

Better access to outpatient magnetic resonance imaging in Ontario, but for whom?

John J. You, MD MSc, Vikram Venkatesh, MD, Andreas Laupacis, MD MSc

Dr. You is an Assistant Professor of Medicine and Clinical Epidemiology & Biostatistics at McMaster University in Hamilton, Ontario, Canada. Dr. Venkatesh is a postgraduate trainee in the Department of Radiology at McMaster University. Dr. Laupacis is the Executive Director of the Li Ka Shing Knowledge Institute of St. Michael's Hospital in Toronto, Ontario, Canada. Drs. You and Laupacis are Adjunct Scientists at the Institute for Clinical Evaluative Sciences in Toronto.

Author e-mail addresses: John J. You (jyou@mcmaster.ca), Vikram Venkatesh (vikvenk@yahoo.ca), Andreas Laupacis (laupacisa@smh.toronto.on.ca)

Word count (excluding abstract, acknowledgements, figure legends, and references): 776

Number of tables: 0; number of figures: 1

Address correspondence to: Dr. John J. You, McMaster University, 1200 Main Street West, HSC-3V51, Hamilton, ON. Tel: (905) 521-2100, x76722. Fax: (905) 521-4971.
e-mail: jyou@mcmaster.ca

Revised: July 22, 2008

ABSTRACT

Background: Ontario has recently made considerable investments to improve access to magnetic resonance imaging (MRI) services. We hypothesized that this has been associated with a widening of previously existing disparities in MRI utilization according to socioeconomic status.

Methods: Analysis of all Ontario Health Insurance Plan claims for outpatient MRI scans performed between April 1, 2002 and March 31, 2007. Age- and sex-standardized rates of MRI utilization were determined using Statistics Canada population and income data.

Results: Over the five-year period, the annual age- and sex-adjusted rate of MRI scanning increased from 1,511/100,000 to 2,976/100,000 (97% increase). In 2002, individuals living in neighbourhoods in the wealthiest quintile were 25% more likely to receive an MRI than individuals living in neighbourhoods in the poorest quintile (age- and sex-adjusted rates of MRI scanning of 1,702/100,000 versus 1,358/100,000). Despite this, the most marked increases in rates of MRI scanning in the subsequent five years were seen among those living in the highest income neighbourhoods (increases of 83%, 87%, 95%, 112% and 102% for the lowest to highest neighbourhood income quintiles, respectively), so that by 2007, those in the highest quintile neighbourhoods were 38% more likely to receive an MRI than those in the lowest quintile neighbourhoods.

Conclusions: Even in jurisdictions with universal health insurance, decision-makers should be aware that efforts to increase capacity may exacerbate disparities in access according to socioeconomic status. This underscores the need for simultaneous initiatives that strive to improve the appropriateness of health services utilization.

INTRODUCTION

In the face of concerns raised by citizens about long waits for health services,^{1,2} federal and provincial governments in Canada made reducing wait times for key health services—including magnetic resonance imaging (MRI) scanning—a priority.³ Under Ontario's Wait Times Strategy, launched November 17, 2004, Ontario has seen considerable investments of \$97 million in incremental operational funding for MRI scans and \$21 million in funding for MRI equipment (personal communication, Steven Johansen, 2008).

Previous work has shown that, despite Canada's system of universal health insurance, there is greater use of some health services (including MRI scanning) among higher income groups and that these differences are unlikely to be explained by differences in medical need alone.⁴⁻⁷ We conducted a population-based analysis to determine whether recent investments in MRI scanning in Ontario have led to a widening of previously documented disparities in outpatient MRI use according to socioeconomic status.

METHODS

We identified all Ontario Health Insurance Plan claims for MRI scans performed between April 1, 2002 and March 31, 2007.⁸ Inpatient MRI exams were excluded since they are covered through hospital global budgets. Only one body part-specific scan per patient per day was counted. Neighbourhood income at the census dissemination area level was used as a proxy for the personal income of patients receiving MRI scans and was determined by linking patients' postal code of residence to the Statistics Canada

Postal Code Conversion File. MRI scanning rates (for Ontario and within each neighbourhood income quintile) were determined using Statistics Canada population and income data, were age- and sex-adjusted using direct standardization to Ontario's 2001 population, and are expressed as the number of MRI scans per 100,000 population. This study was approved by the Sunnybrook Health Sciences Research Ethics Board.

RESULTS

In Ontario, from fiscal years 2002/03 to 2006/07, there were substantial increases in the volume of MRI scans (183,729 to 389,261 scans; 112% increase) and in age- and sex-adjusted population rates of MRI scanning (1,511/100,000 to 2,976/100,000; 97% increase). In 2002/03, the rate of scanning among individuals living in the wealthiest quintile neighbourhoods was 25% greater than for individuals residing in the poorest quintile neighbourhoods (age- and sex-adjusted rates of 1,702/100,000 versus 1,358/100,000). Despite this, the greatest increases in MRI scanning rates over the next five years were seen among those living in the highest income neighbourhoods (increase of 83%, 87%, 95%, 112% and 102% for the lowest to highest neighbourhood income quintiles, respectively; Figure). Thus, by 2006/07, the difference in MRI rates between individuals living in the wealthiest and poorest quintile neighbourhoods had risen to 38%.

DISCUSSION

We found that recent efforts to improve capacity for MRI scanning in Ontario have been successful, with a doubling in MRI utilization over five years, but that utilization increased disproportionately for those living in the richest neighbourhoods.

Although the relative roles of public versus private financing of healthcare in Canada remain hotly debated, many Canadians identify strongly with their healthcare system whose mandate is to provide access to care based on medical need and not on ability to pay.⁹ While we did not adjust for patient level clinical characteristics, it seems unlikely that the disparities we observed can be explained solely by differences in medical need since poorer individuals would be expected, on average, to have a greater burden of disease.

We suspect that individuals with higher socioeconomic status may be more likely to ask their physicians for an MRI scan and may be more adept at navigating the health system to gain access to the health services they desire.^{7,10} Others have found that physicians have negative perceptions of patients of lower socioeconomic status across several domains,^{11,12} and that physicians are more likely to order a diagnostic test in wealthier patients¹³.

Our analysis has some limitations. We did not have data regarding income at the household or individual level; therefore, some misclassification may have occurred. However, our finding of greater health services utilization among higher income groups is consistent with the published literature. Also, we did not have information about which clinical indications were driving the increase in MRI use, or the clinical characteristics of patients receiving the MRI scans. However, most diseases occur more frequently in individuals of lower socioeconomic status and so we would expect disease burden to be highest in the low income neighbourhoods.

In conclusion, even in jurisdictions with universal health insurance, decision-makers should be aware that efforts to increase capacity may have the unintended

consequence of exacerbating disparities in access according to socioeconomic status. Our findings underscore the need for simultaneous initiatives that aim to target new services to those in greatest need and that strive to improve the appropriateness of health services utilization.

ACKNOWLEDGEMENTS

We thank Dr. Rick Glazier for comments on this manuscript. Dr. John You is supported by an Ontario Ministry of Health and Long-Term Care (MOHLTC) Career Scientist Award. The Institute for Clinical Evaluative Sciences receives core operating funds from the Ontario MOHLTC. The Ontario MOHLTC had no role in the study design, analysis and interpretation of data, writing of the report, or the decision to submit the report for publication.

- REFERENCESX**
- (1) Chaouilli v. Quebec (Attorney General). 2005 SCC 35 (June 9, 20005).
 - (2) Mackie R. Queue-jumping foes fear launch of MRI clinics. *The Globe and Mail* 2002 Jul 9;A7.
 - (3) A 10-year plan to strengthen health care. First Ministers' Meeting on the Future of Health Care; 2004 Sep 16. Available: www.hc-sc.gc.ca/hcs-sss/delivery-prestation/fptcollab/2004-fmm-rpm/index_e.html (accessed 2008 May 29).
 - (4) Demeter S, Reed M, Lix L, MacWilliam L, Leslie WD. Socioeconomic status and the utilization of diagnostic imaging in an urban setting. *CMAJ* 2005;173:1173-7.
 - (5) Tu JV, Pinfold SP, McColgan P, Laupacis A. Access to health services in Ontario. Toronto: Institute for Clinical Evaluative Sciences; 2005.
 - (6) Alter DA, Naylor CD, Austin P, Tu JV. Effects of socioeconomic status on access to invasive cardiac procedures and on mortality after acute myocardial infarction. *N Engl J Med* 1999;341:1359-67.
 - (7) Alter DA, Iron K, Austin PC, Naylor CD. Socioeconomic status, service patterns, and perceptions of care among survivors of acute myocardial infarction in Canada. *JAMA* 2004;291:1100-7.
 - (8) Ontario Ministry of Health and Long-Term Care. Ontario Health Insurance Plan (OHIP) Schedule of Benefits and Fees; 2007. Available: www.health.gov.on.ca/english/providers/program/ohip/sob/physerv/d_radiol.pdf (accessed 2008 May 29).
 - (9) Steinbrook R. Private health care in Canada. *N Engl J Med* 2006;354:1661-4.
 - (10) McIsaac W, Goel V, Naylor D. Socio-economic status and visits to physicians by adults in Ontario, Canada. *J Health Serv Res Policy* 1997;2:94-102.
 - (11) Woo JK, Ghorayeb SH, Lee CK, Sangha H, Richter S. Effect of patient socioeconomic status on perceptions of first- and second-year medical students. *CMAJ* 2004;170:1915-9.
 - (12) O'Reilly D, Steele K, Patterson C, Milsom P, Harte P. Might how you look influence how well you are looked after? A study which demonstrates that GPs perceive socio-economic gradients in attractiveness. *J Health Serv Res Policy* 2006;11:231-4.
 - (13) Scott A, Shiell A, King M. Is general practitioner decision making associated with patient socio-economic status? *Soc Sci Med* 1996;42:35-46.

FIGURE LEGEND

Figure. MRI utilization in Ontario by neighbourhood income, 2002/03 to 2006/07

Q1 to Q5 denotes neighbourhood income quintiles, with Q1 representing the lowest income neighbourhoods and Q5 the highest income neighbourhoods. (Neighbourhood = Statistics Canada census dissemination area).

