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Orchestrating Radiology Workflow: Measuring, Managing and Load Balancing

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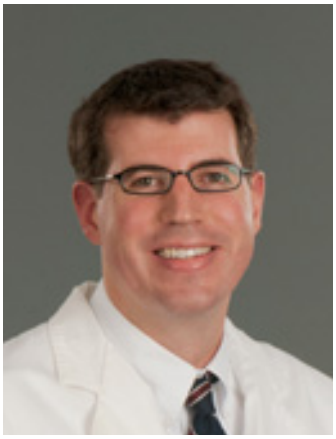
Workflow is both the magic and worry of radiology. To borrow a phrase from a nursery rhyme: when it is good, it is very good indeed, but when it is bad, it is horrid. While many radiology groups enjoy good workflow, most have room for improvement in measuring productivity, managing studies and balancing workloads to boost business and burn out physician burnout and ease fatigue. Here's how two leading radiology group practices are making workflow better.

Radiology practice leaders told us in a recent poll by *Radiology Business Journal* and RadiologyBusiness.com that their No. 1 concern is measuring and managing quality workflow, including load balancing and assigning exams. The leaders who chimed in include radiologists, executives, administrators and IT managers and directors. This article is the first of three to dive into the top three pain points radiology practices identified in the survey—and offer effective solutions.

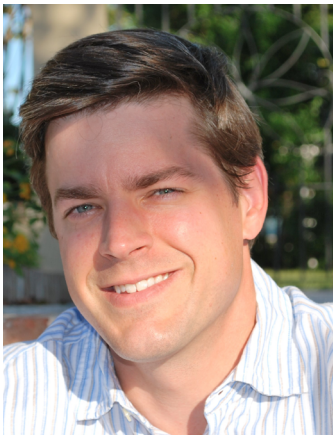
So what's a radiology group to do to make work flow? Think outside the digital lightbox, innovate, learn from trends and break off the rearview mirror to do radiology right.

Dr. Matt Brady and Dr. Jay Patti are two IT-savvy radiologists looking at workflow with a new eye.

Brady is the president of Roper Radiologists in Charleston, S.C. The practice of 26 radiologists and 2 physician assistants is dedicated to reading for Roper



Jay W. Patti, MD



Matthew Brady, MD

St. Francis Healthcare. The 671-bed health system is comprised of more than 110 facilities which include doctors' offices across seven counties, urgent care centers, and freestanding ERs. The system is built around three hospitals, Roper Hospital, Bon Secours St. Francis and Roper St. Francis Mount Pleasant, and a fourth, Berkeley Hospital, is slated to open in 2019. One hundred and fifty years old and counting, Charleston's only private, not-for-profit hospital system is focused on "healing all people with compassion, faith and excellence."

Patti is the chief radiology informatics officer at Mecklenburg Radiology Associates (MRA), the oldest radiology group in North Carolina. This practice of 47 board certified radiologists and 15 physician assistants is focused on offering high-quality imaging and image-guided therapy services to the greater Charlotte

region. Mecklenburg Radiology Associates specialists in all aspects of radiology, including stroke therapy, breast MRI, cardiac CT, cardiac MRI, minimally invasive tumor therapy, PET/CT tumor imaging, spine therapy and neurological and musculoskeletal imaging. The group reads for seven hospitals and 15 hospital-owned imaging centers.

How It Works

At Roper, each radiologist is assigned a seat per day, and is responsible for a defined area, with the system constantly filtering a worklist and pushing it for the radiologist to view. At Mecklenberg, worklists work in reverse, with radiologists pulling cases off a shared worklist to read. Think of it this way: The Roper radiologists are offered a plated meal, while in Mecklenberg they're ordering off the a la carte menu, for now, until they too migrate to a push environment in the near future. The objectives are optimizing schedules, improving performance and reducing costs.

Roper uses a workflow engine, Change Healthcare Workflow Intelligence™ , that integrates with their PACS. It's where efficiency in the eyes of the hospital meets efficiency in the eyes of a radiology group in terms of patient class and acuity. Looking back over the last year since go-live, Brady says: "It's helping us to achieve the system's goals while controlling and improving our own workflow."

A vendor-neutral medical imaging workflow rules engine, Change Healthcare Workflow Intelligence consolidates interpretation and quality tasks in either a single PACS or multiple PACS environment to promote visibility and communication. A smart worklist improves productivity by aligning demand with supply, using dynamic prioritization, automatic escalation and smart assignment to the most appropriate radiologist available. That means immediately delivering an exam to the right radiologist at the right time for the right patient. The system seeks to facilitate higher quality care and improved efficiency, offering a look inside the data to visualize and measure workflow and trends. "We've taken the sum total of work we have and balanced it in regards to clinical acuity, subspecialty, and geography," Brady says.

Mecklenberg is moving in that direction too, Patti says. "For a hospital system to maintain a state-of-the-art radiology department moving forward, it will need the tools to allow radiologists to analyze their workflow data and customize their workflows to meet the needs of their unique clinical environment."

Measure for Measure

Improving productivity starts with measuring productivity. The old measure of exam turnaround time is passé, says Brady, who advocates for broader performance metrics. "When you look only at the radiology interpretive process—the timeframe between a study becoming available to be read and when the report is completed—you're getting extremely skewed data. It's inappropriate to use averages. You really need to be looking at percentage breakdowns. When you create those time thresholds in a workflow product like this, you allow tails to be truncated. We're able to reshuffle how the work gets assigned, based on clinical acuity."

For example, Roper allocates workflow based on subspecialty, and assigns all ER studies to specific individuals on any given day. This work structure means other radiologists only see ER studies when they're escalated and at risk of delayed review. The other radiologists are thus free for other high acuity cases, and as a result, "turnaround time tails for ICU and our inpatient work really came down in significant ways," he says. In fact, the average turnaround times for outlier studies in the ICU improved by 75 minutes. In other words, physicians for those critically ill patients, started getting the diagnosis they needed a lot faster.

With an eye toward cutting down read times to urgent care areas like the ER or ICU, the worklist auto-escalates cases as they become more urgent. "We can isolate ER cases away from urgent care cases, ICU cases, non-ICU inpatient cases and then

the outpatient base," Brady says. "Right away, we're stratifying those. ER cases escalate the fastest, ICUs a little less aggressively, and inpatient cases even less aggressively. Eventually, if unread cases hit their last time threshold, they cross-populate across everybody's lists. Within minutes, somebody's opening and reading."

So which measures are the right ones? "If you think about the list of metrics practices have used in the past—line item count from PACS, dictation count, billed and/or received dollars by the group, total RVU sum, the physician work [PW] RVU sum—some work, some don't," Brady says. "A PW RVU per clinical day worked is probably the tightest you're going to get. You want that valuation averaged over time, at least quarterly or even semi-annually."

But remember, data gained from your billing service is usually three months old.

Dollar-to-dollar comparisons are challenging too, Patti notes, when a group is covering two different hospital systems or has patients in different types of insurance contracts, each paying a different rate for a chest film, for example. "Dollars collected isn't always a good representation of the actual work the individual did, whereas RVUs is much cleaner and more consistent because it's based on the study type," he says.

Moving from dollars to exam volume and load balancing, Patti points to the common misconception among radiologists and radiology groups that there is wide variability in workloads over similar time periods. "Some people call themselves a "black cloud". Their gut feeling is that they have unusually busy days compared to other people. But if you actually look at the data, in most cases, volume is extremely consistent from day-to-day and week-to-week, especially when you are looking at larger organizations."

Diving into the data monthly works well at Roper. "It's useful to look at averages over an aggregate," Brady says, "and nice to have a uniform amount of time. You want to know the day-to-day statistics, but I've found a four-week aggregated period of daily average volume is effective to watch and manage."

Transparency is important too, Patti adds. "The general concept with transparency is that, as radiologists, we're all professionals trying to practice at our highest level. Transparency is healthy. When done right, it takes away suspicion among whoever's dividing up the potluck dinner."

Brady agrees. Physicians need to be "OK with what the group has decided is an appropriate amount of work and know that they have had a hand in decision-making. Data can verify that trust and, if not, we all see that changes are needed. That's why we need to monitor it periodically."

Quality Reads

But in all the data, we can't forget quality—hard as it can be to define. As Patti says: "When you don't look at the quality of the end product and you're just counting the RVUs, you could have unacceptable variability in quality. In other industries, it is easy to define end product. For example, the quality of a bolt can be easily measured based on whether it fits into the nut. But it's hard to define quality in radiology, because quality means different things to different people."

If we go back to our food analogy, whether the steak is cooked properly relies on how you like it done. "For somebody who really likes rare meat, a well-done burger would be totally unacceptable. That's the problem. We all may be able to tell the difference between wide varieties of quality, but parsing smaller variations is harder to define."

Radiology practices also have to account for things computers know nothing about: people and interruptions. Stuff happens. People have questions. It's impossible to account for—or to program in—variety, time and complexity of cases, let alone phone calls and stop-ins.

Brady cites literature on the benefits of using non-clinical RVU add-ins or having group-specific multipliers. "One common theme is the sort of procedural mix that we have to do when we're up and out of our chairs. These routinely have different ranges of complexity or involvement. Even if we can move cases around on a diagnostic list, there are implications to how efficient you can be. A lot can depend on the geographic location where you are working."

The career experiences and even blisters of burnout need to be considered too. In your group, who's judging what constitutes a good day or a full day? What's variety? That touches on a burnout issue. "I think that radiologist burnout happens for personal reasons," Patti says, "but it also can happen when you don't have good inner workings and adequate transparency within a group."

"We have to account for variables and interruptions somehow," Brady offers. "What's empirically a fair amount of work to operate? We need to keep the group operating in a sense of trust with each other and trust with the work they're getting done. I think that, longitudinally, getting group buy-in to move toward a push model is a big step for a lot of groups."

Efficiency is really the key in anything you do, Patti offers. "If you can do something more efficiently, then you can do better-quality work or a greater amount of volume with the same expenditure of effort or the same amount of time. Anything that can increase efficiency speaks not only to increasing revenue for the institution or the practice, but also to increasing the quality for the patient. If something takes you less time to do because you're not doing menial tasks, that's a good thing for every party involved."

Questions to Ask

The positives stack up for utilizing a workflow rules engine to improve radiology practice. But how best to select, install and implement such a tool? Brady and Patti recommend defining your needs, gathering your advocates and being sure your existing systems will integrate well.

Buy-in, early, is essential to success. "Really engage stakeholders to get buy-in before you try to roll things out and change how the group is operating," Brady says. "You want an aspect of the product interface available to your local PACS admin staff, if not certain superuser radiologists, to edit or adjust the product over time."

Integration with PACS is important too, Patti says, as is making sure you have the support and the accountability of your organization. "You need to have proof the systems will work well together. And you need to pick a vendor with whom you already have a good relationship. It becomes very frustrating to deal with vendors pointing fingers at one another. Sticking with a single vendor can prevent the finger pointing."

What We've Learned

Orchestrating workflow more efficiently is a win-win-win for patients, physicians and staff. Patients benefit when the radiologist who's best equipped for and experienced in reading that type of subspecialized exam is automatically chosen to read it, and it's routed quickly and efficiently. Always bring the expert chef, Brady says. "High-end cross-sectional imaging is better interpreted by subspecialists. That can be a very controversial thing for a lot of reasons, but a tool like this allows you to become more subspecialized at an earlier state or a smaller size. There are groups two and a half times larger than ours that cannot use their subspecialists on a day-to-day basis like we can."

Radiology groups also need to longitudinally evaluate and make changes over time—and make sure the changes don't require too much IT time, Brady says. Radiology practices need to be able to operate without reaching back to vendor service and getting deeper into the engineering structure of the product. "It should have the flexibility and optimization tools for your IT and administrative staff," he says.

Patients also benefit when radiologists keep their eyes on the exam, not the workflow. As Patti says, "I offer greatest value when my eyes are on the patient's scan I'm interpreting. Anything that can help keep my eyes on the screen is a net positive for patients."

Brady nods in agreement. "Anything that automates workflow steps that I don't really have to participate in is a plus," he says.

Data from the workflow engine also is helping to make more effective business decisions at Roper, with the team identifying some temporary and long-term changes. For example, when dealing with flu cases over the winter, they were able to demonstrate how the composition of cases was very likely to ease off. That meant they didn't need to increase weekend staffing. As Brady says, "That was a big deal in terms of dollars. We were able to look at data, ensure that we were dealing with a potentially temporary situation and make a tactical decision of no change. We revisited it later and realized we had made the right decision."

More long-term, they had considered adding staff about the time they were adding the system a year ago but held off. They're glad they did, as they were able to avoid spending significantly more than they needed to. "We had confidence in the workflow engine helping to better balance workloads, and it did. We'll probably add staff within the year to support growth, but until now our staffing has been sufficient," Brady says. "No doubt we are more efficient now from workflow and workload perspectives. And we know that over time that will get even better."