

# Attitudes of Family Physicians, Specialists and Radiologists about the Use of Computed Tomography and Magnetic Resonance Imaging in Ontario

Attitude des médecins de famille, des spécialistes  
et des radiologistes face à l'utilisation de la  
tomographie par ordinateur et de l'imagerie par  
résonance magnétique, en Ontario



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## Abstract

**Background:** Despite efforts to reduce wait times for computed tomography (CT) and magnetic resonance imaging (MRI) in Ontario, little is known about physicians' attitudes regarding contemporary patterns of CT and MRI scan use in this province.

**Methods:** We interviewed 19 Ontario family physicians, specialists and radiologists from diverse settings between November 2006 and April 2007. Our detailed written notes were independently reviewed to identify major recurring themes.

**Results:** Major themes were grouped under two categories: (a) non-clinical reasons for ordering CT and MRI ("defensive ordering," indeterminate imaging reports, patient demand, supply-induced demand, marked variation in ordering practices) and (b) communication among groups of physicians (increasing isolation between clinicians and radiologists; specialists and family physicians working in silos).

**Conclusion:** These interviews revealed infrequent communication among physician groups and marked variations in ordering practices that are often driven by a number of non-clinical factors, such as fear of litigation and patient demand. Recent increases in CT and MRI capacity may not be leading to better care for patients. Our findings, however, are very preliminary and require validation in other studies.

## Résumé

**Contexte :** Malgré les efforts visant à réduire les temps d'attente pour une tomographie par ordinateur (TO) ou pour une imagerie par résonance magnétique (IRM) en Ontario, on connaît peu l'attitude des médecins face aux schémas actuels d'utilisation des TO et des IRM dans la province.

**Méthode :** Nous avons interviewé 19 médecins de famille, spécialistes et radiologistes dans divers établissements en Ontario, entre novembre 2006 et avril 2007. Les notes détaillées que nous avons prises pendant les entrevues ont été examinées de façon indépendante afin de dégager des thèmes récurrents importants.

**Résultats :** Les thèmes importants ont été regroupés en deux catégories : (a) les raisons non cliniques invoquées pour prescrire une TO ou une IRM (« prescription de protection », imagerie non concluante, requête de la part du patient, demande causée par l'offre, variations marquées dans les pratiques de prescription) et (b) la communication entre les groupes de médecins (isolement accru entre médecins et radiologistes; cloisonnement du travail chez les spécialistes et les médecins de famille).

**Conclusion :** Ces entrevues ont révélé une communication sporadique entre les groupes de médecins et elles font voir des variations marquées dans les pratiques de prescription, lesquelles sont souvent stimulées par nombre de facteurs non cliniques tels que la crainte du litige et les requêtes formulées par les patients. L'accroissement récent de la capacité d'effectuer des TO et des IRM ne conduit pas nécessairement à

de meilleurs services pour les patients. Toutefois, nos résultats restent préliminaires et il est nécessaire de les faire valider par d'autres études.

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**D**espite a marked increase in the number of computed tomography (CT) and magnetic resonance imaging (MRI) scans performed in Ontario during the decade prior to 2005 (Tu et al. 2005), there were still reports of unacceptably long wait times for these services (Mackie 2002). Therefore, the Ontario Ministry of Health and Long-Term Care identified CT and MRI scanning as a priority for further investment, and in 2005 committed \$95 million to increase Ontario's capacity to perform CT and MRI scans (Hudson and Glynn 2005, 2007). To complement these supply-side efforts to reduce wait times, the Institute for Clinical Evaluative Sciences (ICES) was asked to undertake a study to examine the demand side of CT and MRI scan utilization. The ICES team performed an audit of the indications for and results of 24,000 CT and MRI scans performed in 2005 at 29 randomly selected Ontario hospitals. The results show that for some common indications, such as CT scan of the brain for headache, only 2% of scans revealed a treatable abnormality, whereas for other common indications, such as an MRI scan of the spine for back pain, 90% of scans revealed multiple imaging abnormalities whose clinical importance was often unclear. Furthermore, it was found that recommendations for further diagnostic testing occur frequently (as often as one in four CT scans of the chest), particularly when scan results are indeterminate (You et al. 2007).

Despite mounting public pressure and increased funding to reduce wait times for CT and MRI scans, little is known about physicians' attitudes regarding current patterns of CT and MRI scan use. Accordingly, after abstracting data from 6,000 scans, the ICES investigators shared preliminary results of their CT/MRI audit with selected Ontario radiologists and clinicians to elicit their attitudes regarding contemporary patterns of CT and MRI scan use in Ontario. In this paper, we describe the results of these interviews.

## Methods

### Participants

We interviewed 19 Ontario physicians from diverse practice settings: academic medical oncology (n=3), academic clinicians who frequently order CT/MRI brain scans (n=3), academic orthopaedic surgery (n=2), academic spine surgery (n=2), northern Ontario family practice (n=3), southern Ontario urban family practice (n=2) and radiology (n=4). Radiologists were community-based and academic; family

practitioners were community-based. The participants were chosen because of their expertise and the respect in which they are held by their peers (i.e., opinion leaders). Participants had been in practice in Ontario for an average of  $24 \pm 10$  years (mean  $\pm$  standard deviation).

## Interviews

Interviews were conducted by teleconference, with physicians from the various groups being interviewed together (e.g., radiologists together, oncologists together, etc.). They took place between November 2006 and April 2007, lasted 60 minutes and were led by one of the authors (J.J.Y.), who took detailed written notes to document the proceedings. Each session began with a 10-minute overview of the rationale for the ICES CT/MRI study and a review of the preliminary findings (i.e., summary of the most common indications for scanning and the results of these scans), which had been sent to the participants beforehand. A series of open-ended questions were then posed to serve as a starting point for discussion about the preliminary findings from the CT/MRI audit. These questions included some general questions, such as, "Are the findings consistent with your clinical practice?" and "Do you think these patterns of CT and MRI use indicate underuse, overuse or optimal use of this technology?" followed by specific questions for each group of participants, such as, "Over 90% of MRI spine scans had at least one abnormal finding – what are the implications for clinical practice?" or "The majority of CT scans of the brain for headache and dementia were normal – what are the implications for clinical practice?"

This study was approved by the Sunnybrook Health Sciences Centre Research Ethics Board. Written informed consent was obtained from all study participants.

## Analysis

Three authors (J.J.Y., A.L. and W.L.) independently reviewed detailed notes from the interviews to identify major recurring themes. Differences in opinion were resolved by discussion. For validation, the study findings were shared individually with each study participant, with an invitation to provide feedback. There were no objections to the major themes identified.

## Results

We grouped the major themes into two broad categories: non-clinical reasons for ordering CT and MRI, and communication between physician groups (Table 1).

TABLE 1. Major themes emerging from interviews

<b>Non-clinical reasons for ordering CT and MRI</b>
Defensive medicine
Indeterminate imaging reports
Patient demand/Patient reassurance
Supply-induced demand
Variation in ordering practices
<b>Communication among physician groups</b>
Increasing isolation between clinicians and radiologists
Specialists and family physicians working in silos

CT = computed tomography; MRI = magnetic resonance imaging

## Non-clinical reasons for ordering CT and MRI

### THE PRACTICE OF “DEFENSIVE MEDICINE”

Medico-legal concerns were felt to be an important reason that physicians order CT and MRI scans. Participants said that even in situations in which the pre-test likelihood of life-threatening disease is low (e.g., most patients with headache), they would feel more comfortable ordering a CT scan because of the fear of being sued for a delay in diagnosis. Some physicians felt that clinical decision rules, such as the Ottawa Ankle rules (Stiell et al. 1993), would be helpful in protecting them from future legal action should they decide not to order an imaging test that they feel is not clinically indicated.

### THE DILEMMA OF INDETERMINATE IMAGING REPORTS

Several clinicians discussed problems arising from indeterminate imaging reports that make written recommendations for further diagnostic testing. Although clinicians felt they could sometimes disregard such recommendations because of their knowledge of their patient’s history, the perceived medico-legal consequences of missing a serious diagnosis after ignoring an expert recommendation emerged as an important reason that clinicians feel pressured to follow through with further testing, even when they believe it is not clinically indicated. It was also noted that recommendations such as “no change in small mesenteric nodes in two years; further repeat scans are not necessary unless new symptoms develop” would be helpful because they would give ordering physicians added confidence to stop repeated testing. Currently, such notation rarely occurs. Finally, it was suggested by some that, as advances in medical imaging produce increasingly detailed images, indeterminate findings and recommendations for follow-up testing will become more common.

#### THE INFLUENCE OF PRESSURE FROM PATIENTS

Patient demand was frequently cited as an important reason that physicians order CT and MRI scans. Clinicians described several reasons why their patients demand imaging tests. One was that persistent and unexplained symptoms (e.g., chronic back pain) sometimes lead to repeated physician visits and frustration among patients with what they perceive as little being done by their doctor to address their symptoms. In these situations, physicians said that they might order an imaging test to satisfy their patient that something concrete was being done. Clinicians also reported that a patient's desire for reassurance that he or she does not have a serious condition (e.g., cancer) was an important driver of patient demand for CT/MRI scans.

#### SUPPLY-INDUCED DEMAND: "IF YOU BUILD IT, THEY WILL COME"

Interview participants consistently noted changes in physician and patient behaviour associated with recent increases in CT and MRI capacity. For example, several physicians remarked that since their local hospital obtained a CT scanner, they were ordering CT scans for minor head injuries more frequently and in a broader spectrum of patients than in the past. Several family physicians also stated that patients are increasingly expecting that a scan will be performed as part of the routine work-up of their symptoms (e.g., back pain), either because patients are aware of the added capacity for CT and MRI scanning in their communities, have spoken to friends who had a scan as part of the work-up for a similar complaint or have received recommendations from healthcare professionals (e.g., physiotherapist, sports trainer) that they get a scan to investigate their symptoms further.

#### MARKED VARIATION IN ORDERING PRACTICES

Participants described marked variations in ordering practices. For example, one family physician said that some of his colleagues would order a CT scan for virtually every new headache patient, whereas other colleagues would almost never order a CT scan for headache. Similarly, another physician described one consultant who ordered a CT scan for every new patient referred for assessment of dementia, whereas another consultant in the same community rarely obtained a CT scan.

### Communication among physician groups

#### INCREASING ISOLATION BETWEEN CLINICIANS AND RADIOLOGISTS

Several participants raised issues related to communication between ordering clinicians and radiologists both at the point of the original imaging request and at the time the results of the scan are being communicated back to the referring physician. Radiologists described the challenges of providing a definitive interpretation when given scant

clinical information (e.g., “rule out pathology”). Radiologists felt strongly, particularly in more complex cases, that they could give a more useful interpretation after a verbal discussion with the ordering physician. Many clinicians, however, reported increasing difficulty in talking to their local radiologists. Sometimes this difficulty was related to hospital restructuring and mergers, which resulted in relocation of radiologists to more remote sites and administrative changes within imaging departments (e.g., more interaction with booking clerks than with radiologists). Radiologists also noted that their increasing workload gives them less time to talk with ordering physicians.

Radiologists suspected overuse of CT and MRI scans for some indications but stated that the sheer number of requisitions they receive prevents them from discussing most potentially inappropriate requisitions with ordering physicians. Moreover, radiologists expressed discomfort with acting as “gatekeepers” because of the difficulty in assessing appropriateness without having seen the patient, and the tension it would create with their referral base. Although the purpose of recently published Diagnostic Imaging Referral Guidelines (Canadian Association of Radiologists 2005) is to “[assist physicians] in making decisions in regard to appropriate imaging studies for specific cases,” none of the clinicians that we interviewed was aware of them. It was felt that a Web-based order entry system that prompts the clinician with evidence-based ordering guidelines and clinical decision rules would be a more effective and efficient way of improving the appropriateness of ordering.

#### SPECIALISTS AND FAMILY PHYSICIANS WORKING IN SILOS

One of the most striking findings of our study was that each group of physicians blamed other physician groups for problems in the use of CT and MRI scanning in the province. Academic specialists often spoke pejoratively about the “community,” suggesting that if one wanted to find evidence of inappropriate CT and MRI scan use, one should examine community practice. Specialists also gave the impression that general practitioners overused scanning for some symptoms. For example, spine surgeons were frustrated by the considerable amount of time they spent explaining to patients with back pain why they do not need surgery despite their abnormal MRI scan. In contrast, family physicians pointed out that spine surgeons would not see new referrals for back pain without an MRI scan and complained about the long waits for specialist consultation, saying that it is much faster to get an MRI scan of the spine than to see a specialist. This was especially true in Northern Ontario, where physicians said they will sometimes order an MRI scan of the spine to obviate the need for specialist referral.

## Discussion

In a series of interviews, we elicited the attitudes of academic specialists, family

physicians and radiologists regarding contemporary patterns of CT and MRI scan use in Ontario. The picture that emerged was one of a fractured health system, with academic specialists, family physicians and radiologists often showing disdain for one another and blaming one another for problems in the use of CT and MRI scanning; infrequent communication among physician groups; and marked variation in ordering practices that are often driven by a number of non-clinical reasons, such as fear of litigation and patient demand. Although we often heard that access to CT and MRI scanning was getting better, we did not hear that care was improving.

Although the fear of being sued was cited as an important reason for ordering tests, Canadian malpractice insurance data indicate that overall, legal actions occur much less frequently than physicians believe – currently, 13 actions per 1,000 physicians, which is 50% less than a decade ago (Jones 2007). In fact, many lawsuits stem from poor physician–patient communication rather than negligence in care (Levinson et al. 1997). Clinical decision rules addressing the most common reasons for ordering CT and MRI scans (e.g., headache, back pain, etc.), if rigorously developed and aggressively disseminated, may help give clinicians added security and alleviate this fear.

Patient demand was cited as another important reason for ordering CT and MRI scans. Such demand is probably driven by many factors: a genuine worry that a serious diagnosis is being missed, unrealistic views about the ability of the scans to make a diagnosis and the high value that our society generally places on sophisticated medical technology (Mechanic 2002). Certainly, it can be easier to order a scan than to explain to a patient why it is not necessary, and several participants reported that they order scans to reassure their patients. However, several studies have shown that patients are not consistently reassured by normal test results (Spiegel et al. 2005; McDonald et al. 1996). Although public education that provides a balanced view of the benefits and limitations of diagnostic imaging may prove useful, it is unclear whether this information would truly influence patient demand. Further research is needed to develop effective means for public education.

As has been described for other medical interventions (Fisher et al. 2000; Nallamotheu et al. 2007; Wennberg et al. 1997), supply-induced demand appeared to be an important driver of CT and MRI ordering in Ontario. As a result, it is possible that recent increases in CT/MRI scanning capacity may not lead to a decrease in wait times if more patients receive scans for questionable indications. In fact, some of those interviewed suggested that this phenomenon is already occurring.

Although physicians, not surprisingly, are affected by a missed diagnosis, the fear of missing a serious diagnosis must be balanced with the potential risks of diagnostic imaging – e.g., investigation of incidentalomas with potentially invasive tests, unnecessary radiation exposure and anxiety associated with false positive results (Stone 2006; Fisher and Welch 1999; Laupacis and Evans 2005; Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation 2006). It was clear from the



interviews that some physicians are quite selective about the patients for whom they order a scan. To encourage more appropriate use of diagnostic imaging, academic teaching hospitals must highlight the importance of responsible ordering. At present, it is our impression that the “complete work-up” is held up as a model that may be giving trainees the wrong message.

Finally, the coordination of our healthcare system is challenging. Our interviews illustrate the difficulty in communication among specialists, family physicians and radiologists, and indicate that at times, they express disdain for one another. In a healthcare system that appears increasingly to value specialization, the solution to this problem will not be easy. Web-based ordering of imaging tests, with pop-up screens that provide advice to ordering physicians in real time, would be one way of improving the quality of information received by radiologists from clinicians and may improve the appropriateness of ordering patterns. Indeed, a systematic review of interventions to improve outpatient referrals from primary care to specialist care found that, although passive dissemination of practice guidelines was not effective, the use of standardized referral tools for a variety of problems was effective in improving the appropriateness of referrals (Akbari et al. 2008). There are also preliminary data showing that computerized decision support using structured referral templates for ordering of imaging tests can be effective (Kaushal et al. 2006; Khorasani 2006); however, more studies are needed. To improve communication further, a department could potentially designate a radiologist each day who would be available to referring clinicians to answer questions about the most appropriate use of imaging tests. However, increases in radiologists’ workloads are such that this strategy may not be practical.

## Limitations

Our study has some limitations. First, full transcripts of the interviews were not recorded. Although detailed notes were taken, it remains possible that our own views on the subject may have unconsciously influenced the findings. The fact that all study participants reviewed and did not object to the major themes we identified suggests that significant distortions or omissions were unlikely to have taken place and provides some validation of our findings. Second, we interviewed a small number of physician groups who were not randomly sampled and we did not use data saturation methods; therefore, the results cannot necessarily be considered representative of all Ontario physicians. Given these limitations, our findings should be interpreted with caution and are best considered as a preliminary identification of key issues regarding the use of CT and MRI in Ontario that may serve as a useful starting point for further inquiry.

## Conclusion

Recent increases in CT and MRI scan capacity may not be leading to better care. Several factors, such as communication breakdowns, medico-legal concerns and patient expectations for testing appear to be important non-clinical drivers of CT/MRI scan ordering. It is interesting to note that within the United States, regions spending the most on healthcare also have the highest rates of imaging utilization and yet do not have better health outcomes compared to lower-spending regions (Fisher et al. 2003a,b). Although rates of CT and MRI scanning are much lower in Ontario than in the United States, it is important that our preliminary findings be confirmed in other studies so that we are better positioned to make the best possible use of diagnostic imaging.

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