The Canadian Radiological Foundation | Fondation radiologique canadienne

A Day in the Life of MR in Canada
Profiling MR Appropriateness and Utilization in Canada

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Objectives

We are proposing to conduct a study of MR imaging in Canada.

Our primary objective is **to assess the appropriateness of the MR exams** being performed across Canada. Our secondary objective is **to assess and compare medical imaging appropriateness guidelines for common MR exams**. This study will also provide insight into MR imaging volumes, access and practice variations across the country.

Methods

At a high level, we propose to invite all academic medical imaging centres in Canada to participate in the study. From each participating site, we will request information relating to (a) their facility and (b) each MR exam performed within a specified 24-hour period.

The facility-level information will provide insight into the imaging environment and current appropriateness-assessment processes across Canada.

The exam-level information will be used to compare the information gathered via exam requests to several existing imaging guidelines to determine the (i) applicability of the guidelines to typical imaging requests, (ii) the appropriateness of each exam, and (iii) variations that may exist among sets of guidelines. We intend to include the American College of Radiology Appropriateness Criteria, the Canadian Association of Radiologists (CAR) Referral Guidelines, the United Kingdom's Royal College of Radiologists Referral Guidelines, as well as others.

Thus far we are conducting a thorough literature review of appropriateness guidelines related to MR imaging and previously published imaging appropriateness assessments, with a particular focus on those conducted within Canada. This review is informing our study design, particularly relating to specific data elements to collect and appropriateness guidelines to include.

After finalizing the study design, including the 24-hour period for which we will request data (the "sample day"), we will invite all academic imaging centres in Canada to participate. After identifying participating organization, we will obtain approval for the data collection from the University of Saskatchewan and from each participating organization if they require it. We will then distribute the study materials to the contact person at each organization, which will include (a) an explanation of the study and protocol (b) a facility/environmental survey, (c) a formatted spreadsheet specifying the information to be submitted relating to each exam, as well as any other materials that may be needed. We will also request a copy of the requisition form relating to each exam conducted on the sample day (anonymized).

Box 1 (hereof) provides a list of facility- and exam-level data that may be requested, although this list may be amended based on our completion of the aforementioned literature review. To facilitate participation, organizations will be able to choose among various data-submission methods such as electronically or via courier. We anticipate that residents will be responsible for collecting the information and compiling the submission materials at each site. We have included funding in the budget to compensate them for the time they invest in these activities. Upon receiving each organization's submission, all information will be entered into a secure database enabling us to link facility- and exam-level data.

- ***Facility-level data***
  - *# and type of MR scanners*
  - *facility operating hours*
  - *referral restrictions*
  - *request triaging process*
  - *wait times & targets by urgency level*
  - *prioritization process*
  - *use of appropriateness criteria/guidelines*
- ***Exam level data***
  - *all information from request form*
    - *age, gender, indication*
  - *request date*
  - *requesting physician specialty*
  - *priority level*
  - *patient type (out-, in- or emergency)*
  - *study type (first MR vs. follow-up)*
  - *history of prior imaging for same indication*

Each set of appropriateness guidelines will be applied to each exam request by one of our two senior, highly experienced radiologists. The reviewer will assess each exam request/appropriateness guideline pair and record the following information to the extent possible: (i) whether or not the request contains sufficient information to apply the guidelines, (ii) whether or not a guideline exists for the indication specified, (iii) the result of the guideline, and (iv) the radiologists overall conclusion based on the guideline result (appropriate, inappropriate, unclear). Where necessary, the second radiologist may also be consulted to reach a conclusion. Given that each request resulted in an exam, our null hypothesis is that each exam was appropriate.

We will then synthesize and analyze the data to develop a profile of the imaging activity within each facility, both qualitatively (referral rules, use of urgency levels and appropriateness guidelines, wait times, request triaging processes, scanner characteristics, etc.) and quantitatively (number of exams per MR per operating hour, per patient type, per anatomical region, etc.) We will also profile the patient population based on demographic information, proportion with previous imaging, wait times, and common exam indications, among others. Relating to appropriateness, we will summarize the

results of questions (i)-(iv) above and provide details by facility (anonymized), procedure group, referral source, and guideline set. We will also compare the results among the guidelines to determine if there were conflicting recommendations and compare the exam protocols of patients with similar indications to assess variation in imaging protocols.

We will also:

- compare the requisition forms obtained from each facility to identify commonalities and differences among the data elements collected, and contrast the format and content of each to the request completion rates based on question (i) above;
- obtain feedback from our reviewing radiologists regarding the applicability and usefulness of each guideline set, individual guidelines and each request form, as well as their perspective on any sources of ambiguity that may have been found in either the guidelines or forms;
- examine patient imaging histories to determine the extent to which imaging substitution/redundancy may be occurring.