

Imaging appropriateness criteria

Why Canadian family physicians should care

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Family physicians are recognized as the primary guardians of Canada's publicly funded health care system, diligently assessing patient issues and deciding which warrant additional testing.¹ Between 1996 and 2006, annual use of computed tomography (CT) and magnetic resonance imaging (MRI) increased 2-fold and 5.6-fold, respectively.² Family physicians now order 20% of MRI studies in Canada.³ While physicians and patients increasingly rely on diagnostic imaging on a daily basis, overuse has led to problems: increased costs, excessive radiation for patients, and lengthening wait times. Less obvious but of even more concern is the cascade of additional—sometimes unnecessary—imaging, invasive biopsies, or surgeries that follows overuse of imaging.⁴ While the growing breadth of indications for medical imaging provides clinicians with an expanding diagnostic tool kit to help their patients, provincial governments are watching expenses balloon. In response, policy makers in some jurisdictions are deciding what is medically necessary instead of physicians by withdrawing funding for some imaging tests.^{5,6} In an effort to help Canada's guardians of publicly funded primary care, we discuss the concept of medical imaging appropriateness in the hope that existing guidelines can be integrated into family practice.

Imaging appropriateness

The concept of imaging appropriateness arose from a peculiar finding: geographic areas with similar populations demonstrated variations in diagnostic imaging use.⁷ Clearly, imaging was overused in some populations and underused in others. In response, the American College of Radiologists (ACR) was the first to bring multi-disciplinary physicians together to obtain consensus on the appropriateness of imaging in the early 1990s: the expected patient benefit of a diagnostic imaging test was weighed against its risks in a variety of clinical scenarios.⁷ The resulting ACR appropriateness criteria now cover 180 topics.⁸ The Canadian Association of Radiology (CAR) followed, providing clinicians with guidelines for appropriate imaging requests.⁹ Both of these tools were designed to help physicians request appropriate medical imaging tests in day-to-day practice (Table 1).^{8,9}

Table 1. Authors' suggestions for interpreting ACR appropriateness criteria⁸ and CAR guidelines⁹: Note that no guideline declares when a test is necessary. When in doubt, consult a radiologist.

CAR CATEGORY	ACR SCORE FROM 1-9	AUTHORS' SUGGESTION
Indicated	Usually appropriate (score 7-9)	Request the most appropriate imaging study first. Always provide the radiologist with the relevant history and rationale to ensure the correct protocol is followed
Indicated only in specific circumstances	NA	Follow specific recommendations or consider specialist referral
Specialized investigation	Might be appropriate (score 4-6)	Avoid ordering; consider specialist referral or radiology consultation
Not indicated	Not usually appropriate (score 1-3)	Avoid ordering

ACR—American College of Radiology, CAR—Canadian Association of Radiology, NA—not applicable.

Consider the example of chronic headaches. Neurologists, neurosurgeons, and radiologists on the ACR appropriateness committee reviewed the low yield of diagnostic imaging (<0.5%) in stable headaches and concluded that imaging is equivocal in terms of appropriateness.¹⁰ Similarly, the CAR guidelines⁹ report that imaging is not generally useful in this scenario. In contrast, when features suggest subarachnoid hemorrhage or meningitis, or when patients are at risk of intracranial pathology (eg, in the context of HIV), guidelines recommend appropriate CT or MRI examinations. When clinical decision rules (eg, Canadian C-Spine Rule) are established, both ACR and CAR guidelines incorporate this evidence into recommendations for specific clinical scenarios. While the guidelines are not prescriptive (Table 1),^{8,9} they are akin to consulting a radiologist or specialist. In the end, the decision to request a study might ultimately depend on the referring physician, who knows the patient best. Both the ACR appropriateness criteria and the CAR referral guidelines are updated, readily available for free online, and offer evidence-based imaging guidelines on a variety of clinical scenarios.

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Implementing imaging appropriateness

The challenge facing physicians and policy makers is the effective and safe implementation of appropriateness criteria. One top-down instrument employed by payers has been the delisting of medical imaging services. In Ontario, for example, MRI is no longer funded for low back pain without concerning features.¹¹ The intent is to curb the use of an expensive test that often shows abnormal results yet does not necessarily correlate with need for surgery or with improved outcomes.¹² Unfortunately, strict enforcement could lead to a scenario in which patients suffering from chronic low back pain require private insurance. As an alternative, one could foresee a day in Canada when physicians must negotiate with third-party insurers or the provincial government for preapproval before obtaining imaging tests, akin to dealing with radiology benefit management firms in the United States.¹³ And for the medical community, this “managed care” furthers the tension between clinicians and bureaucrats over who dictates what is medically necessary.⁶ In Canada, the effect of these interventions on imaging use has yet to be measured.

In contrast to the top-down approach, some health care providers have implemented clinical decision support systems in an attempt to reduce inappropriate imaging. Electronic clinical decision support systems provide feedback to ordering physicians at the time of order entry either advising appropriate imaging or identifying inappropriate requests. At one US institution, clinical decision support was instituted to encourage evidence-based imaging protocols for head MRI, lumbar spine MRI, and sinus CT imaging.¹⁴ Using electronic order entry, the requesting physicians answered mandatory clinical questions: referral to physiotherapists (back pain) or allergists (sinus disease) was recommended if imaging criteria were not met. The rate of imaging tests ordered for patients with headache, sinusitis, and low back pain decreased by approximately 25%.¹⁴ Similar clinical decision support systems have been implemented at hospital and even state levels in the United States.¹⁴ Naturally, the effect on use of clinical decision support depends on high physician uptake, which can be difficult and time-consuming to attain.¹³ To be effective, clinical decision support systems must also be coupled with an accountability mechanism that identifies outlier referring physicians and provides feedback to ensure best practices. The goal of these local tools is to enable referring physicians to retain decision-making control based on their clinical assessment, but supported by evidence-based guidelines.

No matter the practice setting, we recommend that the first step to ensuring appropriate imaging is integrating evidence-based imaging strategies into a physician’s everyday practice. With the rapid advancement of medical imaging, family physicians cannot be expected to remember the optimal imaging modality for each clinical scenario; medical schools recognize this challenge and are integrating imaging appropriateness into their curricula.¹⁵

As such, we suggest that the ACR Appropriateness Criteria⁸ or CAR Diagnostic Imaging Referral Guidelines⁹ should sit in doctors’ offices next to the pharmacy handbook (physically or virtually) helping family physicians decide which imaging tests to request, if any. Consulting the local radiologist—while admittedly not always practical—can help accelerate patient care by ensuring family physicians order the most appropriate test first.

Conclusion

As stewards of our public health care system, Canadian family physicians play a central role in the appropriate use of medical imaging. Preventing the consequences of unnecessary imaging—ballooning costs, wait times, radiation exposure, and invasive procedures—should not be left to policy makers alone. Instead, family physicians and radiologists should take the lead to protect patients and our health care system and work cooperatively to apply appropriateness criteria. Radiologists should be more available for consultation, while family physicians should incorporate appropriateness criteria in their everyday practices. These changes—whether implementing decision-support software or simply consulting readily available ACR or CAR guidelines—in primary care practice are crucial for appropriate patient-centred care. As importantly, physician leadership on appropriateness can help ensure sustainability of the health care system as a whole. 🌿

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Competing interests

None declared

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