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Chairman's Letter: Productivity—Workflow Assessment and the Discovery Cycle

THIS ISSUE of the *Journal of Digital Imaging* has as its special focus, productivity and workflow in the digital or filmless diagnostic radiology department. Why should we assess electronic departmental gains in productivity and workflow over what can be accomplished with the traditional film-based operation? Why is it important to examine the systems and report the findings?

In general, we have done a poor job in the field of radiology of documenting whether the technologies we use have an impact on health care. I believe such documentation is important, for a number of reasons. Technology assessment and validation is one reason. Cost justification is another.

In much the same way that we must reproduce in the laboratory novel results reported in the scientific medical literature, we must test, examine, and analyze the devices, technologies, and procedures we put into place in the true "clinical laboratory." Assessment of clinical workflow may help us redesign current practices to be more optimal for the digital environment. Examination of workflow and productivity in the clinical arena may lead to discovery of previously unthought-of methodologies as well as affect the modification of current systems and the development of future product design.

An example is the ongoing discussion about which type of digital projection radiography device is better—computed radiography (CR) or digital radiography (DR). This debate has been going on for years. What has changed in the technologies or in the radiology workplace that keeps this topic dynamic? For one thing, the devices are here now and are in clinical use, so they can and must be objectively evaluated. Measuring, documenting, and reporting clinical performance helps to advance the technology available to us for use in the future.

Comparisons between computed and digital radiography have motivated system developers to make technological improvements that give them a competitive edge. For example, the significantly lower detective quantum efficiency (DQE) (roughly indicative of signal-to-noise measurements) of CR versus DR devices has stimulated the development of improved signal-collection mechanisms for CR. These include the exploration of needle/versus/powder phosphors, as well as changes in reader design that allow dual-sided signal stimulation and collection.

The speed of DR image production has prompted a radical new CR scanning design, evolving from point-by-point signal stimulation and collection to line-by-line signal stimulation and collection. In addition, single-step work-

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flow DR devices, less cumbersome than traditional CR cassette-based workflow, have given impetus to the development of cassetteless CR scanners.

On the DR advancement front, detectors now are incorporated into wall and table buckys for use in studies and regions of anatomy other than the standard upright chest examination. In addition, DR detectors are being made industrial strength for use in the true clinical environment, and more maneuverable, even semiportable, devices are being developed for use in bedside x-ray examinations, which cannot be performed with existing DR equipment.

And what about cost? If we do not understand productivity and workflow, how can we evaluate cost in any meaningful way? In a managed care environment, hospital administrators are requiring departments to reduce their operating costs and capital budgets. Picture archiving and communication systems (PACS) and digital imaging and information systems technologies have gained enthusiasm for potential increases in efficiency and improvements in the quality of care, as well as a long-term reduction in cost. The promise of these technologies must be proven, however, through careful scientific examinations such as those reported in the research papers presented in this special issue.

An examination of seemingly mundane workflow and productivity measures can lead to novel ideas, unique designs, outside-the-box thinking, and amazing advancements. We must continue the discovery cycle of idea → design → implementation → analysis → redesign → implementation → analysis → redesign—or even new idea, unless we want technology discovery to become static.

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