sort of my frustration with her. Sometimes I think we're all sort of – I feel this with the specialists. Like, the physiatrist orders another test and another thing and another. And for what purpose?

> You know, I find we do too many investigations without standing back and asking her, "What do you want?" … But then it's hard when they go see the specialist who starts going on, and then I get kyboshed. And then off we go into some – I think we're doing some biological agent now, which is going to cause problems. [001M_P003]

When family physicians have many specialist physicians to collaborate with, they are challenged by the number of tests that are ordered and are not always clear on the rationale behind the investigations.

CARE MANAGEMENT

Managing multimorbidities was a common frustration expressed by providers, including how to provide support to the patient and the caregiver when the situation extended beyond their clinical control:

> Do I have frustration? Yes, who doesn't? I mean, she's on coumadin for atrial fibrillation. So maintaining a therapeutic window appropriate for her is difficult. Her thyroid is difficult. And her constant need to drive at 92 with her progressive dementia is difficult because of her lack of understanding. I think any time you have a 92-year-old that is adamant that there's been an injustice – I'm frustrated because I can't help. … You know, I think we're doing what we need to be doing. I'm just frustrated that I can't, you know, turn back the clock, change her vascular dementia, make her a better driver, to make her answer things, more importantly improve her executive functioning, cure her hypothyroidism. You know, aren't these frustrations of every family doctor? [003M_ 023P]

Physicians were unsure how to prioritize patient needs and felt that they lacked the appropriate resources to do so. Additional challenges included the management of difficult symptoms, the inability to prevent crises or acute exacerbations of the chronic disease and not being able to diagnose conditions rapidly when these were confounded by other diseases.

LACK OF ADHERENCE

Like caregivers, physicians were frustrated with patients' noncompliance with treatment. For example, a physician described a patient to be noncompliant when she declined community support, further distressing the informal caregiver:

> But they're in crisis and she doesn't want to go to emerg. Or I've tried to convince her to allow other people to come in and help, and she declines. And then the daughter calls me like she's ready to kill herself. [002M_007P_007C]

Physicians did, however, recognize that the patient's disease complexity was a barrier to accepting supports and complying with treatment recommendations.

NO FRUSTRATIONS

Lastly, not all physicians were frustrated in providing patient care, particularly if the patient was stable, or if the patient–caregiver unit organized their own care:

> No. I'd say no, from my perspective. … More independent and driven, yes. He [patient] does a lot of my work for me in a sense. I mean he really does. I don't have to go at the specialists and nag at them. He does it for me. So that's great. Thank you. [001M_P002]

Interestingly, in the cases when physicians experienced little frustration, a substitution effect occurred whereby the burden of frustration appeared to shift to the patients and caregivers. This will be explored further in the discussion.

Discussion

Older patients, informal caregivers and family physicians experienced both system- and patient-level frustrations. These frustrations included poor communication from and between care providers, long wait times for appointments and feedback, making decisions about care and managing multiple diseases. Our findings align with previous research, including a study by Yen and colleagues (2011), who explored patient and provider perceptions of chronic care policies. These authors demonstrated that patients and providers both have competing demands in self-management practices, and require greater resources and access to chronic care. Similarly, Newcombe and colleagues (2010) described patient barriers to the self-management of chronic disease, and also identified health system barriers such as care discontinuity and communication failures.

Our study adds to this evidence base by illuminating the perspectives and challenges within the patient–caregiver–physician triad and providing a full understanding of commonly identified issues. While the issues of communication, care coordination and wait times were more or less similarly articulated by all parties, some clear differences emerged, particularly in the involvement of medical trainees, the management of multimorbidity and treatment nonadherence. While patients and families recognized the necessity of training hospitals, they were frustrated by the sheer number of providers involved in their care, and the uncertainty exuded by individuals still in the early stages of their training. Our findings illuminated a potential trade-off between supporting medical trainees in their respective roles while also providing continuous, patient-centred care from familiar and consistent providers, especially since older persons with multimorbidities desire care coordination from a single source (Bayliss et al. 2008). Having a care manager act as a "point person" who can support both trainees and patients may begin to ameliorate this challenge.

More specifically, even though patients, caregivers and physicians were similarly frustrated by not having appropriate answers or the ability to manage medical issues and symptoms, the issue of treatment nonadherence was articulated only by caregivers and physicians. Disease complexity often hindered treatment adherence and increased difficulty for the caregiver–physician team to manage the patient. Providing the appropriate treatment plan while considering the patient's limitations is essential. Furthermore, protecting patient autonomy while also providing needed support is a difficult but necessary balance to achieve. Finding ways to engage patients in determining an appropriate level of support without diminishing their sense of independence is required and should be the subject of further investigation.

Interestingly, some family physicians also reported not having any frustrations while organizing care for their patient. In this case, it appeared that the organization of care shifted to the patient–caregiver dyad, who in turn had to assume the brunt of the issues encountered. This finding has important implications for future research and chronic disease self-management. Patients and caregivers who take an active role in their care may in fact end up bearing the burden of their care without needed formal support and guidance. Finding the appropriate balance between formal support and self-management of conditions is not easy and requires further analysis.

Many of the challenges identified by patients, their caregivers and physicians were interrelated and often exacerbated each other. For example, poor communication among the care team delayed decision-making and increased wait times for feedback and appointments. Frustrations with managing the disease and patient adherence were further aggravated by the system's inability to support decision-making and provide the appropriate solutions for resolving health crises. Therefore, we elaborate on facilitating better communication, easing care transitions and coordination, and improving the management of multimorbidity and decision-making to better guide health policy for multimorbidity care. In the section that follows, we provide examples from the literature on ways to address these key challenges illuminated in our findings.

Communication

Timely access to, and clear feedback from, specialists was a need that was articulated by patients, caregivers and physicians. Interventions to ameliorate these challenges have been piloted and implemented. An Ontario-based pilot project facilitates timely referrals for specialty care using an electronic consultation system as an alternative to face-to-face consultations (Liddy et al. 2013). Patients in this program experienced improved access to specialist care and reduced wait times, as family physician-users are able to receive rapid replies to clinical questions, clarify the need for diagnostic tests or treatments and determine whether a face-to-face consultation is required. Specialist physician-users also expressed improved collaboration and communication with family physicians and improved appropriateness of referrals (Liddy et al. 2013). E-referral programs may offer an opportunity to enhance

communication, reduce wait times for people with multimorbidities and increase the ease of managing complex patients.

Care transitions and coordination

Family physicians, caregivers and patients also noted issues with care coordination and were confused about the role of different providers. Innovative clinical interventions that bring a holistic interprofessional, person-focused approach are required. Chouinard and colleagues (2013) conducted a pragmatic trial by applying a case management approach to managing complex chronic diseases. The intervention targeted persons with multimorbidities who were frequent users of acute care services. The intervention was led by a nurse within a primary care practice who worked as part of an interdisciplinary team. She regularly followed up with patients and provided them with self-management support (Chouinard et al. 2013). Another example is the Geriatric Resources for Assessment and Care of Elders (GRACE) model, which is an interdisciplinary case management model that links older persons with high needs to a designated nurse and social worker who communicate regularly with the patient's family physician (Counsell et al. 2007). Similarly, the Guided Care model of Boult and colleagues (2008) is led by a nurse who develops an integrated care guide designed to meet the unique circumstances of patients and their caregivers. The Guided Care nurse monitors the patient's needs, encourages self-management, provides support and education to caregivers, and coordinates the patient's care between providers and across care boundaries (Boult et al. 2008). Models of care such as these encourage greater patient and family participation, as well as decision-making support through intensive involvement of a multidisciplinary team including specialist physicians.

Improving the management of multimorbidity and decision-making

Fundamental to managing multimorbidities is decision-making support for patients, their caregivers and care providers. Few clinical practice guidelines are available to family physicians to address the needs of seniors with complex chronic conditions. Clinical practice guidelines for primary care are often developed for single diseases and aren't applicable to patients with multimorbidities (Boyd et al. 2005; Tinetti et al. 2004; Upshur and Tracy 2008). Persons with multimorbidities tend to require expert input from several providers to manage their illnesses. Balancing much-needed specialist input and whole-patient care is challenging and requires further attention. Tracy and colleagues (2013) developed a multidisciplinary primary care clinic for community-dwelling seniors with complex healthcare needs called the Interprofessional Model of Practice for Aging and Complex Treatment (IMPACT). In this model, patients and their caregivers actively participate in a comprehensive assessment and are given decision-making support by a multidisciplinary team including specialists. These examples highlight strategies that can be adopted to support patients, their caregivers and family physicians in the management of multimorbidities.

Limitations

Study participants were predominantly Caucasian, English-speaking and sampled from a single family practice in an affluent urban setting. Thus, the transferability of our findings may be limited to patients who fit this demographic profile.

Conclusion

By asking patients, caregivers and family physicians to share their frustrations, the study unveiled important system- and patient-level issues from three critical perspectives. The inclusion of the perspectives of key members of the patient's circle of care provides triangulation of evidence on issues that can be comprehensively understood and potentially better managed.

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RESEARCH PAPER

Waiting for a Specialist Consultation for a New Condition in Ontario: Impacts on Patients' Lives

Attente pour la consultation auprès d'un spécialiste pour un nouvel état de santé, en Ontario : impact sur la vie des patients

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Abstract

As leading barriers to specialist care, wait times are at the forefront of the Canadian healthcare policy agenda. However, knowledge is limited about how wait times affect patients' lives. We utilized the 2010 Canadian Community Health Survey to examine the experience of patients requiring a consultation with a medical specialist for a new condition. Multivariate logistic regression predicted the likelihood that a respondent self-reported his or her life was affected. Subsequent cross-tabulations determined the ways in which life was affected. Females, middle-aged respondents, new immigrants and those with low income and poor health status were more likely to report their life was affected. Worry, stress and anxiety were the most frequently reported impacts, followed by pain, stress on family/friends, deterioration of health and loss of work. Our research demonstrates a need to address the impacts of wait times on health and well-being, with a focus on particular subpopulation groups.

Résumé

À titre d'obstacle principal pour l'accès aux services d'un spécialiste, les temps d'attente figurent en tête de liste des programmes d'action pour les services de santé au Canada. Cependant, on connaît peu la façon dont les temps d'attente affectent la vie des patients. À l'aide des données de l'Enquête sur la santé dans les collectivités canadiennes de 2010, nous avons étudié l'expérience des patients qui nécessitent une consultation auprès d'un spécialiste pour un nouvel état de santé. Une analyse de régression logistique multivariable a permis de prédire la probabilité qu'un répondant auto-déclare que sa vie en est affectée. Des tableaux croisés subséquents ont permis de déterminer de quelles façons leur vie était affectée. Les personnes les plus susceptibles d'indiquer que leur vie est affectée sont les femmes, les personnes d'âge moyen, les nouveaux immigrants et les personnes à faible revenu ainsi que celles dont l'état de santé est le plus fragile. Les impacts les plus déclarés sont l'inquiétude, le stress et l'anxiété, suivi de la douleur, du stress sur la famille et les amis, de la détérioration de l'état de santé et de la perte d'emploi. Notre recherche démontre qu'il faut traiter les impacts des temps d'attente sur la santé et le bien-être, en mettant un accent particulier sur des sous-groupes particuliers de la population.

The *Canada Health Act* (1985) removed financial barriers to healthcare by mandating that access to medically necessary services be available to all Canadians. While this legislation eliminates socio-economic inequities in access, other barriers to medically necessary healthcare services persist. Wait times are consistently identified as leading barriers by patients and providers (Barua and Esmail 2012; Sanmartin et al. 2004, 2007; Wilson and Rosenberg 2004), though less attention has been paid to specialist care. Access to specialist care is fundamentally different than primary care, as patients generally require a referral from a general practitioner or other health professional for access (Dunlop et al. 2000). As part of a gatekeeper model of care, time spent waiting from the referral to initial contact with a specialist represents an important period in the continuum of care (Liddy et al. 2013).

International comparisons reveal that Canadians are more likely to wait for access to specialist care than people in other countries (Bichel et al. 2009; Health Council of Canada 2010; Schoen et al. 2009). Over the past two decades, the total time the average Canadian spends waiting between referral from a general practitioner to consultation with a specialist has increased by 129%, from 3.7 weeks in 1993 to 8.5 weeks in 2012 (Barua and Esmail 2012). Time spent waiting for specialist care is not necessarily problematic in and of itself; however, it is if there are related adverse health effects or other impacts on patients' lives. For example, waiting six months or longer for treatment for chronic pain has been associated with general deterioration in emotional health related to psycho-social outcomes and loss of quality

of life (Lynch et al. 2008). As well, longer wait times for adjuvant therapy for cancer have been linked to increased likelihood of cancer recurrence and decreased survival times (Chen et al. 2008; Kulkarni et al. 2009).

Because wait times vary by health need and demographic and socio-economic factors, it is plausible that the impacts of wait times also vary among subpopulation groups, an important area for research. It is also important to understand the diverse range of ways in which people's lives are affected by wait times for specialist care. Thus, the goals of this study are twofold: to examine the reasons that patients might report that their life is affected by time spent waiting for a specialist consultation, and to examine the ways in which patients' lives are affected.

Methods

This study used data from the 2010 Canadian Community Health Survey (CCHS) public use microdata file (Statistics Canada 2012). The CCHS is a cross-sectional telephone survey that collects information regarding the health, health behaviours and healthcare utilization of Canadians over 12 years of age. This study focused on an optional module of the survey related to access to specialist care, collected in Ontario (n=21,536; response rate, 70.0%). The study sample included all respondents who required a visit to a medical specialist for a consultation or diagnosis for a new condition in the year prior to the survey (n=2,516). These respondents also answered follow-up questions about barriers to accessing care and questions related to ensuing impacts on their lives.

Respondents were asked about their experience waiting to visit a specialist, including whether they had visited the specialist already; whether the visit had been cancelled or postponed at any time; and whether the respondent felt that his or her life had been affected by waiting for the specialist visit. The survey then asked how the patient's life was affected, listing the following categories:

1. Worry, anxiety, stress
2. Worry or stress for family or friends
3. Pain
4. Problems with activities of daily living (e.g., dressing, driving)
5. Loss of work
6. Loss of income
7. Increased dependence on relatives/friends
8. Increased use of over-the-counter drugs
9. Overall health deteriorated, condition got worse
10. Health problem improved
11. Personal relationships suffered
12. Other

Independent variables were coded as shown in Table 1. Potential covariates were included per Aday and Andersen's (1974) behavioural model for access to medical care related to predisposing characteristics, enabling characteristics and need. Predisposing characteristics refer to those that guide an individual's propensity to use health services (e.g., age, sex). Enabling characteristics reflect the ability of individuals to engage with health services defined by personal resources, or resources that are available in one's local area, state or country (e.g., income, education, having a family doctor, health region of residence). Income was defined by household income quintiles adjusted by household size and community of residence. Statistics Canada uses health regions as the primary sampling frame for the CCHS, and health regions were re-categorized as "Urban," "Rural" and "City of Toronto." Health regions were categorized as urban if they satisfied one of two criteria: the health region had more than 150 people per square kilometre (OECD 1994) or the health region contained a Census Metropolitan Area that represented at least 85% of the population of the region. This definition has been used successfully elsewhere (Harrington et al. 2013).

TABLE 1. Variable coding scheme

Determinant type	Variable	Coding
Predisposing factors	Sex	Female (reference) / Male
	Age	Under 30 (ref.) / 30–44 / 45–59 / 60+
	Marital status	No partner (ref.) / Living with a partner
	Time since immigration	Born in Canada (ref.) / Less than 10 years / More than 10 years
Enabling factors	Education	Less than high school (ref.) / High school / Post-secondary educated
	Income	Lowest (1st) income quintile (Ref.) / 2nd / 3rd / 4th / 5th
	Health region	City of Toronto (ref.) / Urban / Rural
	Visited specialist	No – still waiting (ref.) / Yes
	Time spent waiting	Less than 1 month (ref.) / 1–3 months / 3–6 months / Over 6 months
	Opinion of wait time	Acceptable (ref.) / Not acceptable
Need factors	Chronic conditions	No chronic conditions (ref.) / 1–3 conditions / 4+ conditions
	Self-rated general health	Good (ref.) / Poor

Need factors refer to actual or perceived health and are recognized as the most important determinants of healthcare use (Aday and Andersen 1974). Self-rated health was included as a measure of health need, recoded here as good (i.e., excellent, very good or good) or poor (i.e., fair, poor). The CCHS also collects data on a range of self-reported chronic conditions including asthma, arthritis, high blood pressure, chronic obstructive pulmonary disorder (COPD), diabetes, heart disease and cancer, among others. Respondents were classified as having any chronic conditions versus none.

Descriptive statistics were all calculated with population weights provided by Statistics Canada. A weighted multivariate logistic regression model was used to predict the likelihood that respondents' lives were affected during the time spent waiting to visit a specialist. A subsequent analysis based on frequency of response was also used to determine the range of ways in which waiting for a specialist had affected respondents' lives. Analyses are presented with 95% confidence intervals generated using a bootstrap technique. All analyses were performed using R v. 2.15.1 (The R Project for Statistical Computing 2013).

Results

A descriptive summary of the CCHS cohort, compared to the subsample of interest, is presented in Table 2. In terms of accessing specialist services, 26.5% of the population required a visit to a specialist in the previous year. Of these, 44.1% required a specialist visit for a new illness or condition. The mean wait time between scheduling an appointment with a specialist and visiting a specialist for a new illness/condition was 63.3 days (median, 30.0 days). However, those who had already visited the specialist at the time of the survey had shorter average wait times (mean, 56.5 days) than those who were still waiting for their appointment (mean, 139.9 days). Approximately 21.2% of respondents requiring a visit for a new condition reported that their life was affected by the wait to see the specialist.

TABLE 2. Sample characteristics with 95% confidence intervals

Attribute	CCHS Ontario (%)	Required a specialist for a new condition (%)
Female	51.0 ± 1.2	59.6 ± 3.2
Under 30	28.0 ± 1.1	17.4 ± 2.3
30–44	24.2 ± 1.2	23.2 ± 2.6
45–59	26.3 ± 1.2	31.6 ± 3.4
60+	21.6 ± 0.8	27.8 ± 2.7
Living with partner	59.0 ± 1.3	64.1 ± 3.0
Canadian-born	67.2 ± 1.3	69.1 ± 3.4
Immigrant: < 10 years	8.2 ± 0.8	6.9 ± 2.3
Immigrant: 10+ years	24.6 ± 1.2	24.0 ± 3.3
Less than $20,000	7.5 ± 0.7	7.6 ± 1.6
$20,000–$39,999	15.6 ± 0.8	15.5 ± 2.2
$40,000–$59,999	16.9 ± 1.0	14.1 ± 2.4
$60,000–$79,999	16.3 ± 1.2	15.6 ± 2.8
$80,000 and more	43.7 ± 1.4	47.1 ±3.5

TABLE 2. Continued

Attribute	CCHS Ontario (%)	Required a specialist for a new condition (%)
Less than secondary school	19.8 ± 0.8	12.0 ± 1.9
Has a family doctor	89.4 ± 0.9	95.3 ± 1.2
No chronic conditions	54.5 ± 1.3	37.7 ± 3.1
City of Toronto	20.9 ± 1.2	21.4 ± 3.2
Urban	56.6 ± 1.3	56.2 ± 3.2
Rural	22.4 ± 0.8	22.3 ± 2.4

The multivariate logistic regression model (Table 3) revealed a number of significant covariates. In terms of predisposing factors, females were more likely than males, and those from the middle-age groups (i.e., between 30 and 59) were more likely than younger or older respondents, to report that their life had been affected by the wait, though the relationship was significant only for the 30–44 age group. In general, new immigrants were more likely than Canadian-born respondents to report that their life had been affected (OR=1.95).

TABLE 3. Multivariate logistic regression of life affected by waiting

Factor	OR	95% CI	Signif.
Intercept	0.07	(0.03, 0.17)	***
Sex (ref: Female)			
Male	0.74	(0.54, 0.99)	*
Age (ref: Under 30)			
30–44	1.67	(1.01, 2.80)	*
45–59	1.49	(0.91, 2.50)	
60+	0.91	(0.53, 1.58)	
Living arrangement (ref: No partner)			
Partner	1.18	(0.84, 1.65)	
Time since immigration (ref: Canadian born)			
Less than 10 years	1.95	(1.07, 3.55)	*
10 or more years	1.27	(0.90, 1.79)	
Income (ref: Lowest quintile – 1)			
Quintile 2	0.85	(0.53, 1.37)	
Quintile 3	0.51	(0.32, 0.82)	**
Quintile 4	0.53	(0.33, 0.86)	**
Quintile 5	0.38	(0.23, 0.61)	***
Education (ref: Less than high school)			
High school	2.01	(1.17, 3.56)	*

TABLE 3. Continued

Factor	OR	95% CI	Signif.
Self-rated health (ref: Good)			
Poor	1.47	(1.01, 2.13)	*
Chronic conditions (ref: None)			
1+ conditions	2.24	(1.60, 3.17)	***
Visited specialist (ref: Waiting)			
Visited specialist	0.24	(0.16, 0.37)	***
Wait time (ref: <1 month)			
1–3 months	1.76	(1.21, 2.55)	**
3–6 months	1.92	(1.23, 3.00)	**
6 months or more	2.78	(1.54, 5.05)	***
Opinion of wait time (ref: Acceptable)			
Not acceptable	11.28	(7.95, 16.19)	***
Health Region (ref: City of Toronto)			
Urban	0.82	(0.56, 1.20)	
Rural	0.91	(0.56, 1.47)	

Significance codes: $p<0.05$=*; $p<0.01$=**; $p<0.001$=***

Respondents who had completed at least a secondary school level of education were more likely than their counterparts who had not completed high school (OR=2.01) to report that their life had been affected waiting for a specialist visit. Income displayed an overall negative association with the odds of reporting life being affected. That is, as level of income increased from the lowest quintile to the highest, the odds of reporting that life was affected by the wait to see a specialist decreased. At the regional level, no differences were found between those living in the City of Toronto, other urban areas or rural regions.

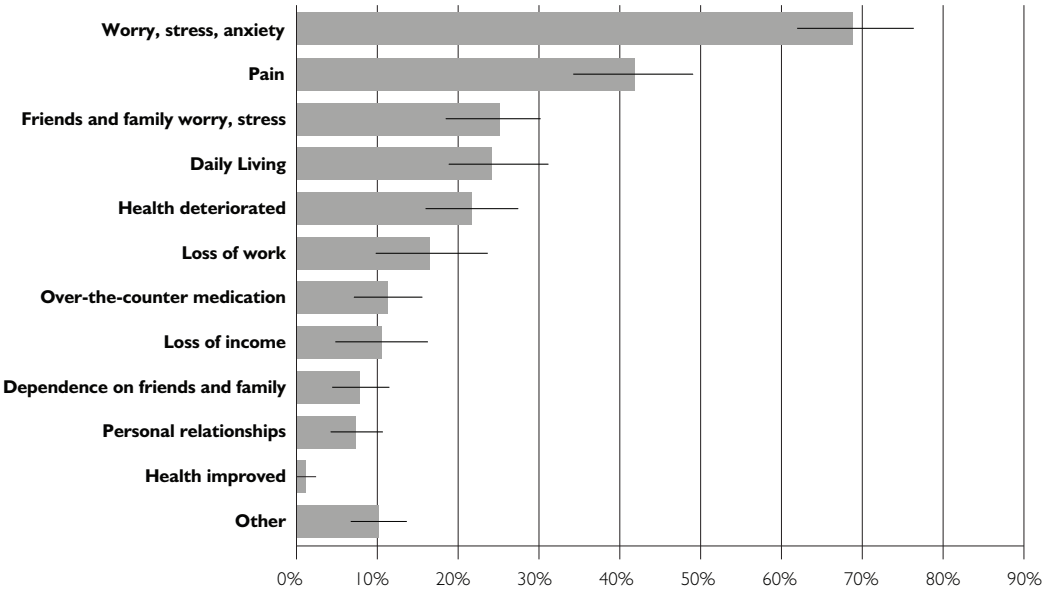
Health status was significant in the model. In particular, respondents with chronic conditions were more than twice as likely to report that their life was affected by the wait (OR=2.24) than those with no chronic conditions, while those with poor self-rated general health were approximately 1.5 times as likely.

There was substantial difference between respondents who had seen the specialist already and those that were still waiting. Specifically, those who had already visited the specialist were approximately 75% less likely to report that their life had been affected by the wait time. Longer wait times exhibited a clear dose–response effect, with the odds of reporting that life had been affected by the wait increasing with the length of time waiting. Compared to respondents who had waited/been waiting for less than a month, the odds ratios associated with waiting for 1–3 months, 3–6 months and more than 6 months climbed from 1.76 to

1.92 and then to 2.78, respectively. Finally, respondents who perceived their time waiting to see a specialist as unacceptable were 11.3 times more likely to report that their life had been affected.

The ways in which respondents reported that their lives were affected by waiting for a specialist visit are presented in Figure 1. Respondents could provide more than one response. The most frequently reported way in which life was affected was worry, stress and anxiety (69.1%). This was followed by pain (42.1%), worry or stress for friends or family (25.2%), reduced activities of daily living (24.3%) and deterioration of health (21.7%). Loss of work, increased use of over-the-counter medication and loss of income were mentioned relatively less frequently, but still by more than 10% of the respondents.

FIGURE 1. How life was affected by wait to see a specialist: frequencies of responses with 95% confidence intervals



Discussion

Approximately 20% of respondents requiring a visit to a specialist for consultation or diagnosis related to a new condition reported that their life was affected by the time spent waiting from referral to visit. This percentage is comparable with the findings of Sanmartin and colleagues (2006), who reported that 17.7% of Canadians reported that their life had been affected. However, their analysis focused on all visits to a specialist, whereas in this study the focus was on specialist visits for new conditions, potentially explaining the slight difference.

The results indicate that psycho-social effects, including worry, stress and anxiety, were the most frequently reported impacts followed by pain, stress on family and friends and deterioration of health. Psycho-social and physical impacts of wait times have been documented previously (e.g., Lynch et al. 2008; Sanmartin et al. 2007). However, the current study contributes by providing an understanding of a more diverse range of the ways in which life is

affected. Specifically, we identify other important impacts including loss of work, increased use of over-the-counter medication and loss of income, all of which could differentially affect low-income households or individuals with part-time or by-the-hour employment. This represents an important area of investigation.

Time spent waiting, and perceived acceptability of wait times, clearly emerged as important covariates. These results support the impact of longer wait times on patients and their families, as reported previously (Chen et al. 2008; Kulkarni et al. 2009; Lynch et al. 2008; Sanmartin et al. 2007). As well, those who had visited the specialist already – versus those still waiting – were much less likely to report that their lives were affected. On the one hand, this result may indicate some recall bias in the population who had already visited the specialist. That is, these respondents may not recall the ways in which their lives were affected, whereas those still waiting could have been more apt to articulate the specific ways in which their life was currently being affected. On the other hand, this result speaks to the importance of ensuring timely access to specialists.

People who found their wait times to be unacceptable were more than 11 times as likely to report that their life was affected. Previous work has suggested that impacts on patients' lives are primary determinants of perceived acceptability of wait times (Sanmartin et al. 2007). We suggest that the direction of this relationship remains ambiguous. Is it more likely that people who consider their wait time unacceptable have experienced related secondary impacts? Or, alternatively, that those who have experienced secondary impacts on their life consider their wait time unacceptable? At this time, it is impossible to comment definitively on the nature of this relationship. Deeper investigation into the relationship between these highly correlated variables presents an opportunity for future research.

Given that older people are more likely to access specialist care, have multiple specialists and experience more barriers to access (Chan and Austin 2008; Hopley et al. 2009), the relationship with age might seem counter-intuitive, though previous research has reported that older individuals are less likely to complain about quality of care than their younger counterparts (e.g., Bismark et al. 2006). This result may reflect the fact that the specialist visits examined here were limited to new conditions. In this case, those in the middle-age range could be accessing specialist care for the first time in their lives and thus may perceive the time spent waiting to have greater impacts. Another possible interpretation is that middle-aged respondents are more likely to be in the workforce, more sensitive to time issues (e.g., taking time off work to see a specialist) and therefore, more sensitive to waiting to see a specialist, in contrast to older individuals, who are more likely to be retired and have more flexible schedules. Older individuals, alternatively, may have more experience with accessing healthcare in general and specialty care in particular. This may attenuate older patients' perceptions of the impact on their lives, as the result could reflect the expectation that there will be at least some time spent waiting to access care.

The relationship with the sex of respondents may reflect the difference in average wait times between men and women (Thind et al. 2012) or differences in type of specialist care

needed. Indeed, women have been found to have significantly longer wait times than men with respect to specialist consultations (Carrière and Sanmartin 2010), increasing the potential for impact on their lives.

Respondents who had been living in Canada for less than 10 years were almost twice as likely as Canadian-born respondents to report that their lives had been affected by wait times. There is growing evidence that newcomers face unique difficulties in accessing primary care upon arrival (Asanin and Wilson 2008; Harrington et al. 2012; Sanmartin and Ross 2006). The results suggest that waiting for access to specialist care also affects this population more severely. We suggest two possible explanations. First, recent immigrants are more likely to experience difficulties negotiating the healthcare system in Canada upon arrival because of language barriers, cultural differences and a lack of information about or familiarity with the administrative processes inherent in accessing care (Leclere et al. 1994). Access to specialist care may present additional difficulties and therefore have a greater impact on patients' lives. Alternatively, this is an important finding in the context of the "healthy immigrant effect," a theory that suggests that upon arrival to a host country, immigrants typically enjoy better health than the general population, particularly with respect to chronic conditions. These rates tend to converge with those of the host country following an acculturation period of 10 years (Newbold 2005). Thus, during an immigrant's first 10 years in Canada, specialist consultations are more likely for acute conditions that require more urgent care (e.g., orthopaedic surgery to repair skeletal damage) than for chronic conditions such as cardiovascular disease or cancer. The increased impacts reported by this population, then, may reflect the types of specialist care that newcomers access relative to the Canadian-born population. However, as analysis by type of specialist was not available using the CCHS public use file, we cannot comment on this difference with certainty.

Respondents with secondary school education were more likely to report that their lives had been affected. Education has been inversely related to access to primary care (Hendryx et al. 2002), though the results found here might perhaps be linked to a difference in perceived expectations of the healthcare system. Sanmartin and colleagues (2007) reported that those without a secondary school education were almost half as likely as those with higher levels of education to report that wait times for specialist visits were unacceptable. Income was inversely related to impact on life, with those with household incomes in the lowest quintile the most likely to report that their lives had been affected. The suggestion that secondary health impacts of wait times are socio-economically inequitable runs counter to previous studies that have found no socio-economic differences with respect to the length of time spent waiting (Sanmartin et al. 2006; Thind et al. 2012). Thus, despite the importance of the *Canada Health Act* for removing direct financial barriers to accessing medically necessary specialist services, our results provide evidence to suggest that time spent waiting for specialist care may be particularly burdensome for low-income individuals and their families.

The findings on education level and income might represent two sets of social processes operating in opposite directions. Education and employment status are closely associated.

More highly educated individuals who are more likely to hold higher-status employment might be more time-sensitive than individuals who are less educated and in lower-status employment, underemployed or unemployed. On the other hand, those in the lowest income quintile are more likely to be in poor health, need specialist care and therefore be more time-sensitive to wait times.

Those in poorer health were more likely to report that their life had been affected. These results suggest that those accessing the healthcare system at a higher frequency are affected more by wait times than the general population. Though previous work has found no differences in wait times for those with chronic conditions and time spent waiting in Canada (Ho and Morris 2008), similar to the experience of the low-income population, there are inequities in the ways in which these wait times affect the lives of Ontario's sickest individuals.

Limitations

Our results need to be interpreted in the context of some of the limitations of the research. CCHS is a cross-sectional survey, and as such the direction or the changing intensity of the causal relationships over time cannot be determined. The data do not allow for analysis of someone who sees multiple specialists or how waiting between specialist visits affects everyday life. Nor do the categories of how life is affected provide any sense of how everyday life is affected experientially. Dealing with these issues requires longitudinal data that would combine the timeliness of administrative data with the health, health behaviours and healthcare use data of surveys such as CCHS and qualitative studies to analyze how wait times affect everyday life. Secondly, the CCHS is based on self-reported measures and may be subject to recall bias. Third, wait times and perceived impacts may vary by type of health condition being addressed. It is possible that impacts may be greater for life-threatening conditions (e.g., cancer) versus those that are less serious (e.g., a skin condition). Fourth, the analysis does not take into account the availability of specialists within local communities.

Finally, for the 2010 cycle of the CCHS, questions specific to access to specialist healthcare services were optional content, which only the province of Ontario chose to have administered. Though these data have yielded important knowledge with respect to access to specialist services in Ontario, it is impossible to generalize these findings to the national level. This limitation highlights the importance of continued routine collection of population-level data related to access to specialist healthcare across Canada. In the context of an aging Canadian population that will likely increase the demand for specialist services, it will be increasingly important to understand issues related to access, barriers to specialist services and wait times for specialist care, and how these change over time. The CCHS is an ideal tool for ensuring these data are available and can be analyzed towards improving healthcare delivery in Canada only if the questions on access to specialist care are made part of the core content and asked in every part of Canada.

Conclusions

This research makes an important contribution to understanding access to specialist care in Ontario. While previous work has suggested that inequalities in wait times are limited, it is clear from our research that the impacts of these wait times are in some ways inequitable, i.e., there is clear evidence that the lives of some populations are affected more by wait times than others.

Though wait times are, and should continue to be, related to urgency of care, the differential impacts on the health and well-being of these groups warrant consideration from a policy perspective. We echo the recommendations forwarded by others in the Canadian context (e.g., Sanmartin et al. 2007) that in addition to continuing efforts to reduce wait times, policy actions aimed at attenuating these impacts for vulnerable groups may contribute positively to patient health and quality of life, and overall satisfaction with the healthcare system. Potential interventions could include procedures for monitoring and responding to impacts on patients' health throughout the time spent waiting for contact with a specialist. Consistent communication with those waiting to see a specialist could also help to draw together patient expectations of the healthcare system with the realities of providing timely access to care, potentially curtailing patients' perceptions of the impacts of wait times.

The federal, provincial and territorial governments of Canada have made the reductions in waiting times for all health services a priority (Health Canada 2006). Reducing waiting times is illusory if it also means growing inequities related to the impacts of wait times on Canadians depending on age, sex, socio-economic status, citizenship or health need. This research reminds us of the complexities in achieving both efficiency (with respect to effort, time and cost) and equity in the Canadian healthcare system.

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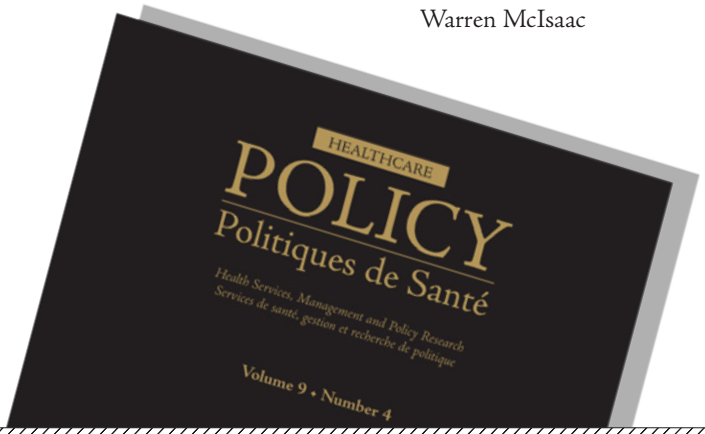

RESEARCH PAPER

The Effect of Rostering with a Patient Enrolment Model on Emergency Department Utilization

L'effet de l'inscription des patients, à l'aide d'un modèle d'adhésion, sur l'utilisation des services des urgences

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Abstract

Objective: To assess the effect of rostering with a patient enrolment model (PEM) in Ontario on emergency department utilization for non-emergent care.

Data sources/study setting: Administrative data for fiscal years 2006/07 through 2010/11 from the Ontario Ministry of Health and Long-Term Care were used for the analysis.

Study design: Patient-level analysis with a difference-in-difference modelling approach was used to study the relationship. A control group was established using propensity score matching.

Principal finding: Results suggest that rostering with a PEM is associated with a statistically significant reduction in emergency department (ED) (non-emergent) visits in Ontario. More specifically, enrolment with PEMs reduced ED visits by 3% during the study period, translating into cost savings of approximately $8 million for hospitals in Ontario.

Conclusion: This study shows that PEMs have achieved some degree of success in enhancing health system efficiency in Ontario through the reduction in the use of EDs for non-emergent care.

Résumé

Objectif : Évaluer l'effet de l'inscription des clients, à l'aide d'un modèle d'adhésion des patients (MAP), en Ontario, sur l'utilisation des services des urgences pour les soins non urgents.
Sources de données/paramètres de recherche : Des données administratives pour les exercices financiers de 2006/2007 à 2010/2011 provenant du ministère ontarien de la Santé et des Soins de longue durée ont été utilisées pour l'analyse.
Conception de l'étude : Une analyse au niveau des patients ainsi qu'une modélisation de l'écart dans les différences ont été employées pour étudier la relation. Un groupe témoin a été formé au moyen des coefficients de propension.
Principaux résultats : Les résultats font voir que l'inscription des patients à l'aide d'un MAP est associée à une réduction statistiquement significative des visites (non urgentes) aux services des urgences, en Ontario. Plus précisément, l'inscription des patients a permis de réduire les visites aux services des urgences de 3 % au cours de la période d'étude. Cela se traduit par une économie d'environ 8 millions de dollars pour les hôpitaux ontariens.
Conclusion : Cette étude montre que le MAP connaît un certain succès dans l'accroissement de l'efficience du système de santé en Ontario grâce à une réduction de l'utilisation des services des urgences pour des soins non urgents.

There is now considerable evidence suggesting that a strong primary care system not only leads to better health outcomes and higher patient satisfaction, but also lowers healthcare costs for the associated jurisdiction (Atun 2004; Starfield and Shi 2002). Given this evidence, and faced with an aging population and rapidly increasing healthcare costs, countries such as the United States and Canada have introduced various primary care reform strategies with the objective of improving health system efficiency.

For Ontario, the largest province in Canada, reforms to the primary healthcare system have meant a move away from a fee-for-service payment mechanism for family physicians (FPs) and general practitioners (GPs) to non–fee-for-service arrangements involving collaborative health teams and a blend of financial incentives, premiums and other types of payments.[1] The cornerstone of this new arrangement is patient rostering or patient enrolment, where funding and compensation of participating physicians are tied to the number of patients enrolled (in this paper, the terms enrolment and rostering are used interchangeably).

Through rostering, which has emerged as a key component of recent primary care models in many countries such as Australia, the United States and United Kingdom, Denmark, New Zealand and Canada, patients in Ontario enter into a formal agreement with their rostering physician. Under this agreement, patients commit to seek treatment from their enrolling physician while physicians agree to provide comprehensive care to their enrolling patients.

Theoretically, the move towards rostering has been argued on the grounds that such a system leads to better health outcomes for patients through continuity of care and through better access to patient information (because patients return to the enrolling physician, except in emergencies). Further, from a health system perspective, rostering is likely to result in the more efficient use of resources because enrolling physicians are expected to direct their patient to the most appropriate healthcare provider. In other words, by formalizing the relationship between the physician and the patient, patient enrolment models (PEMs) are able to improve the delivery of care and ensure a more appropriate use of health services by patients. An indirect benefit of rostering may be the more appropriate use of emergency departments (EDs), walk-in clinics or other health services. More specifically, rostering may be associated with the reduction in the utilization of EDs for less urgent care. Determining whether such an association exists was the purpose of this study.

The reduction in ED utilization, particularly for minor health conditions, has been the objective of several health jurisdictions around the world for years. Canada, Australia and the United Kingdom have instituted health reforms that include setting targets for the time patients spend in the ED (Guttmann et al. 2011). Studies have reported that 15%–25% of Canadians use ED services at least once a year (Brown and Goel 1994; Chan et al. 2001), and up to 30% primarily for non-urgent problems (Burnett and Grover 1996; Vertesi 2004). According to a 2011 report published by Health Quality Ontario (HQO), one in 20 Ontarians who visited an ED in 2010 left before being seen because they were tired of waiting. Such overcrowding in EDs in Canada and Ontario are a much discussed issue and a cause of concern not only for policy makers but also for the general public.

One reason stated for the observed overcrowding in Ontario's EDs has been the perceived or actual difficulty in accessing a FP or GP. According to the HQO report (2011), one in two Ontarians felt they could have been treated by their primary care provider if care had been available the last time they visited their hospital or ED. Given this backdrop, primary care reforms in Ontario have entailed the growth of diverse PEMs that are alternatives to the predominant fee-for-service model. Through rostering, PEMs seek to ensure that the primary care providers are the first point of contact for patients seeking medical treatment and that once in contact, physicians can direct patients to the most appropriate medical care. For example, all PEMs provide some form of after-hours and weekend care, so patients are able to access care when needed. In other words, the system has been set up to ensure that services such as EDs are used more appropriately, leading to an increased overall efficiency in the healthcare system.

Evidence from countries such as the United States (Christakis et al. 2001; Gill et al. 2000), the United Kingdom (Pickin et al. 2004) and the Netherlands (van Uden et al. 2004) has shown that continuity of primary care or improved primary care access with after-hours care – all features of PEMs – are associated with lower ED use. As well, a study (Howard et

al. 2008) conducted in a medium-sized Ontario city, Thunder Bay, with a single ED, found that patients whose physicians practised in a model based on capitation, with contractual agreement to provide some after-hours services and to roster patients, used the ED less often than patients whose physicians practised in other models (fee-for-service). Thus, there exists some empirical evidence suggesting that a non–fee-for-service system is associated with lower ED utilization.

We used administrative data for fiscal years 2006/07 through 2010/11 to analyze the effect of rostering with a PEM on ED utilization in Ontario. While there are studies that measure the effectiveness of PEMs in terms of their impact on physician visits per week (Sarma et al. 2010), or on physician performance of certain services such as colorectal cancer screening or mammograms (Jaakkimainen et al. 2011), those that study the association between PEMs and ED use in Ontario are far fewer. The few that exist are primarily cross-sectional population-based analyses (Glazier et al. 2009) or evaluations based on patient questionnaires conducted in one ED in a single city (Howard et al. 2008).

Alternatively, this study was an individual-level analysis and employed a difference-in-difference modelling approach to study the above relationship for the province of Ontario. While the objective was to understand the association between primary care delivered under a non–fee-for-service setting and the use of ED services, the analysis can inform future government policy work through the identification of any improvement opportunities in the delivery of primary care in Ontario. Our results confirm the findings of studies from other countries: results from the zero-inflated negative binomial (ZINB) model suggest that for the period 2006/07 through 2010/11, rostering with PEM is associated with an average 3.5% reduction in ED visits for non-urgent care (defined as CTAS levels IV and V).[2]

Primary Care Delivery in Ontario

Since the adoption of a universal health insurance system in Canada in 1969, rostering or patient enrolment has been the distinctive characteristic of the provision of primary care in Ontario. Hutchison and colleagues (2001) point out that the first wave of innovation in primary care during the 1970s saw the emergence of alternative organization and funding models such as community health centres (CHCs) and health service organizations (HSOs), the latter providing medical care to rostered patients in Ontario.

After the release of the Romanow Commission's (2002) report on the future of healthcare in Canada, Ontario introduced two new enrolment models – family health networks (FHNs), a blended capitation model, and family health groups (FHGs), an enhanced fee-for-service blended model. While physicians under FHNs are required to roster their patients through a formal enrolment process, physicians under FHGs are encouraged, although not required, to roster their patients. However, FHG physicians receive fee premiums for services provided to rostered patients after-hours and regular fee-for-service provided to non-rostered patients.

FHN physicians, on the other hand, receive an access bonus that is reduced by the cost of services provided to their rostered patients by non-FHN FPs or GPs.[3]

In 2006, Ontario introduced family health organizations (FHOs), a blended capitation model. FHOs harmonized the earlier-introduced HSOs and primary care networks (PCNs); although they are similar to FHNs, FHOs have higher average capitation rates.[4] According to data drawn for 2011 from the CPDB (Corporate Provider Database) and the CAPE (Client Agency Program Enrollment Database), FHOs had the largest percentage of PEM physicians (at 45%) and the largest patient enrolments (at 51%). Even so, almost one-third of Ontario's physicians continue to practise under a pure fee-for-service payment system.[5]

For the purposes of this study, all non–fee-for-service models are grouped together as PEMs. Although there is some variation across PEMs in their payments or benefits to physicians, the models were introduced as alternatives to the dominant fee-for-service model and are designed to alter (through embedded incentives) physician behaviour in the provision of primary care. Arguably then, these models together can be understood as influencers of an alternative means of delivering primary care in Ontario.

Data

Data for the analysis were obtained from the Ontario MOHLTC. Patients with a valid Ontario health number in the Registered Persons Database (RPDB), Ontario's healthcare registry with patient information (age, sex, place of residence) for all people covered by the Ontario Health Insurance Plan (OHIP), were identified for the fiscal years 2006/07 through 2010/11. From this sample, only active health numbers were selected – i.e., those that had at least one (any) claim in the Claims History Database (CHDB) in the past six available years.[6]

The Client Agency Program Enrolment (CAPE), a repository of the association of a registered person with a specific physician at a specific agency in a formally recognized program, was used to identify patient enrolment by physician type. In other words, a case cohort was established by selecting patients (sampled from the RPDB) who became newly rostered with PEMs during the fiscal year 2008/09 and continued with a PEM through the rest of the study period (until 2010/11). Case cohort patients were allowed to move between different PEMs between fiscal years 2008/09 and 2010/11. Note that although patients were enrolling in PEMs prior to 2008/09, for our analysis we chose this as the arbitrary intervention date.

The analysis also required a control cohort. This included patients who were not rostered with a PEM during the entire study period (fiscal years 2006/07 through 2010/11; for the control cohort, the arbitrary intervention date was September 30, 2008). To ensure that the control cohort was similar to our case cohort, we used propensity score matching based on the patient's age, sex and geography.

In the next step we linked the case cohort and the control cohort to the National Ambulatory Care Reporting System (NACRS) to get the number of ED visits.[7] These were defined as CTAS levels IV and V, consisting of relatively less urgent ED cases.

Methodology

To measure the effect of PEM rostering on ED visits in Ontario, we employ the difference-in-difference regression technique. Expressed algebraically, the research design is:

$$Y_{i,t} = \alpha + \beta_1 PEM_i + \beta_2 T_t + \beta_3 (PEM_i)*(T_t) + \beta_4 X_{i,t} + \varepsilon_{i,t}$$

where:

$Y_{i,t}$ = number of emergency department visits for patient i in time period t. For simplicity, we group our data into two time periods, with fiscal years 2006/07 and 2007/08 together representing the pre-intervention period (t=0) and fiscal years 2008/09 through 2010/11 together representing the post-intervention period (t=1); thus ED visits represent the sum of visits in 2006/07 and 2007/08 when t=0 and the sum of ED visits in 2008/09 through 2010/11 when t=1;

T_t is a binary variable: =1 indicating post-intervention, =0 indicating pre-intervention;

PEM_i is a binary variable indicating the case cohort with enrolment with a PEM/non–fee-for-service (=1) or the control cohort established through propensity score matching, with fee-for-service/non-PEM (=0);

$X_{i,t}$ is a vector of other control variables: patient's age (included as a categorical variable), place/LHIN of residence[8] and sex;

$\varepsilon_{i,t}$ is the error term, assumed to be normally distributed; and

$(PEM_i)*(T_t)$ is the interaction term representing the intervention (enrolment with PEM) effect.

Finally, α, β_1, β_2, β_3 and β_4 are regression parameters to be estimated, with β_3 representing our parameter of interest. β_3 measures the effect of rostering with PEMs on the number of ED visits in Ontario.

The advantage of the difference-in-difference research design is that it permits the establishment of a causal relationship between variables of interest. With this approach, the behavioural change for the control cohort picks up any naturally occurring changes in behaviour over time, while the treatment group/case cohort's behavioural change picks up the same naturally occurring changes over time plus the impact of the intervention (enrolment in PEMs). Thus, a comparison of the changes in behaviour of the two groups that are similar on observable characteristics reveals the impact of the intervention.

One concern in estimating the impact of patient enrolment on ED visits is that of patient selection, which may lead to biased estimates of our parameter of interest, β_3. More specifically, certain PEMs – capitation models (FHNs and FHOs) in particular – may incentivize physicians to "cream-skim" their patients, i.e., choose to roster only healthier patients or those likely to require little care in the future. This would result in a healthier patient sample – or patients less likely to use EDs – under PEMs, and a relatively less healthy patient sample in our control group.

A potential solution to the selection issue would be to introduce several control variables and assume that any difference between the case cohort and control cohort is fully accounted for by these variables. In particular, controlling for factors such as case mix of patients would reduce such bias. However, the data sets that we used do not have extensive clinical or other individual-level information that could be used as potential controls.[9]

Given these shortcomings, we dealt with the selection issue in the following manner: first, we used propensity score matching to construct our control cohort so that this cohort was similar, at least on observable characteristics, to the case cohort. Second, we introduced 96 sub-LHIN–level dummies to control for any geographic or socio-economic variation in ED rates. Finally, assuming that any remaining bias between the case and the control cohorts was based on unobservable patient characteristics that are time-invariant or if there existed "selection on unobservables," then such biases were differenced away under the difference-in-difference regression approach.[10]

Another, perhaps more serious, concern with the above framework is the assumption of normally distributed errors. Clearly, this assumption is violated here because the distribution of ED visits is skewed to the right with a preponderance of zeros; 80% of individuals in our sample had 0 ED visits (Table 1). Given this, we modified the above framework and tested four regression models that offered, successively, more safeguards against misspecification of the conditional mean and the error structure. These count data models are the Poisson model, the negative binomial model, the zero-inflated Poisson (ZIP) model and the ZINB model.

TABLE 1. Total and average emergency department (ED) visits (with standard deviation), 2006/07 through 2010/11

ED visits	Number of ED visits	% ED visits
0	1,722,307	79.6
At least 1	441,545	20.4
Total	2,163,852	100
Average ED visits	0.37	
Standard deviation of ED visits	1.25	

The Poisson specification is a basic econometric model that is able to incorporate the discrete non-negative values of ED visits. However, one restriction of the model is that the mean and variance of the count data be equal. As Table 1 shows, this assumption is violated because

the variance of ED visits is much larger than the mean. Theoretically then, the negative binomial model turns out to be more flexible, because under this model the mean and variance are no longer required to be equal. In other words, over-dispersion in the data is no longer an issue.

However, if the major source of dispersion in the data is the preponderance of zero counts, the ZIP or the ZINB models may be more appropriate than the Poisson or the negative binomial model (Karazsia and van Dulmen 2008). This consideration is particularly relevant to our study because 80% of ED visits have a zero count (Table 1).

A key statistical advantage of the zero count models over the Poisson and the negative binomial models is that the former can model the preponderance of zeros as well as the distribution of positive outcomes simultaneously. More specifically, these models first account for the excessive zeros by predicting group membership (a dichotomous outcome) based on predictors in the model and then predicting the frequency of counts for the "non-zero group" (a continuous outcome). The latter process is similar to a standard Poisson or negative binomial model, but after accounting for excessive zeros. The ZIP model accurately reflects the data when over-dispersion occurs due to a preponderance of zeros, while the ZINB model is more appropriate when the over-dispersion is due to factors beyond the inflation of zeros (Karazsia and van Dulmen 2008). Based on likelihood ratio tests for model selection, the ZINB model proved the most appropriate for the data used for the study.

In the next section we present results using the ordinary least squares regression framework and the ZINB model. While the primary objective of this study was to assess the relationship between rostering and emergency department utilization, we use the results from the ZINB model to derive an estimate of the potential financial savings for hospitals in Ontario for fiscal year 2010/11.

Empirical Results

Table 2 presents descriptive statistics for the case cohort – patients enrolled in PEMs starting fiscal year 2008/09 through 2010/11, and the control cohort – patients who were never enrolled in a PEM throughout the study period (2006/07 through 2010/11).

TABLE 2. Characteristics of case cohort and control cohort, for fiscal years 2006/07 through 2010/11

	Case cohort		Control cohort	
	Mean	n	Mean	n
Male	0.511	276,317	0.513	277,729
LHIN of residence				
Erie St. Clair	0.060	32,212	0.060	32,686
South West	0.064	34,412	0.064	34,570
Waterloo Wellington	0.037	20,238	0.041	22,086
Hamilton Niagara Haldimand Brant	0.089	48,239	0.089	48,165
Central West	0.060	32,692	0.062	33,338
Mississauga Halton	0.091	49,434	0.090	48,693

TABLE 2. Continued

	Case cohort		Control cohort	
	Mean	**n**	**Mean**	**n**
Toronto Central	0.104	56,360	0.103	55,618
Central	0.142	76,984	0.143	77,147
Central East	0.129	69,541	0.135	73,207
South East	0.042	22,651	0.044	23,706
Champlain	0.105	56,768	0.101	54,606
North Simcoe Muskoka	0.025	13,468	0.016	8,904
North East	0.037	19,830	0.036	19,503
North West	0.015	8,134	0.016	8,734
Age categories				
0–4 years old	0.028	15,202	0.028	15,276
5–9 years old	0.045	24,521	0.046	25,084
10–14 years old	0.059	31,905	0.057	31,066
15–19 years old	0.072	38,679	0.069	37,569
20–24 years old	0.075	40,500	0.074	39,840
25–29 years old	0.079	42,707	0.077	41,628
30–34 years old	0.08	43,017	0.082	44,531
35–39 years old	0.083	44,979	0.084	45,330
40–44 years old	0.088	47,843	0.086	46,593
45–49 years old	0.09	48,948	0.093	50,562
50–54 years old	0.078	42,321	0.079	42,631
55–59 years old	0.063	34,232	0.061	32,960
60–64 years old	0.051	27,584	0.052	28,010
65–69 years old	0.035	19,024	0.036	19,701
70–74 years old	0.027	14,496	0.027	14,807
75–79 years old	0.021	11,131	0.021	11,182
80–84 years old	0.015	7,931	0.015	8,246
85 plus	0.011	5,943	0.011	5,947
Total number of observations	**540,963**		**540,963**	

Case cohort represents patients that were enrolled in a PEM starting fiscal year 2008/09. The control cohort, derived from propensity score matching, includes patients that were never enrolled in a PEM throughout the study period (2006/07 through 2010/11).

The table indicates that the fraction of males, the fraction of individuals located in different LHINs in Ontario and the fraction of individuals in different age categories are very similar across the two cohorts. This is no surprise because the control cohort was constructed based on propensity score matches of age, sex and location with the case cohort.

To get a more accurate picture of ED visits by cohort type, we analyzed ED visits pre- and post-2008/09, our arbitrary intervention date. Overall, ED visits in Ontario have been climbing upwards over time – for example, between fiscal years 2004/05 and 2010/11, ED visits in Ontario increased from 408 per 1,000 population to 421 per 1,000 population, or by 3% (Table 3). On the other hand, visits defined as ED visits for the purposes of this study – the CTAS IV- and V-level visits representing less severe cases – dropped by 9% over the same period.

TABLE 3. ED visits per 1,000 population in Ontario, by CTAS levels, Ontario

CTAS category	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	Change FY 2004/05 to FY 2010/11	% change FY 2004/05 to FY 2010/11
I–II	42	47	48	53	56	60	66	24	5.9%
III	148	155	155	157	162	171	174	26	6.4%
IV–V	218	213	210	205	197	188	181	–37	–9.1%
Total	**408**	**415**	**414**	**415**	**414**	**419**	**421**	**13**	**3.2%**

Table 4 shows mean emergency department visits (CTAS IV and V) pre- and post-intervention for the case cohort and the control cohort. The table shows that for both cohorts, ED visits declined post-intervention, although the rate of change is higher for enrolled patients.[11] Ideally, for the difference-in-difference research design, mean ED visits pre-intervention (i.e., pre-2008/09) should be similar across the two cohorts. However, mean ED utilization for the control cohort (at 0.37) is lower than the mean ED utilization for the case cohort (at 0.42). One potential reason for this may be that some individuals with a valid health number who appeared to be eligible for OHIP services and were active (i.e., they had at least one claim in the past six years) were in fact not residing in the province (they may have left the province or did not live continuously in the province). This issue could be more likely for individuals in the control cohort, resulting in lower average ED visits for individuals in that cohort.

TABLE 4. Average per-patient ED utilization (visits CTAS levels IV and V), pre- and post-intervention, Ontario (without controls)

	Pre-intervention	Post-intervention
Case cohort	0.42	0.37
Control cohort	0.37	0.32

Case cohort represents patients that were enrolled in a PEM starting fiscal year 2008/09. The control cohort, derived from propensity score matching, includes patients that were never enrolled in a PEM throughout the study period (2006/07 through 2010/11). For this study, the intervention period (rostering with a PEM) was arbitrarily chosen as fiscal year 2008/09.

To establish the relationship between PEM enrolment and ED visits, we controled for patient's age, introduced as five-year groups, with ages 85-plus years as the reference category; person's sub-LHIN of location in Ontario; and whether the individual was female (with male as the reference category), in a regression framework. Table 5 presents results from OLS regression (first column), followed by results from the ZINB regression model.

TABLE 5. Effect of rostering with patient enrolment model (PEM) on emergency department (ED) visits in Ontario using various models

	Ordinary least squares		Zero-inflated negative binomial	
	(1)		(2)	
	Coeff.	SE	IRR	SE
PEM	0.050***	0.002	1.084***	0.006
Period	-0.046***	0.002	0.913***	0.007
PEM*Period	-0.005	0.003	0.965***	0.009
Female (reference=male)	0.000	0.002	1.019***	0.005
Age group (reference = 85 plus)				
0–4 years old	0.211***	0.009	1.266***	0.027
5–9 years old	0.054***	0.009	0.934**	0.027
10–14 years old	0.060***	0.009	0.968	0.027
15–19 years old	0.160***	0.008	1.250***	0.026
20–24 years old	0.165***	0.008	1.261***	0.026
25–29 years old	0.121***	0.008	1.196***	0.026
30–34 years old	0.093***	0.008	1.162***	0.026
35–39 years old	0.064***	0.008	1.129***	0.026
40–44 years old	0.049***	0.008	1.106***	0.026
45–49 years old	0.027**	0.008	1.079**	0.025
50–54 years old	0.016*	0.008	1.035	0.026
55–59 years old	-0.003	0.008	0.984	0.026
60–64 years old	-0.002	0.009	1.001	0.026
65–69 years old	-0.007	0.009	1.005	0.027
70–74 years old	0.023**	0.009	1.088**	0.028
75–79 years old	0.037**	0.010	1.068**	0.029
80–84 years old	0.051***	0.010	1.141***	0.030
Constant	0.407***	0.013	0.611***	0.037
Controls for sub-LHIN (health region of residence)	Yes		Yes	

***$p<0.0001$, **$p<0.05$, *$p<0.10$

IRR = Incidence Rate Ratios with the corresponding Standard Errors (SE); All SEs are robust; total observations = 2,163,852

PEM is a dummy variable coded 1 if case cohort (patients enrolled in a PEM) or 0 if control cohort (patients never enrolled in a PEM throughout the study period); "period" represents the arbitrarily set intervention period (2008/09) and is coded 1 for all time periods post-2008/09 (i.e., fiscal years 2008/09, 2009/10 and 2010/11) and is set 0 for pre-intervention period (fiscal years 2006/07 and 2007/08); the difference-in-difference estimate is represented by the interaction term PEM*Period.

Results from ordinary least squares (OLS) regression in column (1) suggest an inverse (although not statistically significant) effect of rostering with PEM on ED visits, with the coefficient on the interaction term (PEM*Period) of -0.005. As mentioned previously, because the distribution of ED visits is positively skewed, count data models may provide a better fit for the data. In column (2), we present results from the ZINB model. For ease of interpretation, coefficients have been transformed into incidence risk ratios (IRR).

Before we present the results of the ZINB model, it may be instructive to briefly discuss other count data models that were tested against this model. We tested the Poisson model, the negative binomial model and the ZIP model using the same controls as the OLS and the ZINB model (regression results and model selection tests have not been shown but are available upon request.) For the negative binomial model, the dispersion parameter "alpha" was significantly greater than zero, suggesting that the response variable is over-dispersed and is not sufficiently described by the simpler Poisson distribution. While the negative binomial model certainly fit the data better than the Poisson model, we wanted to determine whether zero-inflated models may yet be more appropriate given the preponderance of zeros in our data.

To do so, we first carried out the Vuong test – a likelihood ratio test for model selection. The test compares the ZIP model to a standard Poisson model and the ZINB model to the negative binomial model. For the ZIP model, the *z*-value was positive and significant, suggesting that the ZIP model fit the data better than the standard Poisson model. More importantly, the *z*-value for the ZINB model was also positive and statistically significant, suggesting that the ZINB model is more appropriate than the standard negative binomial.

Next, we conducted a likelihood ratio test to establish whether the ZINB model is more appropriate compared to the ZIP model. The large test statistic with an associated *p*-value of <0.0001 suggests that the ZINB model fit our data better than the ZIP model. We derived two additional measures of model fit: the Akaike's information criterion (AIC) and the Bayesian information criterion (BIC) to compare the ZIP model and the ZINB model. Both these measures were relatively smaller for the ZINB model, suggesting again that the ZINB model is more appropriate for our data, which are over-dispersed and have a preponderance of zeros. (For the ZINB model, the AIC is 3,164,402 and the BIC is 3,165,297. For the ZIP model, the AIC is 3,367,582 and the BIC is 3,368,464.)

Results for the ZINB model in column (2) indicate that enrolment with a PEM is associated with a statistically significant decline in ED visits. For our sample, enrolment with a PEM results in an average 3.5% reduction (IRR = 0.965) in ED visits.

The other variables in column (2) confirm earlier findings. The coefficient on PEM indicates that pre-intervention, ED visits for those enrolled in PEMs are significantly higher than for the control cohort. Further, the coefficient on period suggests that post-intervention, ED visits declined significantly for the non-enrolled group. However, the interaction term suggests that the rate of change of the decline in ED visits is higher for enrolled patients. This finding implies that PEMs have had a significant additional protective effect in terms of the overuse of EDs.

In terms of sex, results suggest that males use EDs more than females. Finally, those very young (0–9 years of age) and those much older (70–84 years of age) use EDs more than those in the 85-plus age group. However, individuals in a number of working age groups (15–49 years) also use emergency departments more than those in the 85-plus age category. This finding reflects the possible overuse of ED facilities for less emergent care by individuals in different age categories.

Together, the above analysis suggests that rostering is associated with a statistically significant reduction in ED visits. This finding suggests that efforts must continue to encourage physicians to enrol patients so that patients with less serious health conditions do not end up crowding Ontario's EDs.

Discussion

Patient rostering was introduced in Ontario as part of the provincial government's primary care reform initiative, with the objective of improving patient care. Through rostering, patients are able to access the healthcare system through the same healthcare provider over time, thereby benefiting from continuity of care. As well, patients have access to primary care providers (in the enrolling group) after-hours and through the telephone health advisory service, thereby improving access to care.

While the above constitute some direct benefits of patient rostering, the objective of this study was to examine any indirect benefits that may arise due to patient rostering. In particular, our objective was to examine whether patient rostering is associated with any reduction in ED utilization for non-urgent care. Such reduction may result if non-urgent patients seek treatment with their rostering healthcare provider, their first point of contact with the health system, rather than at emergency departments.

Our results suggest that PEMs have achieved some degree of success in enhancing health system efficiency in Ontario through the reduction in the use of EDs for non-emergent care. The study shows that enrolment with PEMs reduced ED visits by 3.5% on average for the study period 2006/07 through 2010/11.

The above estimates can be used to derive potential financial savings for hospitals in Ontario for fiscal year 2010/11. The 3.5% estimated reduction in ED visits results in about 55,000 fewer ED visits (CTAS levels IV and V) for rostered patients (from 1,577,214 visits to 1,522,012 visits) for FY 2010/11. With the average cost of such an ED visit at $147.38, the potential cost saving for hospitals is estimated at $8 million (derived by multiplying the mean cost per visit with the reduced number of visits estimated from the model).[12] Further, if the same reduction in ED visits could be achieved for non-enrolled patients (who had 546,251 non-urgent visits), this would result in approximately $2.8 million in additional potential savings for hospitals for the same fiscal year.

These results are in line with other related research that has shown that continuity of care is associated with not only better patient outcomes but also with the more efficient use of the health system. A paper by Glazier and colleagues (2008) shows that in Ontario, patients without a regular family doctor were 1.22 times more likely to visit an ED and 1.32 times more likely to have had a medical, non-elective hospital admission than people who reported having a regular family doctor. Other studies have shown that continuity of care is associated with decreased hospital visits in the United States (Raddish et al. 1999) and reduced ambulatory care–sensitive hospitalizations in Canada (Menec et al. 2006).

The present study is an individual-level analysis of the relationship between rostering and ED utilization. The administrative data in the study, obtained from the Ministry of Health

and Long-Term Care, are highly reliable and permit a study of the relationship over time. Previous studies primarily used cross-sectional data to assess this relationship.

Our study has some limitations. First, we did not have access to and were therefore unable to control for population groupers such as Adjusted Clinical Groups or Diagnostic Cost Groups. Usage of such systems for propensity score matching and risk adjustment could further improve model performance. Second, we did not have reliable information for other potentially important factors such as the rural/urban location or patients' ethnic background. However, we used 96 sub-LHIN dummy variables to mitigate somewhat the effect of location on ED utilization. Third, our study was conducted during a period in which coding changes to the triage levels were underway. This may have accounted for the general downward trend observed over time for all patients in their use of EDs for less urgent care. Finally, in terms of the study design, the case and the control groups were not comparable in their ED use at baseline: the case cohort's utilization of EDs for non-urgent care was relatively higher.

In conclusion, our study shows that patient rostering is associated with a statistically significant reduction in non-urgent ED visits. This finding suggests that efforts to encourage rostering of Ontario's patients – thereby improving continuity of care – are likely to result in greater health system efficiencies in the province.

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Notes

1. In Ontario, primary care is organized predominantly around family physicians and general practitioners working in solo and small group practices (Hutchison et al. 2001).
2. The Canadian Triage and Acuity Scale (CTAS) levels IV and V represent less complex non-urgent visits that may have, potentially, a primary physician visit substitution. The CTAS, developed by the Canadian Association of Emergency Physicians (CAEP) in 1998, is based on medically acceptable wait times in Canadian EDs. The scale includes five categories, where level I consists of the most urgent cases (resuscitation) and level V constitutes the least urgent (non-urgent) cases. Patients are assigned a category according to level of urgency, and each level has an expected fractile response time indicating maximum waiting time for the type of complaint.
3. The penalty is applied if patients go outside the group, even if they go to a different FHN group. There are further premiums and incentives in these primary care service delivery models; for details, see Muldoon and colleagues (2006).

4. Compared to FHNs, FHOs have a broader basket of fee schedule codes that are subject to capitation and not fee-for-service payment. This presumably explains the higher capitation rates for FHOs.
5. The other PEMs in Ontario include the comprehensive care model (CCM), a fee-for-service blended model; community health centres (CHCs) and Aboriginal health access centres (AHACs), both blended salary models; group health centres (GHCs), a blended capitation model; rural and northern physician group agreements (RNPGAs); and shared care pilot sites (SCPSs). For detailed information on PEMs, see HealthForceOntario (2007).
6. CHDB is the repository of information retained by MOHLTC relating to medical claims submitted by providers of healthcare services to eligible Ontario residents. The database is used in the assessment and processing of claims and is a financial record of monies paid to a provider for services billed on behalf of Ontario residents.
7. NACRS contains data for all hospital-based and community-based ambulatory care, including surgical day/night care, outpatient clinics and EDs. Currently, data submission to NACRS has been mandated in Ontario for emergency rooms, surgical day/night care, dialysis, cardiac catheterization and oncology (including all regional cancer centres).
8. Ontario's 14 local health integration networks (LHINs) are community-based, non-profit organizations funded by the Ministry of Health and Long-Term Care to plan, fund and coordinate services delivered by hospitals, long-term care homes, community care access centres, community support service agencies, mental health/addiction agencies and community health centres.
9. For example, not all patients in our sample were hospitalized; case mix of patients is observed only for the sample of patients that are ever-hospitalized.
10. A related concern is that individual physicians may self-select into different remuneration groups based on unobservable personal preferences, their abilities or other unobservable characteristics (Gaynor and Gertler 1995), which could potentially influence their delivery of care. However, so long as the unobservable heterogeneity is time-invariant, it is differenced away under the difference-in-difference approach.
11. Possible explanations for the downward trend in ED visits may be the change in triaging practice (fewer patients coded as CTAS levels IV and V and instead coded as CTAS III) on account of the revision of the scale in 2008; or, better access to walk-in clinics and primary physicians for all patients regardless of enrolment status.
12. The average hospital cost of an ED visit (CTAS IV and V) was derived from the Ontario Case Costing Initiative (OCCI) database, which has individual patient costs.

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RESEARCH PAPER

Deliberative Dialogues as a Strategy for System-Level Knowledge Translation and Exchange

Le dialogue délibératif comme stratégie d'échange et de transfert de connaissances au niveau du système

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Abstract

We undertook a case study in order to explore deliberative dialogue as a system-level knowledge translation and exchange (KTE) strategy and to describe the design features and intended effects of this dialogue. Our data included observations made during the dialogue, evaluations completed by dialogue participants and interviews. We placed these data in the context of our broader experience. We learned that (a) all the design elements we examined could be maintained in future dialogues, but organizers of dialogues that address similar issues and take place in similar contexts should consider the relative importance of these

features and (b) the intended effects of a deliberative dialogue that addresses a low-priority policy issue are mainly apparent at the individual level among dialogue participants. Further research is required to explore the key features and intended effects of deliberative dialogues used to address other issues or in different contexts.

Résumé

Nous avons mené une étude de cas pour étudier le dialogue délibératif comme stratégie d'échange et de transfert de connaissances (ETC) au niveau du système et pour décrire les caractéristiques conceptuelles ainsi que les effets visés par ce type de dialogue. Nos données comprennent des observations notées au cours du dialogue, des évaluations faites par les participants et des entrevues. Nous avons situé ces données dans le contexte d'une expérience plus vaste. Nous avons appris que (a) tous les éléments conceptuels examinés peuvent se maintenir dans d'éventuels dialogues, mais les organisateurs de dialogues qui se penchent sur des enjeux semblables et qui ont lieu dans des contextes similaires doivent tenir compte de l'importance relative de ces caractéristiques et que (b) les effets visés par un dialogue délibératif qui porte sur des enjeux politiques de faible priorité apparaissent principalement au niveau personnel parmi les participants au dialogue. Il faut effectuer davantage de recherches pour explorer les principales caractéristiques et les effets visés par un dialogue délibératif utilisé pour aborder d'autres enjeux ou dans des contextes différents.

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System-level knowledge translation and exchange (KTE) strategies aim to support the use of evidence in decision-making about problems or issues affecting the health system (CHSRF 2006). Deliberative dialogues are a group process that can help to integrate and interpret scientific and contextual data for the purpose of informing policy development (Culyer and Lomas 2006), among other objectives. Dialogue processes have been used and studied in the public policy arena for many years. For example, a "citizen's parliament" has been used and studied in Australia as a process to learn about and discuss issues of public importance and to make recommendations to public policy makers that reflect the views of the public (Dryzek 2009). Other research has focused on designing deliberative processes to help policy makers assess the strengths and weaknesses of a broad range of policy options and understand stakeholder values and opinions (Kerkhof 2006). More recently, deliberative dialogues have been used as a system-level KTE strategy by bringing various players involved in the policy making process together (e.g., policy makers, stakeholders such as professional and consumer groups, and researchers) to learn from one another and from the research evidence about a specific problem, options for addressing it and implementation considerations (Boyko et al. 2012; Lavis et al. 2009).

Although several key design features of deliberative processes have been identified as promising (e.g., skillful chairing, consultation with all parties affected by the outcome)

(Kerkhof 2006; Lomas et al. 2005), Lavis (2008) suggests that it is very unlikely that a single approach to organizing a dialogue will work for all issues or in all contexts. An important step towards matching specific organizational elements to specific issues or contexts would be to seek input about key design features from dialogue participants. This knowledge can then be used to prepare for future research that examines the effectiveness of specific features that have been appropriately matched to issues or contexts (Lavis 2008).

We undertook a case study of a deliberative dialogue used as a system-level KTE strategy in order to explore the design features and intended effects of this dialogue. More specifically, our objectives were to explore how the participants in one particular deliberative dialogue (a) viewed and experienced specific design features and (b) used the deliberations to support their decision-making following the dialogue. Lessons learned from this study will contribute to our understanding about deliberative dialogues in general, and can inform the organization and evaluation of dialogues that address similar types of issues and that take place in similar contexts.

Methods

Sample and setting

Our sample comprised one case of a deliberative dialogue held to integrate and interpret scientific and contextual data for the purpose of informing policy development. The dialogue was convened by the McMaster Health Forum (www.mcmasterhealthforum.org) and included 14 individuals who were selected by a steering committee as part of the forum's standard planning process. The forum's deliberative dialogue approach generally includes preparatory consultations to help clarify the problem, its causes and possible ways to address it; preparation and circulation (before the event) of an evidence brief; convening a group of 18 to 22 policy makers, stakeholders and researchers for an off-the-record dialogue about the issue; preparation and circulation (after the event) of a dialogue summary; post-event briefings to dialogue partners; a year-long evidence service; and evaluation of the evidence brief and dialogue (McMaster Health Forum 2014). The dialogue participants were drawn from across Canada in order to capture a broad Canadian perspective and to ensure the dialogue engaged a broad array of those involved in the issue, including health system policy makers, managers, stakeholders and researchers. The issue addressed by the dialogue was strengthening chronic pain management in health systems across Canada. The evidence brief prepared by the McMaster Health Forum characterizes the issue in four key ways: (a) the burden of chronic pain that the healthcare system must prevent or manage is high; (b) effective chronic pain management programs, services and drugs are not always available or accessible to all Canadians; (c) current health system arrangements do not support chronic pain management for all Canadians; and (d) there is no "home" for the development, updating, implementation and monitoring of clinical practice guidelines for the management of chronic pain (Lavis and Boyko 2009).

The context within which our case study dialogue took place can be characterized by contrasting it with other dialogues convened by the McMaster Health Forum. First, the focus of dialogues convened by the forum has been local (e.g., Enhancing Patient Transitions from Treatment in Regional Cancer Centres), provincial (e.g., Coordinating the Use of Genetic Tests and Related Services in British Columbia), national (e.g., Supporting Chronic Pain Management across Provincial and Territorial Health Systems in Canada) and international (e.g., Engaging Civil Society in Supporting Research Use in Health Systems), with our case study having a national focus (McMaster Health Forum 2013). Second, previous dialogues convened by the forum included government policy makers, but our case study did not. The forum's steering committee was unable to identify public policy makers who include chronic pain as an issue within their portfolio of responsibilities (despite concerted effort to identify such representation by linking with partners and collaborators in the field of chronic pain). The lack of identifiable contact individuals in government who prioritize engaging with the issue suggests that chronic pain is not a governmental priority. Third, our case study took place within the broader context of a research project entitled Community Alliances for Health Research and Knowledge Translation on Pain (www.cahr-pain.ca). This is a salient difference between the dialogue we studied and others convened by the forum, because the dialogue participants were also part of a research study. An implication of this approach is that the deliberations were observed by a third party. Typical dialogues are "closed" in order to create an environment that enables participants to engage in off-the-record discussions.

Data collection

We collected three types of data over a six-month period that started when our case study dialogue was held. Informed consent was obtained from all dialogue participants (the study protocol was approved by the Hamilton Health Sciences/Faculty of Health Sciences Research Ethics Board, Project #09-402). As part of the consent, dialogue participants agreed to (a) have their participation in the dialogue observed; (b) allow the evaluation data collected by the McMaster Health Forum as part of its standard evaluation procedures to be used for this study; (c) participate in a 30-minute telephone interview two weeks after the dialogue; and (d) participate in a 30-minute telephone interview six months after the dialogue. The first data we collected included observations about the dialogue's design features in context. One researcher (JB) recorded observations during the day-long dialogue, as well as observations about the documents that were prepared by the forum and that participants received as part of their participation (e.g., invitation letter, agenda, evidence brief and evaluation forms).

The second type of data we used included interviews with dialogue participants at two different time intervals. We scheduled interviews with all willing participants two to three weeks after the dialogue. During this first round of interviews, we gathered information about participants' views and experiences in relation to design features and efforts made to address the featured policy issue, including what they have personally done. We invited participants to

a follow-up interview six months later. During this second round of interviews, we gathered information about participants' views about and experiences with the dialogue overall, themes emerging from the data we already collected, whether and how participants had used what they learned from the dialogue, and perceived barriers and facilitators to taking action. The interviews at both time intervals were semistructured, with standard open-ended questions supplemented by probes. Audio recordings and notes were taken during all interviews. We arranged for each audio recording to be transcribed, which allowed us to revisit themes that were not captured through our interview notes. All interviews were conducted by telephone except for two that were held in person.

Finally, we used secondary data that were originally collected by the McMaster Health Forum as part of their ongoing evaluation of deliberative dialogues. The forum conducts formative and summative evaluations of all their dialogues. The questionnaire that the forum uses includes general questions about the dialogue, specific questions about design features, questions about the intentions of participants to use what they learned (Boyko et al. 2011) and questions about participants' roles and backgrounds. The evaluation questions require both ratings and written responses. Details about the forum's questionnaire and evaluation procedures may be obtained by contacting the McMaster Health Forum directly.

Data analysis and coding

Our analysis included both quantitative and qualitative approaches. We calculated simple descriptive statistics of the evaluation ratings provided to us by the McMaster Health Forum. We coded all the qualitative data (i.e., field notes, interview transcripts and written comments from the forum's evaluations) according to the key features of the forum's deliberative dialogues (Box 1). A matrix was devised in order to compare findings about the key features from across the data. The team met on several occasions to reflect upon, discuss and come to mutual agreement on how to interpret the data. We made every effort throughout to establish credibility and to ensure that our findings represented the deliberative dialogue we studied. For example, we used triangulation to compare findings from across data sources in order to strengthen interpretations and create a more meaningful description of our case. We considered the types of data we used in our study to be "equal" given that all our data were based on human judgments (i.e., field notes, interviews, survey comments and ratings). In order to demonstrate transferability of our findings to other similar dialogues, we maintained detailed notes that helped us to provide an account of our case study that we hoped would allow readers to determine whether the findings were applicable to their situation. NVivo 8 software was used to organize and keep track of all qualitative data. Our overall analysis was informed by our knowledge and experience of deliberative dialogues in general, as well as the specific approach used by the McMaster Health Forum.

BOX 1. Key features of the McMaster Health Forum's deliberative dialogues

1. *Addressed a high-priority policy issue.*
2. *Opportunity to discuss different features of the problem, including (where possible) how it affects particular groups.*
3. *Opportunity to discuss options for addressing the problem.*
4. *Opportunity to discuss key implementation considerations.*
5. *Opportunity to discuss who might do what differently.*
6. *Informed by a pre-circulated evidence brief.*
7. *Informed by discussion about the full range of factors that can inform how to approach a problem, possible options for addressing it and key implementation considerations.*
8. *Brought together many parties who could be involved in or affected by future decisions related to the issue.*
9. *Fair representation among policy makers, stakeholders and researchers.*
10. *Facilitator to assist with the deliberations.*
11. *Allowed frank, off-the-record deliberations by following the Chatham House rule.*
12. *Did not aim for consensus.*

Results

Participants' views about and experiences with specific design features

A summary of our findings related to participants' views about and experiences with specific design features appears in the Appendix. Our quantitative data demonstrate that the mean evaluation ratings for the features that we examined were 5.7 or higher on a scale of 1 (very unhelpful) to 7 (very helpful). The lowest-rated design feature was 5.7 (fair representation among policy makers, stakeholders and researchers) and the highest was 6.9 (facilitator to assist with the deliberations). The most common response was 7 or "very helpful" across all the questions pertaining to views about how the dialogue was designed. Several design features had a mean evaluation rating of 6.7 or higher on a scale of 1 (very unhelpful) to 7 (very helpful).

Our qualitative findings provide further insight into the views and experiences of the dialogue participants. We considered four design features particularly noteworthy because each included data from field notes, interviews and evaluation comments, and each included a range of observations (i.e., neither overwhelmingly positive or negative). The first of these design features is that the dialogue provided an "opportunity to discuss different features of the problem, including (where possible) how it affects particular groups." Although the dialogue did not include a focus on how chronic pain affects different groups, two participants that were affiliated with consumer groups shared their personal experiences and challenges in terms of receiving healthcare. Interview comments reflected that participants liked the broad discussion (i.e., without segmentation into groups) given the issue is so complex and a one-day event can only "scratch the surface" in terms of understanding the issue and how to address it. Written comments reflected a lack of discussion about how the problem relates to particular groups.

The second noteworthy design feature relates to how the dialogue provided an "opportunity to discuss options for addressing the problem." The evidence brief that each participant received prior to the dialogue included three options for addressing the issue of chronic pain management in health systems across Canada. These options were the starting point for deliberation about ways to address the problem. Although written comments supported the usefulness of this element, interview comments were mixed. Two participants very clearly indicated that they liked that the options focused the discussion and thinking of participants. Other participants found the options distracting and suggested alternative ways of focusing discussion about policy options such as more actively soliciting what participants think policy options might be.

The third noteworthy design feature is that the dialogue was "informed by a pre-circulated evidence brief." During the dialogue, suggestions were made for improving the evidence brief, including incorporating more qualitative and cost-effectiveness data. During the interviews one participant expressed concern about the transparency of who wrote the evidence brief and whether there was truly an "arm's-length" distance from the funding body of the initiative. Another interviewee found the evidence brief "hard to read" from a visual perspective.

Written comments regarding the evidence reflected enthusiasm for this design element.

Finally, the feature "fair representation among policy makers, stakeholders and researchers" is noteworthy. Several comments were made throughout the day-long event that reflected participants' disappointment with the lack of policy maker representation at the dialogue. Interview comments also reflected the need for more policy maker representation. One participant noted: "I see the problem more that we didn't have the policy people there and several of the people that are in leadership roles and related areas." Written comments also clearly reflected that participants perceived there was not fair representation of policy makers.

Participants' use of the deliberations to support their decision-making

We examined participants' use of the deliberations to support their decision-making by considering their intended and actual use of the full range of factors (including research evidence) affecting the problem, possible options for addressing it and key implementation considerations. Our main quantitative finding related to this objective comes from the forum's evaluation data. The mean of three questionnaire items that measured intention to use research evidence was 6.5 on a scale from 1 (strongly disagree) to 7 (strongly agree).

Our qualitative data related to this objective include written comments from the forum's evaluation data, as well as findings from the second round of interviews that we conducted. The written comments include the results of written response questions that aim to gather comments about future efforts to address the policy issue. All the written comments generally reflect that participants did intend to use what they learned at the dialogue, and the findings from the interviews suggest that many actually did so. We asked participants during the second round of interviews to reflect on what they learned from participating in the dialogue and to identify an important action that they personally have done better or differently to address

the featured policy issue. Several participants identified such actions as speaking with others in their organization about the policy options discussed at the dialogue, and sharing learning with other stakeholders (consumers, colleagues) who were not involved in the dialogue. Some participants did not identify actions related to using research evidence, but rather skills or resources gained as a result of their participation. It is also important to note that although participants were able to identify ways in which their participation in the dialogue had affected them individually, most participants also found it difficult to attribute a specific action to the deliberative dialogue.

Discussion

Our case study of a deliberative dialogue used as a system-level KTE strategy demonstrates two key lessons. First, our study highlights the importance of considering specific design elements of deliberative dialogues that depend on the nature of the issue being addressed and the policy context. All the design elements we examined in the current case study were perceived as useful and could be maintained in future dialogues. However, future dialogues that address similar issues and that take place in similar contexts should consider the relative importance of these features. For example, our study demonstrates that "fair representation among policy makers, managers, stakeholders and researchers" is a challenge for deliberative dialogues that address low-priority policy issues (i.e., those that are not on the "radar" of government decision-makers). Lack of policy maker representation is a salient difference between our case study and other dialogues with which we have been involved (which for the most part have included policy makers) and speaks to there being no one directly affiliated with government that has policy related to the issue within their portfolio of responsibilities. Participants in our case study dialogue perceived this lack of representation by policy makers as a barrier to sparking policy change related to the issue at hand. Thus, it is important to consider the most appropriate geographical context within which to address a low-priority health system issue using a deliberative dialogue. If a dialogue cannot ensure appropriate representation from government decision-makers, then it may be important to address the issue at a local or provincial level in order to generate interest and action on a smaller geographic scale.

Second, our case study suggests that intended effects of a deliberative dialogue that addresses a low-priority policy issue should be expected at the individual level (as opposed to sparking policy change). Immediately following the case study dialogue the participants intended to use the research evidence of the type that was discussed, and within six months of the dialogue some had done so. This finding suggests that the deliberative dialogues may have had some effect on the development of policy measures. However, the evidence of this effect is visible only at the individual level through actions that dialogue participants have performed themselves. This suggests that short-term (i.e., over six months) intended effects of deliberative dialogues that take place in similar contexts or address similar issues should be limited to measures of evidence use among deliberative dialogue participants.

Strengths and limitations

A central strength to our study is the contribution it makes to understanding the key features and intended effects of deliberative dialogues used to address health system issues. We used case study methodology to provide a rich description of the key design features and intended effects of our case study dialogue, which will be useful for future dialogues that address similar issues and that take place in similar contexts. Furthermore, we used our insight and experience from planning and facilitating other deliberative dialogues to highlight similarities and differences between our case study and other dialogues that we have been involved with, and to present a comprehensive picture of our findings.

It is also important to evaluate the findings and interpretations we have provided in consideration of certain limitations. First, because this study primarily involved a single deliberative dialogue, it is limited in terms of generalization of the results. Second, this study had a limited duration (i.e., six months). As a result, participants may not have had sufficient opportunity to use the knowledge they gained at the dialogue to address the policy issue. The third limitation is that only the perspective of dialogue participants was sought. Incorporating perspectives from others involved in the dialogue, such as staff, researchers and steering committee members, may have strengthened the credibility of the findings and contributed a richer understanding.

Conclusion

Through this study of a deliberative dialogue used as a KTE strategy to support action at the system level, we have explored what participants think about specific design features and how they used the deliberations to support evidence-informed decision-making and other actions. Our study has demonstrated that deliberative dialogues that aim to address a low-priority health system issue could maintain (with some modification) all 10 of the key design features we explored and evaluate short-term intended effects at the individual level among dialogue participants. Future research is required that compares the effects of deliberative dialogues that are similar in terms of design but different in terms of the issues addressed or the contexts in which they take place.

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