GILES W. BOLAND, MD, RICHARD DUSZAK JR, MD

Protocol Management and Design: Current and Future Best Practices

This value chain series has stressed that the ultimate output of the radiology workflow is the effective communication of a patient report, and that is inextricably linked to optimizing each link in the imaging value chain. Only when performance throughout the totality of the value chain meets best practices can radiologists be assured that their services offer the maximal potential to effect better patient value and outcomes.

A previous article in this series focused on protocol optimization and highlighted that wide variation in practice undermines the core goal of delivering images optimized for delivering the most meaningful and actionable clinical information [1]. Almost no two institutional protocols—particularly for CT and MRI—are alike. Often, variation exists even within single departments. That variation is multifactorial, and factors include protocol length (time); the number and types of sequences; anatomic area covered; the number of slices and multiplanar presentations; the use, timing, volume, and type of intravenous contrast; and radiation dose. Some of this variation admittedly stems from inherent vendor and equipment differences, yet these are relatively minor contributors overall. Alternatively, many radiologists point, justifiably, to the lack of evidence justifying one particular protocol over another. Others may invoke patient heterogeneity and disease presentation. In truth, however, the dominant theme for variation is radiologist preference, as most departments charge individual radiologists to design their own CT and MRI protocols. Some have a more granular understanding than others of vendor technicalities, physics, or best-practice guidelines, whereas others simply prefer particular protocols for individual personal reasons. Regardless of the reasons, with so many mutable parameters, it is not surprising that such protocol variation abounds.

From a patient and institutional perspective, variation leads to increased waste and less than optimal outcomes. Excessively long MRI protocols, for instance, are uncomfortable for patients and also limit optimal patient throughput. All too often, radiologists prioritize unnecessarily exquisite image quality or volume over the patient experience. Those images may at times be more satisfying to the eye, but they do not necessarily add any real value, except perhaps to the individual radiologist.

One immediate goal should be to minimize protocol variation where possible. This is harder to achieve than it sounds. Nonetheless, this is surely an achievable goal for which stakeholders should be aligned given the current national zeitgeist of quality, safety, and value-based payments. If radiologists can demonstrate, using transparent and meaningful data, to patients, referrers, hospital leadership, and payers alike that their departmental protocols are current and consistently meeting nationally recognized best practices, they will be in a much better position to convince all (in good faith) that they are committed to optimizing patient outcomes. Under value-based payment systems, such initiatives, particularly if supported by robust data, might soon be used to justify more favorable reimbursement. When protocol optimization is then aggregated with other value activities within the value chain, demonstrating an overarching commitment to appropriateness, quality, safety, efficiency, and patient experience (the 5 key pillars of Imaging 3.0™), their activities should align more effectively with the emerging new payment models.

Achieving these goals, however, is far from straightforward, but it begins with leadership. It is only when departmental leaders recognize the need to standardize, as much as reasonably possible, their departmental product that effective change can be initiated. That recognition permits leaders to then outline their vision and goals moving forward, steering the organization toward an aligned commitment to quality, safety, and

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value. This path often means advocating to senior hospital leadership—who easily tire of repeated upgrade requests—for financial support for significant hardware and software improvements that permit faster scanning, lower radiation dose, and an overall better patient experience. Although it is unrealistic to imagine that radiology leaders will successfully secure the entirety of their capital wish list, it is reasonable to expect hospital leadership to understand the interplay between current technology and quality and safety, as well as the opportunity to increase patient throughput. With such understanding as part of a collaborative relationship, it is more likely that upgrades that offer aligned patient and institutional advantages will be approved.

With effective leadership pursuing the most modern (but fiscally reasonable) equipment and setting clear goals for protocol optimization, the department can then better focus all key personnel, working in effective teams, to bring about the necessary changes to deliver optimal practices. The path to protocol standardization is, in all likelihood, a multimonth (if not multiyear) project given the number, variety, and complexity of protocols and the differences in vendor platforms.

A dedicated team of domain experts that includes radiologists, technologists, and physicists is mandatory, but protocol design teams should actively engage other key stakeholders. Operational and IT staff members will be necessary to ensure that chosen protocols are optimally and efficiently implemented into the clinical workflow. Key referring physicians (eg, emergency department and cancer center directors) can often provide input into particular clinical scenarios. Leadership will need to exercise particular skills in helping radiologists (in particular the modality champions and protocol leaders) understand the need to implement widespread standardization and to balance tailored protocols with those that meet the needs of the majority of patients. In many organizations, it is not uncommon for radiologist protocol developers to overemphasize their own domain expertise and preferences to trump the overarching goal of minimum-length standardized protocols. In many circumstances, this is understandable given their knowledge of the capabilities of the modalities, the novel image sequences, and their natural desire to maximize diagnostic image output for the potential benefit of their patients. However, these laudable goals need to be balanced with the goals of quality, safety, efficiency, and patient experience, aside from the institutional benefit when generating increased modality capacity. It is simply impractical—and usually unnecessary—to accommodate each and every radiologist's requests for additional imaging sequences. This does mean that a few patients may need to return for further imaging, but in most circumstances, such legitimate requests will be very unusual.

Although a daunting task—and a key reason why many protocols are infrequently updated—the protocol development team should critically reexamine every CT and MRI protocol and, from the ground up, together evaluate which sequences are mandatory and which can either be dispensed with or used under only limited circumstances. This will require discipline, as radiologists will need to compromise their intellectual desire for a full complement of sequences with the need to optimize efficiency and patient convenience.

Perhaps more challenging, given vendor variation, is managing and minimizing radiation dose. Physicists' input will be indispensable given that they have scientific insight into comparing and managing complex dose algorithms. Radiologists will need to determine which indications require higher CT doses than others. For instance, a follow-up CT study for abdominal abscess evaluation after catheter placement can be performed at a substantially lower radiation dose than for initial diagnosis. On the other hand, patients with known metastatic malignancies could be imaged with higher doses without fear of long-term harm, so as to avoid confusion over subtle imaging findings that may influence their often aggressive treatment algorithms.

Finally, any effort to upgrade and improve imaging protocols should not be viewed as a one-time project but rather a work in perpetuity given ever changing innovations in equipment, science, and evidence. To be effective in this regard, protocol team members need to be allotted sufficient dedicated time to monitor and maintain best practices. Unfortunately, the leadership in many departments (particularly private practices) often fails in this regard; as a result, their teams may tinker with protocols from time to time, rather than approaching them in a longitudinally holistic and iterative manner.

Our article so far has focused on the need for individual organizations to develop their own standardized and optimized protocols. Such efforts would move the profession forward substantially. A more effective, but also logistically

and politically more challenging, proposition would be for protocols to be designed at the national level, leveraging the resources of organization such as the ACR or the RSNA, which already have engaged clinical experts and thought leaders. Optimal protocol development and implementation is a complex process requiring multiple team members with detailed and contemporary vendor and scientific knowledge, something that is difficult to achieve in small organizations. Additionally, having the ACR (or similar large organizations) advocate for such change and implement dedicated ongoing task forces to design and maintain optimal protocols also ensures optimal integration with other initiatives (such as the Dose Index Registry®) that will facilitate appropriate reimbursement under emerging value-based payment models. With such aligned efforts and incentives, patients and referring physicians can then be reassured that regardless of geography, their radiology department is maximizing safety, quality, and the patient experience.

REFERENCE

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Giles W. Boland, MD: Department of Radiology, Massachusetts General Hospital, Harvard Medical School, 32 Fruit Street, Boston, MA 02114; e-mail: gboland@partners.org.