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# Toward decreasing diagnostic errors

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None of us wants to be sued, but it's hard to avoid. We radiologists in daily practice have a 3-5% error rate, with most of our errors consisting of either missed findings or "overcalled" pathology. About 75% of malpractice cases against radiologists are due to diagnostic errors.<sup>1</sup>

Besides having to face malpractice committees, just being the target of a malpractice action can result in anger, frustration, loss of confidence and even concern for one's reputation, regardless of whether the accusation is warranted. Indeed, anxiety certainly drives a considerable number of extraneous diagnostic studies as a shield against practice errors.<sup>2</sup>

Clearly, we should be doing as much as we reasonably can to minimize diagnostic errors, not only for the benefit of our patients, but for ourselves as well. Many factors influence the potential for misdiagnosis, some of which are particular to diagnostic imaging and some not. Errors can be result from two distinct types of factors: *Cognitive* or *inherent*, relating to the reader's direct interpretation of the study; and *external*, or indirect factors, which may also negatively impact reader accuracy. Many items in both sets of negative influences can be mitigated, but they require definitive action by the radiologist and the leadership of the institution, from small private offices to grand academic meccas.

## Cognitive causes of errors

Cognitive factors include the fundamental ability of the interpreter to distinguish

pathology from non-pathology, and to provide either a single or differential diagnosis. The physician's training and experience, intellect, ability to concentrate and perceptual skills are among numerous factors that will determine his or her diagnostic success.

The rate of diagnostic errors may increase due to fatigue, illness, mood (both within normal and clinically pathologic limits), and not keeping up with current literature (particularly reviews). Taking shortcuts through studies—such as viewing only reformatted images without looking at axial views; failing to use optimized tools like magnification and greyscale adjustment or to compare the current examination with available priors; using a "shotgun" approach to complex cases; and attempting to interpret grossly poor-quality studies—will also result in more frequent erroneous interpretations. Some of these factors can be ameliorated by dealing with each of these deficiencies in turn. One of my past department Chairs suggested reviewing each case as if it were that of a relative (one we liked) or a close friend. When I first heard this suggestion I was skeptical, to say the least. But I ultimately found it to be invaluable for motivating me to provide a zealous, dedicated review and to strive for accuracy to the best of my ability. We radiologists usually do not see our patients, so anything that makes us think of them as real individuals is likely to positively impact our interpretation efforts.

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We cannot change our intelligence, but it got us where we are today, so it can't be too bad. Of course, attending every morbidity/mortality conference, where we can see and learn from our and each others' mistakes, is a very good way to avoid making particular misdiagnoses in the future. Encouraging staff to share their diagnostic mistakes among colleagues is beneficial if handled professionally. I believe this "fall on your own sword" approach is much safer than faculty discussing others' mistakes—that is a formula for assaults.

### External causes of errors

A second group of factors that can impact diagnostic performance exists outside the reader—imaging study interaction. Among others, these include: heavy workloads, distractions (phone calls and noise), failure to review the voice dictation (a very common source of mistakes), failure to communicate with the patient's physician regarding emergency or unexpected findings, providing an interpretation with no relevant clinical information, lack of immediate access to online diagnostic reference resources, and working in an "ergonomically challenged" environment. Most of us, I believe, are hesitant to consult on tough cases with colleagues in our own practice. However, they will be pleased to be asked, as long as it's not too often, and they may give you the answer or help you clarify your own thinking. Most of us will not attempt to have a conversation with the patient's physician in complex cases. But such a conversation may provide information to help protocol the study and reach a diagnosis. Unfortunately, the time to do this is seldom readily available.

Among the factors in this second group, I find a heavy workload to be most relevant for me, as well as probably for a high percentage of radiologists, in general. ER radiology not only handles a large volume of cases, but it also experiences great demand for fast turnaround, no control over how many studies may be generated in a short period, and a tendency to image numerous body parts, as the screening approach is commonly used in this setting. There are no guidelines to help determine what number or type of imaging cases can or should be interpreted within a given time. In the world of private practice, at least, the tendency is toward a mindset of "the more dictations, the better." As I described in a previous editorial, "I Love Lucy,"<sup>3</sup> trying to handle too much volume tends to lead to disaster. Interpreting images is something of an assembly line process, and the line can only move so fast to preserve safety. I believe much stronger

efforts should be made to determine how workload can best be measured, how errors can be documented, and how work volume and error rates can be correlated. A recent study from Indianapolis documents the effect of work interruptions on residents' image reading. In this study, just one additional phone call during the hour preceding the generation of a discrepant preliminary report resulted in a statistically significant 12% increased likelihood of a resident error.<sup>4</sup>

We have in our department paid medical student assistants who take phone calls in the ER reading room and attempt to answer simple questions without disturbing the resident. This approach is of some help in decreasing interruptions, but a huge number of residual calls still manage to get through. Other extrinsic factors that can be influenced positively include optimizing the work environment and requiring pertinent clinical and physician contact information for each requested study. Departments should provide radiologists with easy access to medical records to get clinical feedback on their cases, maintain easy-to-use online radiology services that assist with establishing a diagnosis and—perhaps most challenging—provide adequate backup radiologist coverage to avoid overwhelming an in-house radiologist on busy services, perhaps with another on-call radiologist reading from home.

Recognizing the many factors that affect interpretation accuracy is vital. Problems inherent to image interpretation and extrinsic factors that influence the environment of interpretation have rarely been given the attention they are due, yet both need to be addressed. To be sure, even our best efforts will never *eliminate* diagnostic errors; after all, we are human, and even if we do everything correctly, bad luck and bad outcomes can conspire to produce lawsuits that can be lost based on decisions driven by emotions regardless of the quality of the medicine we practice.

Nevertheless, this is a topic ripe for study as a quality-improvement target. Hopefully, focusing greater attention on the factors that generate interpretive errors will improve performance and help reduce the potential harm to patients created by missed diagnoses and over-calls.

### REFERENCES

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