most pathology departments are typically organized around the following service lines: clinical, anatomic, molecular, research, education, and informatics. The boundary lines among these different services are starting to blur, while new services are being added. As we look to the future, pathology labs and pathologists are going to need new proficiencies in three areas:

- Utilizing appropriate molecular and genomic techniques as part of their diagnostic process to enhance patient outcomes.
- Relying on software applications and electronic images of slides (also known as digital pathology) to perform diagnosis and collaborate with peers.
- Operating in a highly sub-specialized team environment and integrating various clinical data points in order to form a diagnosis.

The changes coming to Anatomic Pathology (AP) represent a tremendous opportunity for innovation and technological advancement, but they also carry with them a potential for disruption. Embracing market dynamics is an important step that AP labs should take to seize the opportunities while minimizing the disruption. Many labs have also found it worthwhile to partner with a software vendor that understands the highly specialized space of AP.

Back to basics

As promising as the future is, AP labs today are bracing for the coming changes in a tough economic climate. Many face reimbursement cuts, regulatory pressures, and staffing shortages.

Jesus Ellin, AP supervisor and Pathology Assistant at Yuma Regional Medical Center in Yuma, AZ, facing future shortages, asked himself a simple question, “what can I do today in order to prep my lab for the future of anatomic pathology?” The answer, he claims, was remarkably basic: AP labs have a very manual, manufacturing-style workflow. “You have to start with automating this workflow,” says Ellin. “You have to bring in barcoding of specimen, tracking of samples, and lean processes for printing slides and cassettes. You have to build QA/QC into the LIS to track every step. You have to convince your pathologists to use the computer as opposed to paper, and you have to assist them with adequate training and IT support. You have to do all this before you can start to think about digital pathology.”

That is exactly what Yuma Regional did with cutting-edge laboratory software and instrumentation. Yuma implemented basic workflow automation steps. This allowed the organization to successfully roll out digital pathology by building upon the barcoding of specimens and electronic workflow using the LIS.

Dr. Mark Tuthill, Division Head of Pathology Informatics at Henry Ford Health System in Detroit, has a similar view. “When I first started at HFHS in 2003, we didn’t have a true anatomic pathology information system. Today we rely heavily on one to deliver lean and high quality lab operation with amazing turnaround times and complete asset labeling and tracking.”

“The throughput and safety of specimen handling has been greatly improved with the institution of tracking systems,” notes Dr. Michael Berman, Vice Chairman of Pathology at Jefferson Regional Medical Center in Crystal City, MO. “In addition to help in auditing and tracking, their greatest benefit may be in error reduction. They use barcode technology to better ensure correct tissue pass-off from specimen container to paraffin block to glass slide to pathologist desk.”

With greater reliance on complimentary molecular testing, the need for specimen handling now extends beyond the four walls of histology. Paper-based manual processes become very hard and error prone, especially as volumes go up. This is when things like having all users, including pathologists, on a central IT system and using electronic tools to integrate information and electronically signing cases start to matter more and more. Basic information system technology is again very important.

Enabling the future, today

Let’s assume digital pathology as the future state. In order to image the slides in an automated fashion, there needs to be a mechanism to communicate to the imaging system which slides to image and how. This is a lot like ordering a stain, where the LIS is telling the instrument which slide to stain with what type of stain. The unique barcoded ID becomes very crucial in these cases.

Digital pathology adds steps in the technical workflow that can have a negative effect on throughput if not planned appropriately. Therefore, things like batch sizes, contextual instructions for technologists, and real-time tracking of slides become crucial for maintaining high throughput.

Another “gotcha” with digital pathology, according to Ellin, is that it can amplify histology artifacts. Today pathologists can often work around minor folds and bubbles in a slide when placing the slide under a microscope. However, these artifacts can get amplified and produce consequential visual manifestations when the slide is digitized. Therefore, it is again very important to have robust specimen management and QA/QC processes for the histology staff. “The LIS provides the framework for all these capabilities,” says Ellin.

Finally, let’s turn again to the idea of team-based pathology. There is a real opportunity here for the IT systems to enable digital collaboration. A bone marrow case, for example, may involve, in addition to the morphological diagnosis, additional cytogenetic analysis, molecular analysis, flow cytometry, and immunohistochemistry. These different steps are performed by different team members. That requires coordination and communication of tasks and integration of results for successful case workup. Manual and paper-based processes quickly break down in such scenarios, and the use of information technology is required to become increasingly more sophisticated.

It makes sense that the evolution of pathology will undoubtedly lead to an improved and more adaptable end product—“the holy grail of the pathologist”—the final report. Dr. Berman believes this new species of reports is well underway.