INTRODUCTION
Musculoskeletal (MSK) imaging is the oldest application of radiology and the central part of many radiology departments’ focus on radiography. Today, MSK radiology has evolved to incorporate multiple modalities, including CT, ultrasound, MRI, and image-guided procedures.

Quality improvement projects in MSK radiology can help address the variability of practice and the complexity of this environment. Variability in ordering can lead to the overutilization or underutilization of imaging. Variability in reporting can lead to miscommunication of important findings, with potential medical and legal consequences. Variability in protocolling of imaging examinations can lead to an ineffective scanning environment, with a loss of diagnostic utility or need for repeat imaging.

This article provides radiologists who work in MSK radiology environments with suggestions for potential quality improvement projects.

APPROPRIATENESS CRITERIA
A quality improvement project involving appropriateness criteria would address the application of evidence-based guidelines with referring physicians involved in domains such as spine trauma (orthopedic surgeons, neurosurgeons, emergency physicians, anesthesiologists, radiologists, and neuroradiologists) to ensure appropriate utilization.

Despite the publication in 1999 of the ACR Appropriateness Criteria® for acute cervical spine imaging, there is a persistent gap in clinical practice on how to apply these criteria [1]. Cervical radiography for cervical spine blunt trauma is commonly performed in emergency rooms. The fear of missing a cervical fracture and the risk for medicolegal consequences may lead physicians to overuse cervical spine radiography. As a consequence, the vast majority of cervical spine imaging procedures produce negative results. According to clinical criteria, about 98% of cervical spine radiographs are negative for fractures [1,2].

However, broadly validated decision rules for image utilization exist for only a few domains, such as the National Emergency X-Radiography Utilization Study criteria in the case of cervical spine trauma imaging and the Ottawa ankle rules for ankle radiography. Physicians should adopt these decision rules, which can reliability differentiate low-risk patients from those who need further diagnostic workup or treatment. Residents, fellows, and staff members from different departments should be appropriately trained, and a system of record tracking should be in place.

A multidisciplinary group of emergency room professionals can create a registry of patients with blunt traumata of the cervical spine to be shared with all physicians involved in managing cervical spine traumata.

Other appropriateness criteria with the same introduction model can be introduced in other MSK areas in which imaging plays a key role, such as chronic shoulder pain, wrist trauma, and rheumatoid arthritis.

Quality Project

- Assemble a random collection of 50 to 100 cases every 6 months (depending on the number available) for every referring physician.
- Rank each case for ordering appropriateness (yes, no, or doubtful). Evaluate the data on the basis of the percentage of appropriateness, the increase in appropriateness over time, and variations in prescription among physicians.
- Analyze variables that could affect the imaging rate, such as physician experience, physician specialty, and case mix.

STRUCTURED REPORTING
A quality improvement project could involve structured reporting by introducing the use of radiology report templates to improve communication between radiologists and referring physicians. Metrics could include referring physicians’ and radiologists’ satisfaction and the adoption rate of standardized templates.

According to Armas [3], a good radiology report should follow the rule of the 6 C’s: clarity, correctness, confidence, concision, completeness, and consistency. In practice, radiology reports vary greatly in style and language, and disparate organization potentially jeopardizes the communication of important radiologic findings [4]. At their worst, radiology reports can be verbose and unclear and can fail to communicate the radiologists’ impressions. Moreover, the widespread idea that a vague report will offer protection in case of medicolegal issues is naive. Vague reports bear the risk of miscommunication to referring physicians, which could lead to wrong decisions [5]. For example, phrases such as “if clinically indicated may be of value” and “if clinically warranted” may not be strong enough to convince referring physicians to order further diagnostic examinations [5]. Avoid descriptive
worsening such as “there is a hyperintense line of the posterior horn of the medial meniscus” instead of “tear of the posterior horn of the medial meniscus”. Uniformity of structure and standardization of vocabulary (such as with RadLex) will enhance the effective communication of radiologists [6].

MSK imaging studies such as joint MRI (shoulder, elbow, knee, hand and wrist, hip, foot, and spine) are well suited for standardized reporting because of commonly performed procedures, a relatively limited number of pathologies, and the need to clearly communicate with orthopedic surgeons (the main consumers of this information).

The RSNA’s radiology report initiative offers several templates of radiology reports divided by subspecialty and available online [7]. Sections for indication, technique, comparisons, findings, and impression constitute the body of every report. In the case of ankle MRI findings, for example, divisions include fluid; the medial, lateral, and anterior compartments; the tibiotalar joint; the subtalar joint; bone muscle; the tarsal tunnel; and the sinus tarsi. For every compartment, ligaments, tendons, and osseous structures are evaluated, with several options.

**Quality Project**

- Conduct a satisfaction survey after 6 months of activity before and after the introduction of an MR and CT protocol management system, looking at repeated protocols, wrong protocols, image quality for radiologists and referring physicians, and patient scan delays.
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**REFERENCES**


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