The growing field of advanced analytics is helping radiology groups put their treasure troves of data to use to boost efficiency and improve quality.

Patient safety, satisfaction, and the quality of care you provide are no longer merely questions of how well you complete the appropriate services. More and more, group practices and hospital departments are turning to advanced analytics tools for data to streamline their work flow and improve efficiency. The list of tools is growing, as is the number of companies providing them, but according to industry experts, there are a few advanced analytics systems that should be your technology bedrock.

“It’s absolutely essential to have information at your fingertips if you’re going to provide the safest, most efficient care,” said Eliot Siegel, MD, diagnostic radiology and nuclear medicine professor and associate vice chairman for informatics at the University of Maryland. “Versions of analytics have existed in radiology systems, but they have given limited information. Now, we’re moving from monthly reports to having dashboards and virtually immediate feedback.” However, it can be a challenge to implement advanced analytics effectively. The technology is changing so rapidly that it can be difficult to stay abreast of the latest developments, and convincing your colleagues of the tools’ benefits can be problematic. It’s important to remember, said David Hirschorn, MD, radiology informatics director at the Staten Island University Hospital, that advanced analytics offer something you don’t already have — data mining and evaluation that your PACS or RIS systems simply can’t do. Here are two major areas where advanced analytics are making a difference — and a glimpse of what’s to come.

**Business Analytics**

*Equipment utilization*: Having the latest or most up-to-date MRI or CT equipment is critical for your practice. But to get the most out of the machines, you must know to what degree you’re using them, said Hirschorn, also a radiology informatics researcher at Massachusetts General Hospital. “You must ask yourself if you have too much or too little equipment to meet the demands of your department,” he said. “Is one machine being used a lot? Are patients waiting a long time? Either way, you could be losing business, so you have to find a way to quantify how your equipment is utilized to know if you’re making effective use of time.” Implementing advanced analytics means you won’t have to wait until year’s end to determine your practice’s efficiency. For example, PowerScribe 360 Analytics from Nuance promises to help practices and departments analyze variance in radiologist reports, monitor ordering patterns, and use a variety of parameters to determine turnaround time. “Why not bring analytics into real time. As you collect the data in real time, you can use it in real time,” Hirschorn said. “As radiology becomes more and more data driven, we need dashboards that might not provide day-to-day analysis, but week-to-week or month-to-month to identify our weak points.”

*Personnel utilization*: In addition to maximizing your equipment, it’s also helpful to monitor how efficiently you’re using your time, as well as that of your staff. For example, knowing the details of your neuroradiologists’ schedules can help determine if they have time to read less complicated
scans, as well as brain MRIs. “Analytics can tell you how busy your neuroradiologists or other subspecialists are. Are they really full or do they have time in between cases?” Hirschorn said. “Could you make utilization of that time?”

Merging or Blending Services: Deciding to merge facilities or share radiologists between locations can be a daunting task. Analytics can help institutions decide whether joining together would be viable or even financially advantageous. Software, such as advanced analytics solutions from Montage Healthcare Solutions, can provide data about how radiologists at various sites spend their time and how locations utilize their equipment, these tools allow decision-makers to have more well-informed conversations. Without this data, Hirschorn said, resolutions to merge resources are based on guesswork.

**Clinical analytics**

*Scan Follow-Up:* One clinical tool under development could allow you to follow up on the studies you read. Currently, there is no process in place for you to find out what happens to patients after you review their scans and make recommendations. Soon, though, you’ll be able to circle back with the referring physician to see what impact your contribution created.

“To a large extent, radiologists practice with a relative lack of information except what’s available in the chart. We don’t close a lot of loops when we do our reporting,” Siegel said. “We literally read whatever history is available, interpret the image, make recommendations, and move on to the next case. But there is an advantage to knowing what happens.”

Learning how referring physicians use your diagnoses to treat patients can help improve your work, he said. If you have access to data about your reading accuracy, you can make any positive changes. Research and development on this type of tool is ongoing at the University of Maryland, he said, under the leadership of former radiology associate professor Paul Nagy, PhD.

*Peer Feedback:* All practitioners, even those who have several years of experience, can benefit from hearing what their peers think about their work, Siegel said. One advanced analytics tool bridges business and clinical needs, allowing radiology peers to give feedback about the quality of their colleagues’ studies, their use of radiation dose, and how well they center patients for studies. At the University of Maryland, this in-house tool has helped the radiology department identify sections with longer turnaround times and practitioners who take longer to report findings. It’s also helped departments improve how they use all modalities, he said.

*Radiation Dose:* Limiting radiation dose has been an industry-wide concern for several years, but measuring and tracking it through clinical analytics is relatively new. This type of tool can detect excessive levels of radiation quickly, prompting you to make changes to your protocols. It is likely, Hirschorn said, that it will soon become mandatory for practices to maintain radiation-tracking clinical analytics tools.

*Scheduling Patients:* Multi-site practices could benefit greatly from an analytics program that tracks which sites are least utilized, such as the one from Illinois-based The Optimé Group. Appointment schedulers can use it to direct patients to site with the shortest wait times and least utilized equipment.

“The patient, all things being equal, should to go to sites that are the most advantageous for the institutions,” Hirschorn said. “Practices can build this tool into their scheduling as a way to preferentially push patients toward equipment that is least utilized.”

Even though not every radiology department or practice is associated with an academic medical institution, they can all benefit from research analytics tools, Hirschorn said. By pulling radiology report data from electronic health records, analytics dashboards can synthesize findings to improve clinical care. For instance, looking closely at clinical data can identify which patients undergoing imaging for head trauma are most susceptible to internal bleeding. With that information, radiologists can send reports with more detailed recommendations back to referring physicians.

**Analytics Future and Challenges**

Although not yet in existence, radiologists can look forward to a myriad of intelligent tools that will be on the market in the next few years, Siegel said. Efforts are underway to enhance natural language processing software to identify discrepancies between pathologies recorded in the body of a report and the ultimate conclusions. These capabilities will make departments safer and more efficient, he said.

Advanced analytics tools are also moving closer toward the creation of an “automated resident,” he said. While radiologists in academic medical centers have access to residents and fellows, practitioners in other settings don’t. Such a tool would take on responsibility for reviewing old exams, reading through charts, and giving the radiologist a synopsis of the work. This kind of
software program, Siegel said, will likely give radiologists more time for other tasks and make them more prepared when meeting with patients.

One of the biggest challenges radiology practices face, Siegel said, is looming meaningful use requirements. Identifying the analytics tools that work best for individual practices and training staff to use any health information technology or advanced analytics tools correctly will require significant effort. Additionally, radiology faces what Siegel calls the “Tower of Babel” situation.

“We have a situation now where different people measure things in different ways,” he said. “We need a common vernacular to make sure that when we’re monitoring metrics and discussing them that we’re all measuring what we thinking we’re measuring and talking about the same things.”

In fact, the Society of Imaging Informatics in Medicine has an initiative underway designed to standardize the language used to discuss analytics.

Regardless of the challenges ahead, the industry must make every effort to embrace and master advanced analytics. It’s a trend that shows no sign of slowing, Siegel said.

“We must promote a culture of willingness and enthusiasm for using these tools to find problems, fix them, and measure the results,” he said. “Not all departments currently have that culture, so we must meet the challenge in our institutions of creating a parallel culture of quality improvement.”

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