Radiology wait times
Impact on Patient Care and Potential Solutions

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ABSTRACT
As diagnostic imaging becomes a more prevalent tool in medicine, radiologists must increasingly be concerned with resource management. Wait times represent an important quality of care issue in medicine, especially in Canada, where the number of MRI and CT scanners is limited compared to other countries. Longer wait times have been shown to worsen medical outcomes in a number of different settings, including head and neck cancers, as well as costing patients emotional and financial resources. Accordingly, a number of strategies have been undertaken to reduce waiting times. Teleradiology, which is the assignment of diagnostic interpretation of images to distant radiologists, has worked in the context of reduced staff radiologists in PEI. There may also be a role for encouraging only appropriate indications for imaging. In conclusion, the authors suggest that good radiologic practice consists of considering appropriate use of diagnostic imaging to reduce wait times.

INTRODUCTION
The perception that the radiologist’s only job is diagnostic interpretation of medical imaging is outdated. Radiologists not only provide medical imaging interpretation, but are increasingly involved with resource management and quality of care improvement.1 Wait times are an important quality of care issue, especially in Canada, which has lagged behind other developed countries in efficient utilization of Magnetic Resonance Imaging (MRI) equipment per capita. In Organisation for Economic Co-operation and Development (OECD) countries the median number of MRI scanners per million people is 6.1. Canada’s is 4.6 per million people, which is considerably lower than Japan (35.3) or the United States (19.5), which have the highest MRI per capita in the OECD.2 The expanding indications for imaging combined with inappropriate ordering, and delays in reporting, has led to poorly managed wait lists and unnecessarily long wait times.

DIAGNOSTIC IMAGING IN CANADA
Canada has seen an increase in medical imaging utilization. In Ontario, the number of MRI scans performed increased by over 300%, and the number of Computerized Tomography (CT) scans increased 3-fold between 1993-2003. This rapid increase in use of technology raises the questions of whether the indications for CT and MRI have expanded, or if physicians are using diagnostic imaging appropriately. The average Canadian waits 3.7 weeks for CT and 11.1 weeks for MRI scans.3 In contrast, the Canadian Association of Radiologists (CAR) has recommended that the maximum wait times for non-urgent CT or MRI scans to be no more than 60 days (or 8.6 weeks). The same report outlines the need for better data to monitor wait times.4

IMPACT OF RADIOLOGY WAIT TIMES ON PATIENT CARE
Wait times pose a significant problem to many areas of medicine. Wait times have an impact on quality of care, inconveniences the patient, increases cost of care, and also have material consequences on the medical issues the patient faces.5 A study by Byrne et al demonstrated the effect of wait times in patients with non-small cell lung cancer (NSCLC). Biopsies from patients in a Newfoundland centre who required CT guided lung biopsies in 2009 were compared to biopsies taken in 2011 as there were significantly shorter wait times in 2011. The authors showed longer wait times correlated with an increase in the tumor size and stage found on imaging, which worsens the prognosis of NSCLC.6 Jensen et al, similarly, showed that wait times negatively impacted disease course in the context of head and neck cancers.7 In this cohort, the authors compared initial diagnostic scans with the treatment planning scan of patients diagnosed with squamous cell carcinoma of the head and neck, and measured changes in tumor volume and in disease stage. The average wait time was 4 weeks, with a range of 5 to 95 days, and most (62%) of the patients had an increase in tumor size, and many others developed serious complications of tumor growth including new lymph node metastases (20% of patients) and progression in the TMN classification (10% of patients).

Wait times have an economic impact as well. A report by Barua and Ren estimated that 973,505 Canadians waited an average of 10.6 weeks in order to access treatments in 2016, and that on average each patient lost between $1,759 to $5,360, depending on whether the analysis only included loss of work hours, or included loss of weekends and evenings as well. The total estimate borne by individuals waiting for treatment is between $1.7 billion or $5.2 billion. This estimate does not include the cost of loss of productivity in the family members of the patients, and also does not include mental anguish or worsening medical issues.8

SOLUTIONS TO REDUCE WAIT TIMES IN DIAGNOSTIC IMAGING
The problem of long wait times has many contributing factors. The total radiology waiting time is measured as both the time between referral and examination, and the time between the radiologic examination and the production of the clinical report. A systematic review by Olisemeke et al studied a number of service delivery initiatives targeted at reducing wait times in radiology.
For this review, while the heterogeneity across studies was large, a number of approaches have shown decreases in wait times. Some promising avenues in the literature include technological tools to increase radiologist productivity such as speech recognition software, teleradiology, and increasing radiographic technician’s scope of practice to assist with image interpretation. The introduction of teleradiology improved the number of reports completed within 40 minutes from 34 to 43.

Teleradiology has been particularly successful in Canada when the primary problem is a paucity of staff radiologists. Teleradiology is the practice of interpreting radiographic images at a distance. In Prince Edward Island, a number of changes were implemented that resulted in wait times for elective or non-urgent CT scans decreasing from 22 weeks in January 2009, to under 3 weeks in 2011, and MRI wait times decreasing from 33 weeks to 8 weeks. In order to achieve this improvement in wait times, a quality improvement committee implemented a number of upgrades to their existing procedures, but attributed much of their success to the implementation of teleradiology. Teleradiology practices allow scans to be interpreted by highly skilled radiologists in neighboring provinces, thus reducing the time between radiologic examination and clinical reporting. Hence, this allows for the corresponding primary care physicians or specialists providing care to the patient (depending on the results of imaging scans) to do so in a more timely manner.

The province of PEI has a shortage of staff radiologists relative to the needs of the population, so the PEI Department of health contracted radiologists working in Halifax, Nova Scotia to commit to reviewing a number of cases per day, with a predetermined amount of time to return a report.

Yet another global method of improving wait times is to ensure that only appropriate diagnostic examinations are ordered. A report estimated that 10 to 20% of MRI or CT scans are unnecessary. There are many potential sources of inappropriate scans including patients’ demands for imaging when not indicated, lack of knowledge of up-to-date guidelines by the referring physician, and poor communication between physicians. Despite the high estimated rate of inappropriate diagnostic examinations, very few centres have programs to reduce this inefficiency. The authors of this report suggest that physicians should stay abreast of the appropriate imaging guidelines and to foster a culture of quality within radiology departments. Indeed, it has been demonstrated on a local level, that appropriate use of guidelines by general practitioners reduced inappropriate radiology referrals by 23%. The standardization of imaging guidelines and workflow processes will help to shorten wait times and lead to improved quality of patient care.

CONCLUSION

Wait times for imaging remains a significant issue in the Canadian healthcare system. While this is widely considered a trade-off for our presumably otherwise successful single-payer system, wait times are not benign. Delays in patient imaging can negatively impact patient care in a number of ways, including reducing the quality of care and causing worsening of medical conditions and prognosis. In addition, there are economic impacts associated with waiting for medical care. Wait times is a complex issue and there are many possible approaches to reduce it including appropriate use of imaging, having validated guidelines, increasing radiologist productivity through more efficient workflows, increasing the number of staff radiologists, teleradiology, or increasing the number or operational hours of CT or MRI machines. Different approaches may be successful to different extents in different centres. The PEI example serves as a reminder that drastic changes in this area are possible, and that we need not accept that long wait times are inevitable in our system. We suggest that dedicated task forces investigate the many causes and possible solutions to the problem of lengthy wait times in diagnostic imaging. As mentioned above, although a number of individual research groups have investigated the role of radiology wait times on patient outcomes there is no uniform body in Canada that currently works to address such issues on a national level (other than individual academic health science centre quality improvement projects).

REFERENCES