Technology and Innovation in the Laboratory

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Health information technology is revolutionizing the delivery of health care. A diagnosis of cancer now may be coupled with a specific therapeutic intervention, often referred to as personalized medicine; telemedicine is connecting pathologists with clinicians and clinicians with patients in the far reaches of our globe; and patients are expanding their use of wearable technologies and taking increased responsibility for their own health. Innovations and developments drive the laboratory forward, and spearheading best practices toward innovative technologies is an essential role for pathologists and laboratory professionals.

New technologies are rapidly emerging in the field of molecular diagnostics. As the landscape of our profession shifts, it is in each of our best interests to work together to connect scientific communities by exchanging ideas and sharing knowledge. To this end, ASCP has pursued—and received—multiple grants to collaborate with partners researching diseases at the molecular level, including breast cancer, non-small cell lung carcinoma, myelodysplastic syndrome, and peripheral T-cell lymphoma.

As innovation thrusts us forward, the Society has also been extremely proactive in advocating for the future needs of its members by helping them prepare for what will come. We recently collaborated with the American Society of Cytopathology to facilitate the Advanced Cytopathology Education conference in Philadelphia. The two-day meeting was a crucial opportunity to educate our cytopathology practitioners regarding the changing landscape of cancer diagnostics and help them recognize the opportunities to provide more sensitive and specific diagnoses that will in turn improve patient care.

When new diagnostics emerge, they are meant to be used and shared not just locally, but also globally. ASCP and its members ensure these new technologies’ success in providing increased and enhanced care when we share our knowledge and experience with these innovations through programming such as hands-on training workshops with PEPFAR initiatives and the ASCP Middle East Conference. These efforts unite the global laboratory community and our influence on implementing new technology fosters a worldwide knowledge exchange.

This issue of Critical Values takes an in-depth look at how innovation and technology are making an impact in the laboratory and how they bolster the laboratory as a central element to improving patient care. This is partially evidenced through our close alliances with other medical disciplines, including educators who use technologically savvy resources to provide innovative educational practices for their students. In her article, “Simulated Environments, Real Improvements,” Web Editor Kelly Swails speaks with educators about the use of simulation centers to improve skills needed to better create multi-disciplinary practice teams and provide exceptional patient care.

This issue also showcases our second annual Top Five 40 Under Forty honorees. These five rising stars of the laboratory are innovative thinkers, leaders and facilitators. As exceptional ambassadors for the future of the profession, they are tasked with continuous advancement of laboratory science and assisting their colleagues with an ever-evolving field.

In his article, “The Future of the Automation of Laboratory Medicine,” Dr. Robin Felder discusses technologies on the rise and innovation-driven best practices that will assist pathologists and laboratory professionals. “Automation can add value to what we currently think of as our end product: the lab test result. Automation can provide faster turnaround time and improved accuracy, precision, and safety. Information value can be enhanced by autovalidation of results and also by providing the physician with trending information;” Dr. Felder states in the article. “If properly reported in context with the patient’s current health condition, lab results can encourage healthy lifestyle changes and ultimately the selection of appropriate therapeutics.”

Fusing innovative technologies with practice is critical in the evolution of diagnostic medicine. ASCP members are indispensable to the healthcare team and provide the greatest value for improving patient care.

Thank you for your continued support of the ASCP. Please send me your comments and suggestions at Blair.Holladay@ascp.org. My very best to each of you.

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Dr. Holladay is CEO of ASCP.
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Innovation has driven countless transformative advances in society, from the internal combustion engine to the smartphone. The medical specialty of pathology and laboratory medicine has embraced disruptive advances numerous times throughout its history, dating back to the adaptation of manual laboratory assays to automated platforms, and more recently in the form of genomics, proteomics, whole-slide digital imaging, in vivo microscopy, and other advances in the spirit of “creative destruction.”

The innovative spirit is indeed transforming, but it is embraced inconsistently. Innovation is characterized by a cycle of risk and reward—multiple failures followed by intermittent successes. True innovation—the type that reinvents old paradigms and renders existing systems quickly obsolete—is by its nature unpredictable. MIT economist Robert Merton reminds us that “no human being can possibly foresee all the consequences of an innovation, no matter how obvious they may seem in hindsight.” Innovation requires the courage not
only to “think outside the box;” but to accept the high risk of failure associated with that type of thinking. Jeff DeGraff, a leading author on innovation and a professor at the University of Michigan Ross School of Business, Ann Arbor, Mich., coaches us to embrace the failure cycle associated with innovation and, rather than fearing failure, mitigate its risk by accelerating it. It takes a special breed of investor, leader, manager, or worker to truly live by this philosophy.

When it comes to the excitement of the risk-reward enterprise that is true innovation, many of us fall short of full engagement. Reward? Sure. Risk? Not so much. When it comes to “creative destruction,” we all embrace the creative piece, but perhaps not the destruction, especially if it involves designing our own obsolescence. Everyone loves innovation. We all want to be innovators. And, as innovators, we all want to decry those who would obstruct innovation. We want to design the next breakthrough; we want to preside over the next disruptive wave of the technological revolution; we want to build rockets to the moon; we want to be “game changers.” And, of course, we want to do all of that while going to work every day to a secure job with a predictable income and full benefits. Therein lies the paradox.

There are opposing forces at work in modern health care: The need to more efficiently and effectively utilize existing resources through application of proven and established systems, and the need to continue the process of transformative discovery. The former goal is largely pragmatic, and the latter more idealistic, but both are equally important. At some level each of us needs to embrace the innovative spirit while maintaining the extraordinary order and efficiency that have made our specialty revered for its high level of quality in the delivery of patient care.

On a more personal note, this is my last column in Critical Values as the president of ASCP. At the end of the month I will pass the gavel to my friend and colleague Dr. David Lewin. As an ASCP member, I look forward to benefiting from Dr. Lewin’s unique brand of thoughtful intellectual leadership, and I thank each of you for the extraordinary opportunity you have afforded me in representing this great organization for the past year. I remain immensely proud to be associated with the world’s largest organization representing our specialty—a society whose inclusive nature fully embraces the synergies of teamwork and continues to demonstrate that we are indeed Stronger Together.

References


Dr. Finn is Medical Director of Warde Medical Laboratory and a Partner at IHA Pathology and Laboratory Management in Ann Arbor, Mich.
Around ASCP Journals

The American Society for Clinical Pathology offers information and education that can aid your practice as pathologists or laboratory professionals. Whether you read the printed journals or get your information online, the American Journal of Clinical Pathology (AJCP) and Lab Medicine provide the latest research, reports, and studies. Here are some highlights from recent issues.

AJCP

The August and September issues conclude the series of articles from the 2013 Society for Hematopathology/European Association for Haematopathology workshop sessions. Also in the August issue are two articles and an accompanying editorial on ASCO/CAP guidelines related to HER2. The September issue has essential reading in the publication of the biannual ASCP vacancy survey of medical laboratories in the United States. Finally, a study from the European Institute of Oncology on molecular testing for targeted therapy in advanced non–small cell lung cancer appears in the October issue. These articles and others can be accessed at www.ajcp.com as part of your ASCP membership.

Lab Medicine

The Summer 2015 issue of the journal features a review article on Crimean–Congo Hemorrhagic Fever by Dr. Sara Shayan and colleagues, as well as a case study on the development and detection of Kidd antibodies by Dr. Kimberly Williams and colleagues. A Laboratory QA article in this issue by Dr. Jessica Sugianto et al looks at the application of Lean production principles on gastrointestinal biopsy handling.

LabMedicine.com

If there is one constant in laboratory medicine and pathology, it is change. Different procedures, updated technology, and new protocols are not only common in the laboratory, but expected—if you aren’t changing, you’re falling behind. In this regard, Lab Medicine and Lablogatory have you covered.

- In the Tauxe et al paper, “Fecal Microbiota Transplant Protocol for Clostridium Difficile Infection,” the authors describe a typical FMT procedure that can be adapted by facilities that want to begin a program of their own.
- On Lablogatory, the post, “New Technology for Transfusion Medicine” discusses pathogen reduction in blood products via the Cerus INTERCEPT blood system.

Find this information—and much more—on: www.labmedicine.com and labmedicineblog.com.

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Message from the Incoming President

By David N.B. Lewin, MD, FASCP

Keeping Up With the Joneses

Technology and innovation can arise within the field of pathology and laboratory medicine; however, advances in technology often come from other areas in medicine or from outside the field altogether. As a specialty, we need to “Keep up with the Joneses” to adapt these advances to the field of pathology or otherwise be left behind. Below are some of the advances that are changing the practice of pathology and laboratory medicine.

Simulation Centers

One technology we’re seeing today is simulation centers for medical training. The broadest definition of medical simulation is “an imitation of some real thing, state of affairs or process” for the practice of skills, problem solving and judgment.¹ Simulations can be divided into five categories:

1. Verbal: Role playing in a standardized scenario.
2. Standardized patients: Actors used for evaluation of a physical exam, history taking, and patient interaction.
3. Part-task trainers: Models to represent the normal and disease state so a procedure can be mimicked.
5. Electronic patient: Most comprehensive form of simulation. May incorporate any or all of the above.

Pathology and laboratory medicine has been slow to adopt the use of simulation in primary training and maintenance of skills. Many other medical specialties have incorporated simulations into their training programs, and there are numerous simulation centers at major academic centers. Some of the lag may be attributable to the lack of acuity and direct patient
interaction in many pathology and laboratory medicine practices. However, a number of excellent examples that show how pathology and medical science students can benefit are provided in the article “Simulated Environments, Real Improvements,” by Kelly Swails, MT(ASCP). In fact, much of the slide-based training and unknown slide cases in anatomic pathology could be considered a simulation with a standardized patient (slide).

Procedure-based activities are well suited to part-task trainers. For pathology this would typically involve models to practice fine needle aspiration or bone marrow biopsies. Verbal simulations are easily adapted to pathology and have been described in training for on-call simulation. At the 2014 ASCP Annual Meeting in Tampa, ASCP took advantage of the Center for Advanced Medical Learning and Simulation (CAMLs) to offer simulation workshops in fine needle aspiration and blood banking. Our challenge as a society is to continue these innovative training opportunities.

Digital Pathology

Digital pathology is slowly making inroads into pathology practice and training, and most pathologists are watching its adoption carefully. Microscopes have yet to be replaced by computers and digital images in the majority of diagnostic pathology, but digital pathology and whole slide imaging have shown great promise in educational settings. In graduate education (medical, dental, and veterinary schools), whole slide imaging has mostly replaced traditional microscopy. It is cost effective, very flexible, and supports distance learning. It also has the potential to be a simulation: a standardized
patient (slide) with the additional advantage of annotation and evaluation of tracking and auditing how someone views and navigates the slide. Use in diagnostic pathology likely will first gain traction in settings where there is distance between where the slides are created and where they need to be interpreted (distance consultation, distance frozen section, and distance diagnosis). Again, our challenge as a society is to incorporate whole slide imaging into our education offerings to prepare pathologists for changing practice.

In Vivo Microscopy

Another emerging technology that pathologists and laboratory professionals should keep an eye on is in vivo microscopy. This technology has the potential to turn pathology on its head. It allows the acquisition of real-time images with microscopic detail without requiring creation of a slide or use of a traditional microscope. Current technologies are being used predominantly in ophthalmology with imaging of retinas, and cardiology with imaging of coronary arteries—areas that are not amenable to tissue biopsy. Use in gastroenterology and other specialties involving luminal organs is also gaining traction.

In vivo microscopy’s two major technologies are confocal laser endomicroscopy (CLE) and optical coherence tomography (OCT). CLE integrates high-resolution and 1,000-fold magnification. It relies on fluorescence and functionally produces an image similar to a 10x microscopic image. Most of the images give a tangential section and are in black and white, so they are not typical of what pathologists are accustomed to reviewing. OCT provides cross-sectional imaging of tissues based on back scattering light using near-infrared light. It is optical ultrasound using light instead of sound waves. The images are similar to low power scanning microscopic images. Both of these modalities produce images similar to histologic images, and pathologists are the ideal individuals to review and evaluate them.

Pathologists and laboratory professionals need to be up to speed on the numerous innovative technological advances coming from all sectors. To keep the practice of pathology and laboratory medicine relevant, we must stay ahead of these changes.

References:


Dr. Lewin is Professor of Pathology and Laboratory Medicine at the Medical University of South Carolina in Charleston, and Incoming President of ASCP.
Practical Education to Prepare You for Today and Tomorrow

Globally-recognized change agents discuss some of today’s most critical healthcare issues

Dr. Sanjay Gupta  
CNN Chief Medical Correspondent

Barak Goodman  
Filmmaker

Dr. Rajesh Panjabi  
Ebola Fighter & CEO, Last Mile Health

Dr. Carl June  
Pathologist, University of Pennsylvania
Medical technologies used in clinical laboratories are transforming laboratories at their core, allowing medical companies to quickly advance and develop new ideas to improve patient outcomes. However, medical technologies can be very expensive and may not be affordable to some clinical laboratories, especially those in rural America or developing countries. Because of this, many companies are now focusing on products that are more affordable, to enable faster turnaround time and efficient care to patients.
Innovation in the lab is not an option, but rather a necessity, because of the intense pressure from third-party payers and accrediting agencies as demands for higher-quality and more cost-effective healthcare services increase simultaneously. The tools used in clinical laboratories may be too expensive to employ in developing countries or simply may not be available due to lack of adequate development—and that’s where innovation is needed most. It is the process whereby new technology is transformed to reach a wider range of people.

This is essential to address the problems in the healthcare industry around the world and to cater to the health needs and challenges of a community.

The Galapagos Islands are a well-known example of innovation. Several islands and their inhabitants exist nearly in their full natural state, with little influence from human activities. It is natural selection at work; the living organisms that survive do so by adapting and reinventing themselves so they
can survive with other creatures. Innovation occurs regularly in each organism’s specific environment, meaning that living things can survive if they master their habitat. Apply this to laboratories in different countries, and it helps you see how, by adapting to their environment, human beings can produce and invent relevant equipment that can be substituted for what is used in westernized countries.

**Maximizing Resource Potential**

In developing countries, science and technology require a large amount of investment. Lack of resources in state laboratories forces laboratory professionals to use their creative abilities to reuse and invent as much as possible. For example, a trans illuminator can be built from a box and an ultraviolet light bulb. A micro-centrifuge for samples can be created out of a blender and an aluminum bowl. Harvard University researchers turned bubble wrap into tiny test tubes, a cheap alternative to glass test tubes and culture dishes. The bubble wrap can also serve as a container for performing bio-analyses and storing liquids.

Researchers inject liquids into the sterile, air-filled pockets of bubble wrap, seal them with nail polish hardener, and with this they are able to conduct blood tests for diabetes and anemia, measure ferrocyanide electrochemically, grow *Caenorhabditis elegans* nematodes, and culture *E. coli*—all within the bubbles. This is a welcome material adaptation in clinical laboratories where glass test tubes are not easily available or are expensive, although there are some limitations (eg, the tiny test tubes can easily be popped). Such low-cost technology innovations can be used in developing countries that have no access to a steady power supply or medical equipment needed in the laboratory.

**Innovation in Education**

Medical errors have contributed to loss of life over the years and also to the increased cost of medical care around the world. This in turn has given rise to an innovative medical curriculum that emphasizes the need for proficiency rather than mere acquisition of skills by healthcare professionals. An emphasis on proficiency is important to the education of health professionals, as often in developing countries students complete their university programs but never receive the clinical skills needed for their work.

Simulation-based learning activities in medical laboratory education programs can be effective and supportive tools to enhance student transition into the clinical environment and help them develop the skills they may not have otherwise received. For example, during an online proficiency program about hazardous pathogens, a clinical scenario is presented and the learner makes choices of media or biochemical tests to perform. Results are given and the students try to identify the organism or rule out hazardous pathogens. The proficiency program simulates real laboratory situations with the use of video animations and photo images.

The future looks promising for researchers, scientists, and patients in the developing world as new tools that can be applied globally are created and low-cost technologies are adapted into tools appropriate for healthcare applications and in clinical laboratories. Although countries have different levels of scientific proficiency and technological development, particularly in education, a laboratory’s ability to be flexible and think innovatively can help overcome many of these challenges.

**References**


Mr. Famitango is Laboratory Administrative Director at Morrill County Community Hospital, Bridgeport, Neb., and Program Director for the Phlebotomy Technician and Medical Laboratory Assistant Program at Western Nebraska Community College, Scottsbluff, Neb.
Highlights in the October Digital Issue of Critical Values

The digital version of Critical Values offers bonus content not available in print, and is available for both Apple and Android devices. ASCP members who select the “Journals App” option can also stay connected with current and past issues, search for articles and content, and access the journal on your tablet or phone. To upgrade your subscription, call ASCP at 800.267.2727 today!

Already subscribe to the journal app? Download your copy and enjoy these additional highlights, including:

— a recap of the Advance Cytopathology Education program, launched by ASCP and the American Society of Cytopathology and bringing knowledge needed by cytotechnologists to move forward in their careers and establish a role as an essential part of the clinical care team.

— a podcast featuring ASCP President Dr. William G. Finn and three members of the Food and Drug Administration who worked on the laboratory developed test (LDT) guidance. Find out the latest on the LDT guidance, and how it will affect your lab!

— a photo gallery featuring more images from the University of Alabama’s simulation center, and how this new way of teaching is benefitting laboratory professionals.

For more info please visit: ascp.org/gettheapp

A Comprehensive Guide to Prostate Diagnosis

ACGME/ABMS Competencies for MOC: PC, MK, PBL, SBP

A Comprehensive Guide to Prostate Diagnosis is an A to Z overview of diagnostic prostate pathology. The full online course includes just over 3 hours of webcasts subdivided into six stand-alone modules for convenience.

Building from the very basic to the more complex issues, the course begins with a discussion of normal prostate anatomy and histology in order to provide a baseline to recognize the diverse histology of the prostate gland components.

DONNA E. HANSEL, MD, PHD
Chief of the Division of Anatomic Pathology & Professor of Pathology at the University of California San Diego

User Comments

Good course applicable to current practice.

Exceptionally good CME module. Love the format! Very comprehensive also. Would love to see more like this!

This was a great course!

ascp.org/ProstateDx
In this era of hashtags, tweets, Instagrams, emojis, and social media, electronic communication, particularly the Internet, is modern society’s main form of information acquisition and interaction. In fact, when polled, 69 percent of Americans say they get their news on computers or laptops and 44 percent utilize social media as their source of news coverage.1 Personally, I use Facebook not only to keep up with friends, but also to stay current on world events. In fact, Facebook is where I learned of two historic events within two days of each other: First that the Supreme Court decided to uphold the Affordable Care Act, and then that it had ruled in favor of same-sex marriage. Both events were plastered all over my newsfeed. Indeed, newspapers and magazines, at least in their physical form, are becoming a thing of the past.

This transition to electronic media appears to be permeating other aspects of life, work, and medicine as well. E-learning, or Web-based learning, in which learning is facilitated by the use of electronic media, has been a focus in education for several years. Starting from grade school, kids are using...
Web-based tools to learn to read, type, do math, perform experiments, and take assessment tests. As this generation grows and moves on to high school, college, and graduate school, incorporating e-learning into each stage of curricula will be a prerequisite to engage these students. Accommodating this new generation of learners has even begun in medical schools and residency training programs.

In particular, pathology training has been greatly influenced by e-learning modalities. At the risk of exposing my fellow residents, I would be willing to bet that most of them have not read the great anatomic pathology texts of Rosai and Sternberg in their entirety. These days, websites such as PathologyOutlines.com have quickly become an invaluable pathology reference for residents. Other websites, like the Johns Hopkins Surgical Pathology Unknown Conference, where users can test their diagnostic skills, have also partially supplanted traditional reading of texts and lecture series. E-learning has pervaded clinical pathology as well. You would be hard-pressed to find a pathology resident who
has not visited Blood Bank Guy (www.bbguy.org), the website created by Dr. Joe Chaffin. It’s a great source for residents studying transfusion medicine and contains a mixture of presentations, podcasts, and high-yield notes.

With the explosion of e-learning teaching modalities, the literature has recently been inundated with surveys and studies examining the use of Web-based tools in a variety of subspecialties and areas of medicine, including surgery, cardiology, dermatology, neurosurgery, transfusion medicine, and sonography. Some studies have compared traditional learning tools with those that include some form of e-learning, and the data demonstrate improvement in measured endpoints in the groups exposed to e-learning. Beyond benefits in information integration and improvement in objective assessments, other studies point out the benefits in time management, especially with physician work hours and busy schedules in the face of ever-changing practices and technological advances.

Ruiz et al summarized the evolution and benefits of e-learning nicely in a 2006 review article: “Innovations in e-learning technologies point toward a revolution in education, allowing learning to be individualized (adaptive learning), enhancing learners’ interactions with others (collaborative learning), and transforming the role of the teacher.”

 Seeing as e-learning has found its way into various facets of medicine, including pathology, I thought it would be appropriate to highlight two ways that ASCP is incorporating Web-based learning into the organization:

1. **Lab Management University (LMU)**, described as “the most practical and complete training resource in laboratory management,” is a certificate program designed to instruct and improve aptitude in laboratory management. It was developed to teach practical skills with 25 fundamental courses focusing on the six competencies of lab management: leadership, personnel management, financial management, informatics, operations, and compliance. These courses are interactive, and are geared toward laboratory professionals, pathologists, and residents in training. Since its inception in 2013, LMU has enrolled more than 5,000 participants, both nationally and internationally. Those who complete the LMU Fundamentals certificate can move on to the new LMU Advanced package, which expands into specialized areas and further solidifies competency and competence in your skills. For more information on LMU, visit www.ascp.org/lmu.

2. **ASCPedia** is a website in development that is designed for education and collaboration. It holds an extraordinary library of materials consisting of thousands of images, static and whole slides, that can be searched and used by members. Users will have several levels of access to this image bank for their personal collection, study sets, teaching tools, and presentations. However, the site will be much more than a repository of images, as the endeavor will encompass a broad scope of user features with several goals envisioned. First, creators hope to make an ASCP compendium, a living and evolving textbook, which will provide a quick source of information on each diagnosis. Second, the site will contain annotated case studies and master slide sets from leaders in the field. Third, there are plans to make the site interactive and to “gamify” materials so users can use the images to test their diagnostic skills. Fourth, the website will function as a large, multi-headed microscope with a multitude of purposes, including but not limited to education and eventually consultation, with future possibilities including automated image analysis. Fifth, there are plans to incorporate continuing medical education credits, which will benefit members tremendously. ASCPedia’s various functionalities will be demonstrated at this year’s ASCP Annual Meeting in Long Beach, Calif.
Undoubtedly, the world is becoming more digitized by the day and organizations are going to have to adapt to the learning customs of the younger generation. E-learning and Web-based applications are here to stay, and it will be exciting to see how medicine and pathology, including ASCP, evolve to keep up with the electronic needs of end users and patients.

References


Dr. Sullivan is a Transfusion Medicine Fellow in the Department of Pathology and Laboratory Medicine at Emory University School of Medicine in Atlanta.
A director of quality assurance for a large lab in Texas; a medical laboratory scientist at a major New York cancer center; a molecular technologist at a Midwestern children’s hospital; a blood bank manager with a black belt in Lean Six Sigma; and a director of transfusion medicine for a Pennsylvania health system have been named the Top Five pathologists, residents, and laboratory professionals for 2015 in ASCP’s 40 Under Forty program.

Now in its second year, ASCP’s 40 Under Forty program recognizes 40 highly accomplished pathologists, pathology residents, and laboratory professionals under age 40 who have made significant contributions to the profession and stand out as the future of laboratory leadership.

“By providing support and encouragement to these young professionals, ASCP aims to strengthen our current medical laboratory workforce and foster greatness during this period of historic change in healthcare delivery,” says ASCP President William G. Finn, MD, FASCP. “We are very fortunate to have such a talented group of individuals who are advancing their careers and helping shape the future of patient care.”

A combination of ASCP members voting online, the blogging activity of the 40 Under Forty honorees on ASCP’s online community, and a selection committee determined the Top Five. The Top Five each receive free registration to attend the ASCP 2015 Annual Meeting in Long Beach, Calif., from Oct. 28-30, along with a $1,000 stipend toward airfare and lodging, and recognition at the meeting.

All summer, the 40 honorees were invited to share their knowledge about topics pertinent to pathology and laboratory medicine with a personal blog on ASCP’s ONELab online community. Kimberly Russell, MBA, MLS(ASCP)CM, SBB(ASCP), blood bank manager for the east region at St. John Providence Health System, Detroit, blogged on topics ranging from the latest trends she was hearing about at the American Association for Clinical Chemistry annual meeting, to learning about error tracking systems used by other laboratories.

“This experience blogging has expanded my career horizon. I’ve gotten to know [40 Under Forty] colleagues across the U.S. and learn what issues they are encountering in their labs,” she says. “I can’t wait to meet this group at the ASCP Annual Meeting!”

Another Top Five honoree, Jennifer Dawson, MHA, DLM(ASCP)CM, SLS, QIHC(ASCP), is the vice president of quality and regulatory affairs for Sonic Healthcare USA in Austin, Texas. She built a best practice Quality Management System from the ground up and achieved necessary licenses and accreditations for a state-of-the-art esoteric reference laboratory.

“I have been contacted by pathologists from around the world who work for my company acknowledging this Top Five achievement,” she says. “They are happy to know that young passionate leadership exists in the U.S.”

Honoree LeAnne Noll, BS, MB(ASCP)CM, has been working as the sole clinical molecular technologist in the Department of Pathology and Laboratory Medicine at Children’s Hospital of Wisconsin, Oak Creek, Wis., where she assists with designing, implementing, and performing clinical diagnostic testing using state-of-the-art molecular techniques. Recently, she earned her MB(ASCP) certification and has a goal to advance in the medical laboratory leadership and serve as a resource in molecular diagnostic testing.
Amanda Wehler, DO, completed her anatomic and clinical pathology residency and transfusion medicine fellowship at Penn State Hershey Medical Center, Hershey, Pa., and is boarded in anatomic and clinical pathology and transfusion medicine. As director of Transfusion Medicine for Geisinger Health System, a fully integrated seven-hospital health system in central Pennsylvania, she oversees all of the hospital blood banks and also serves as director of Apheresis and director of the Hematopoietic Stem Cell Laboratory.

One topic Tiffany Channer, MPH, MLS(ASCP)CM, blogged about was inspired by her students, some of whom did not know their own blood type. She aptly titled her blog, “Knowing your blood type.” “It’s important!” says Ms. Channer, lead educational medical laboratory scientist III at Memorial Sloan-Kettering Cancer Center, New York City. “I took my students to the blood donor room to get their blood drawn so that they could learn their blood type. Then we came back and they conducted tests on their own blood. I like to make my teaching interesting and interactive,” she says.

A natural leader, she received the hospital’s 2011 Medical Laboratory Scientist of the Year and the 2012 ASCP Regional Member Award for the Northeast region. She has actively promoted the profession to high school and elementary school students throughout her region as an ASCP Career Ambassador, a program sponsored by Roche. “When you speak to students and see their eyes light up as they discover they have so many career options available, it is just wonderful,” Ms. Channer says.

The 40 Under Forty Top Five carries a very special prestige, she adds: ”It’s such an honor to be recognized by your peers. I am almost 32 and I want to feel as if I have accomplished a lot.”

Ms. Montgomery is a Communications Writer for ASCP.
The Future of the Automation of Laboratory Medicine

By Robin A. Felder, PhD
Automation in the laboratory can often yield impressive gains in productivity. And most aspects of laboratory medicine can be automated—for example: phlebotomy, specimen transportation, accessioning, specimen quality inspection, sorting, aliquoting, pre-analytical processing, analysis, and finally storage and retrieval. Automating laboratories has been shown to result in a 10 percent reduction in laboratory errors, a 50 to 90 percent reduction in inventory, a 75 to 80 percent increase in throughput, a 30 to 50 percent increase in space utilization, and up to an 80 percent reduction in distances traveled by laboratory workers between inter- and intra-laboratory tasks, according to data gathered from Valumetrix Services, a Johnson & Johnson company, and personal communication.

The gains that happen within the laboratory can benefit patients and clinicians outside of the laboratory as well. Laboratory automation offers the opportunity for the many disciplines in medicine to be more efficient by performing many pre-analytical and analytical steps in parallel, and better understanding the patient from a holistic perspective. Treating disease should involve understanding the patient’s norms, habits, medical history, family history, and genetic susceptibility to disease and environmental stresses.

With automatic data capture that uses sensors and tracking systems, we can understand who the patient is, what their issues are, where they are at any particular moment in the treatment process, when they should be scheduled for treatment in the proper sequential order, and how we can best treat them for optimal outcomes. Process management software then assembles these disparate data points and schedules the appropriate diagnostics, treatment, and follow-up.
Data mining this process knowledge will allow processes to be optimized so that resources such as laboratory technologists and analytical equipment are used most efficiently.

As with any process, automation will have to evolve to keep up with new diagnostic tools and medical treatments. Therefore, a necessary aspect of process management is forecasting trends and future needs; I anticipate that future intelligent systems will even be able to suggest process solutions. The earliest examples are already emerging in the literature. For example, Gonzales et al described the development of a semi-automated method for optimized surgical pathology case distribution and predicted how many subspecialty consultations would be required.1

**Adding and Ending With Value**

Automation can add value to what we currently think of as our end product: the lab test result. Automation can provide faster turnaround time, and improved accuracy, precision, and safety. Information value can be enhanced by automation of results and also by providing the physician with trending information. If properly reported in context with the patient’s current health condition, lab results can encourage healthy lifestyle changes and ultimately the selection of appropriate therapeutics.

Yet despite the broad use and acceptance of automation, many laboratories have yet to create an automation program that includes “lean” design to obtain the maximum benefit from automation. Some laboratories have managed to install inefficient processes dispersed throughout a laboratory engineered with the latest in automation technology.

For example, one can have a room filled with accessioners logging in arriving specimens and checking for quality issues (eg, mislabeled specimens, low fill volumes, wrong vials) arranged in a way to take advantage of the linear flow of specimens from dropoff to pre-analytical processing. However, in many laboratories there is a bottleneck between the flow of accessioned specimens and transportation to the pre-analytical automation. Think of it as the queue that occurs in grocery stores when there is no one bagging. To prevent this bottleneck, an increasing percentage of the accessioning process—including the quality inspection of medical specimens—is being automated in larger laboratories.2

The use of automation can simplify and organize workflow so the entire process is more efficient. In Japan and Europe, automated phlebotomy and automated tray preparation are being used with great success. As soon as the patient is identified in the computer, the system dispenses appropriate bar-coded vials based on the physician’s test order in a matter of seconds, while keeping track of inventory. Even patient blood collection can be automated. The Veebot3 is being developed to automatically perform phlebotomy once the patient’s arm is safely secured in the device. Machine vision guides the needle to the proper location and depth. In the next step, pre-analytical automation workstations are being used to consolidate many manual steps into a single platform, such as decapping, aliquoting, and preparation of labeled daughter vials. Centrifugation can either be an independent manual process or, better yet, fully automated and integrated into the system. For several decades, analytical automation has been available to transport specimens to the appropriate analytical device (eg, hematology, coagulation, chemistry, immunoassay), perform the analysis, and then store the specimens in an automated biorepository until the medical episode has been completed.

**Bringing the Automated Laboratory Home**

In the near future, some automated processes will provide even more productivity gains and health benefits beyond central laboratory automation. There is a growing awareness that the future of health care will be home-based, with an emphasis on health prediction, prevention, and determining personalized needs. Technological advances are enabling wearable sensing, computing, and data streaming. More than 3.3 million health bands were sold in the U.S. in the 12 months preceding March 2014,4 and this data does not include the millions of health apps installed on cell phones. Home-based health care should be considered the next iteration of point-of-care testing. However, almost all of the current wearable health technologies provide only a modest amount of data that relates to health. Current offerings include tracking footsteps (with conversion to calories burned), sleep, heart rate, sun exposure, skin resistance (related to stress), and blood oxygen. However, there is a growing demand for devices that also provide appropriate data for an individual’s health challenges. For example, almost 30 percent of the U.S. population is afflicted with high blood pressure, but wearables have not yet been able to measure this important health parameter. From the 1980s to 2011, the number of adult Americans with diabetes tripled to almost 20 million,5 yet no convenient method to measure blood sugar has been developed.

Currently, Google and Novartis are developing a contact lens that will measure tear glucose6 and BlinkBit is developing a
tear duct glucose sensor implant that will be comfortable and remain in place for many months without the daily use requirements of a contact lens. Next-generation health sensing will undoubtedly also include sensors embedded in one’s home environment to determine many other health parameters, including diet, socialization, and mood. The holy grail of wellness technology is how to encourage the unconvinced to adopt continuous positive lifestyle choices that can lead to a healthy and disease-free dotage.

Information providers are gearing up to deal with—and profit from—the data storage and interpretation needs of the personalized health tools. For example, Apple has released its HealthKit developer toolkit to facilitate gathering and making sense of the potential avalanche of data generated by each wearer of its Apple Watch. Electronic health record vendor Epic has announced a partnership with Apple’s HealthKit in order to link it to MyChart, its own consumer data repository, which is often regarded as the most widely used patient portal in the U.S. Undoubtedly, the major electronic medical record and health information service providers such as GE Healthcare, Medios, and MediTouch will all have solutions that will add value to personal health.

Thus, laboratories will have to adapt and perhaps be leaders in this new age of personal health. As always, new tests will have to be developed and tested, consumers will continually need to be educated, and physicians will require constant laboratory support in order to interpret these new data sources.

References


Dr. Felder is Professor of Pathology, and Associate Director, Clinical Chemistry, in the Department of Pathology at the University of Virginia in Charlottesville, Va.

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I am diplomacy. I am America.
By Amy Wendel Spiczka, SCT(ASCP)CMMBCM,HTLCM, and Jennifer Clark, SCT(ASCP)CMMBCM

Technological Advances Affecting Cytotechnologists Addressed by Innovation in Education
Over the past 60 years, the “bread and butter” of most cytol-
ogy laboratories has been screening Pap tests, a fundamen-
tal driver of women’s gynecological health. But in the past
decade, laboratories have seen a decline in Pap test volumes
due to changing screening frequency recommendations, in-
creased efficiencies in Pap test throughput as a consequence
of computer-assisted screening devices, and, perhaps most
important, the technological advance of primary HPV testing,
recently approved by the FDA as an equivalent cervical cancer
surveillance test. These recommendations and technological
changes have altered the employment landscape for cytolo-
gists, and more laboratory consolidations and reductions in
the cytotechnology workforce are expected.

In contrast, many laboratories are seeing an increase in other
more complex, cytology and morphologic tests. Specimens
from fine needle aspirations (FNA) and body fluid samples,
which are diagnostically challenging, require more evaluation
time and increased knowledge of disease state and process-
ing techniques from cytotechnologists. Ancillary tests for
these and other samples include immunohistochemistry for
diagnostic purposes; in addition, prognostic molecular assays
are also increasing in volume and rapidly advancing patient
care and improved clinical outcomes. The morphologic expert-
ise that cytotechnologists have honed for assessing cellular
samples can also be utilized and leveraged when evaluating
tissue samples and specimens for ancillary testing method-
ologies such as Fluorescence In Situ Hybridization.

Cytotechnologists, with the support of professional or-
ganizations, are coming together to address these antici-
pated changes and help expand the skill sets needed to
support these new opportunities as part of the clinical care
team. In 2014, through a memorandum of understanding
and in support of the evolving cytopathology profession,
the leadership of the American Society of Cytopathol-
ogy (ASC) and the American Society for Clinical Pathol-
ogy (ASCP) formed the ASC/ASCP Workgroup: Focusing on
Emerging Roles in Cytopathology.

“The collaboration between ASC and ASCP is designed to
help cytotechnologists identify emerging opportunities
and strengthen their skill sets to ensure they are consid-
ered an essential part of the clinical care team as the indus-
try evolves,” says Dr. E. Blair Holladay, PhD, SCT(ASCP)TM,
CEO of ASCP.
ACE participants were provided online content in advance for pre-learning and access during the course, along with career support resources.

This ASC/ASCP Workgroup will concentrate on developing concrete goals toward addressing evolving practice changes while ensuring that education, practice, and trending data support the cytotechnology profession’s longevity and livelihood. It also will support new roles for pathologists as cytotechnologists are increasingly expected to engage in the rapidly changing healthcare delivery system. Recognizing that change for cytotechnologists is evident and inevitable, the workgroup is focusing on gathering and triaging data, creating practice opportunities, and developing applicable educational activities.

Programming for Change

Education is one of the key domains for this workgroup, and the Advanced Cytopathology Education (ACE) program was collaboratively developed to help cytotechnologists grow to meet both current and evolving responsibilities. “This collaboration between ASC and ASCP is designed to support cytotechnologists locally as they identify emerging opportunities and strengthen their skill set through personalized education,” says Amy Wendel Spiczka, SCT(ASCP) CMMBCM,HTLCM, manager of Anatomic Pathology at the Mayo Clinic, Scottsdale, Ariz. In her role as the primary facilitator for the ASC/ASCP Workgroup, Ms. Spiczka also serves as a key planner for the ACE meeting.

The ACE program was launched June 13–14, 2015, at Thomas Jefferson University, Philadelphia. Educational offerings were personalized based on regional survey data to engage cytotechnologists in various stages of their careers and to help develop new and emerging skills to meet the latest healthcare advances and challenges. A theme of the meeting was the inclusion of cytotechnologists as part of the clinical team, leveraging their morphologic skills and laboratory knowledge to assist clinicians such as radiologists and pulmonologists, as well as cytopathologists, in diagnostic assessment of a patient. Prabodh Gupta, MD, an internationally renowned cytopathologist and professor of Pathology and Laboratory Medicine at the Hospital of the University of Pennsylvania, Philadelphia, noted, “Cytopathologists need to be considered an essential part of the clinical care team.”

ACE interactive educational sessions focused on:

- FNA Adequacy Assessment and Procedurally Related FNA Techniques
- Molecular Diagnostics and Theranostics
- Immunocytochemistry and Immunohistochemistry Interpretation
- Bethesda 2014 Update and Impact of HPV Testing

Education innovations for the ACE program were collaboratively brainstormed with expert faculty, says Jennifer Clark, SCT(ASCP)MBM, ASCP manager of curriculum and learning strategy and cytotechnologist staff workgroup member. She adds: “ACE included pre-course engagement with cutting-edge content from leaders in cytopathology to stimulate discussions at the live meeting; experiential learning with a hands-on FNA/ultrasound session stressing the importance of the clinical care team with a faculty representing clinicians, cytopathologists, and cytotechnologists; and a post-course website that provides continued access to resources on a variety of professional growth topics from ASCP and ASC.”

Focus groups of eight to 10 cytotechnologists representing different career levels were interviewed by ACE faculty in order to bring concerns and information back to the workgroup and provide further insights into work being done on the profession’s current and future needs. Lynnette Savaloja, MBA SCT(ASCP), senior ASC executive board cytotechnologist and workgroup practice facilitator, notes that “the enthusiasm displayed by the many cytotechnologists who volunteered in focus groups proves they are eager to tell us their stories. This allowed us to demonstrate that we want to understand,
and are here to listen to their ideas and concerns.”

Patricia A. Tanabe, MPA, MLS(ASCP)CM, executive director, vice president of the ASCP Board of Certification, and adviser to the workgroup, adds, “Not only are ASCP and ASC listening to the concerns of cytotechnologists, we are the organizations with the power to address them, via education and certifications that may evolve as the professional practice of cytotechnologists evolves.”

**Personalized Education into Practice**

A popular innovative feature of the ACE meeting was a platform for selected cytotechnologists to share their real-life stories about how they transitioned into new careers with knowledge of laboratory information systems, new technology, education, and performing as part of the clinical diagnostic team. “Throughout the ACE sessions, the cytotechnologists were actively involved in an open dialogue to explore other career possibilities,” says Zubair Baloch, MD, PhD, MASCPE, professor of Pathology and Laboratory Medicine at the Hospital of the University of Pennsylvania and one of the local expert ACE planning faculty. “They can be administrators, educators, or laboratory information systems specialists. At ACE, they learn to be an integral part of the diagnostic team in the era of personalized medicine.”

Maria Friedlander, MPA, CT(ASCP)CMIA, who serves as an ASC executive board cytotechnologist and is a workgroup education domain facilitator, adds, “Much of the new services and skills needed to extend a cytotechnologist’s scope of practice represent a natural extension of their current professional duties. It is imperative that cytotechnologists embrace this changing environment and the knowledge they possess to develop new skills and stay relevant for the future.”

As the ACE meeting travels around the country, the program content will be personalized according to the region, in recognition that different regions may have differing needs, and also to meet professionals where they live and work. In their evaluation comments, participants said the program was extremely valuable, with high-level content that stimulated consideration of professional options, and that they would recommend the ACE program to their colleagues.

Look for an announcement of location and dates for the next ACE program, to be held in June of 2016.

Ms. Wendel Spiczka is Manager of Anatomic Pathology at the Mayo Clinic, Scottsdale, Ariz. She is also the primary facilitator for the ASC/ASCP Workgroup, and served as a key planner for the ACE meeting.

Ms. Clark is ASCP Manager of Curriculum and Learning Strategy and cytotechnologist staff member of the ASC/ASCP Workgroup.
When the 2012 ASCP vacancy survey was administered three years ago, the laboratory workforce was still experiencing the effects of the 2008 recession. The overall economic climate, with an unemployment rate of 7.7 percent, brought lower vacancy rates to most of the healthcare professions in the country. Laboratory professionals accepted usually difficult-to-fill night, double, or weekend shifts for additional income, and those nearing retirement age stayed longer in their jobs due to economic uncertainties.

According to the 2014 vacancy survey results, however, hiring managers are now experiencing an increased need for laboratory personnel. As the economy continues to improve and the unemployment rate dropped in 2014 to 5.8 percent, overall vacancies for laboratory positions are higher in all departments (with the exception of cytology and cytogenetics) compared with 2012 (Figure 1). Data from the 2014 survey reveal that the demand for laboratory personnel is on the rise.
Where less-popular shifts were easily filled two years ago, supervisors are now having difficulty finding laboratory professionals to work these hours. Anticipated retirement rates in the next five years for both staff and supervisors are high as well. It appears that laboratory professionals who had been planning to retire during the recession are now able to do so, leaving vacancies that need to be filled (Figure 2). From the 2014 survey, another positive trend in the field is that 92.56 percent of respondents reported that they have not laid off any laboratory professionals in the departments they supervise. Furthermore, 81.79 percent do not anticipate laying off any laboratory professionals in the department they supervise in the next six months. The small number who have laid off staff (18.21 percent) suggest budget constraints as the primary reason, followed by decreased workload and restructuring.

Compared with the 2012 Vacancy Survey, the percentage of participants who indicated that new technologies have caused changes to their staffing needs has increased (27.20 percent in 2012 vs. 40.25 percent in 2014). This suggests what we have predicted from past workforce studies: the emerging prevalence of new technology utilization. Those whose staffing needs are affected by new technologies indicated that on the positive side, staff has more time to work on other projects; there is higher efficiency in work flow and
less routine work. However, while respondents report that new technologies require fewer staff, there is an increased demand for staff with particular skill sets pertaining to the new automated instruments now available. Also, supervisors report more staff time dedicated to maintenance, calibration, and repair of the instruments and increased training and supervision of staff unfamiliar with the new technologies. These factors have a negative impact on department productivity.

Vacancy Survey Key Findings

Across the nation, the Far West region reported the highest overall vacancy rate compared to other regions; the Northeast had the lowest vacancy rate. Taking vacancy rates of the five departments with the most respondents by region, data revealed that vacancies in Anatomic Pathology are highest in the South Central Atlantic (21.70 percent) and lowest in the Northeast (3.16 percent). Vacancy rates in the Blood Bank department are highest in the South Central Atlantic (14.91 percent) and lowest in the Central Northwest (5.50 percent). In the Core Lab, a laboratory that houses multiple departments, the Central Southwest (17.86 percent) has the highest vacancy rates, while the Central Northwest has the lowest (8.97 percent). The Molecular Biology/Diagnostics department has the highest vacancy rates in the Central Northeast (21.5 percent) and lowest in the Central Northwest (2.63 percent). The vacancy rates in the Phlebotomy department are highest in the Central Northeast (15.61 percent) and South Central Atlantic (15.60 percent) and lowest in the Far West (8.42 percent).

ASCP surveyed hiring managers on the difficulties they encountered when hiring (actively trying to fill vacant positions), recruiting (identifying candidates for future positions), and retaining staff. When hiring personnel, respondents reported that the top five difficulties they encounter are other employers offering better pay (19.50 percent); applicants not possessing necessary certification, education, and/or skills to perform the work (18.20 percent); increasing competition for well-trained personnel (17.39 percent); delay in filling positions due to requirement for justification with administration, and/or because of hiring freezes related to fiscal constraints (15.29 percent); and budget constraints (14.73 percent).

In recruiting personnel for open positions in the laboratory, hiring managers indicated that their top challenges are better pay offers from other employers (17.12 percent), increasing competition for well-trained personnel (15.94 percent), applicants not possessing the necessary certification, education, and/or skills to perform the work (18.20 percent); increasing competition for well-trained personnel (17.39 percent); delay in filling positions due to requirement for justification with administration, and/or because of hiring freezes related to fiscal constraints (15.29 percent); and budget constraints (14.73 percent). As for retaining staff, the top five issues are limited potential for advancement and additional compensation (13.76 percent), workload/stress (12.40 percent), other employers offering better pay (10.65 percent), scheduling (8.23 percent), and retirement (8.18 percent).
Compared with the 2012 Vacancy Survey,1 the rate of requirement of hiring certified laboratory personnel by most departments has increased between 6 percent and 13 percent. Data also reveal that 56.51 percent of respondents reported that they hire noncertified personnel to perform the following tasks: pre-analytic processes (84.10 percent), analytical testing—low complexity (44.93 percent), analytical testing—moderate complexity (30.65 percent), and analytical testing—high complexity (22.35 percent). Overall certification rates are highest among the cytogenetics, hematology/coagulation, and flow cytometry departments and lowest among phlebotomy, specimen processing, and anatomic pathology. The education levels of all staff employed in the laboratory who are not certified are as follows: high school/GED (63.07 percent), associate’s degree (40.83 percent), bachelor’s degree (52.75 percent), and advanced degree (10.55 percent).

According to survey participants, the responsibilities of positions not filled in a certain amount of time are temporarily assigned to other staff (40.40 percent), left open (34.03 percent), assigned to agency personnel who are temporarily employed (8.40 percent), eliminated (8.18 percent), or permanently assigned to other staff (7.03 percent). Two years ago, these factors could be attributed mainly to lack of laboratory budget. Today, these factors are attributed to a lack of qualified personnel and retirement. When hiring managers were asked how much budget is allocated to laboratory staff labor/personnel, they indicated that on average it is 43.52 percent.

**Recommendations**

Data from the 2014 survey strongly suggest an increased demand for laboratory personnel. Furthermore, new technologies and the hiring/recruiting/retaining of laboratory professionals express the demand for more highly skilled, well-trained, and certified laboratory professionals. Factors such as retirement and an improving economy are driving the need for more laboratory professionals. Based on the vacancy survey report, the main recommendation should be to start recruiting qualified laboratory professionals in the workforce and students in laboratory programs. These two focal points will be the key to filling the higher vacancies indicated in the 2014 survey results.

Other issues and suggestions to combat the increasing shortage include:

1. The lack of qualified laboratory personnel and the certification status of laboratory professionals are becoming important contributing factors to higher vacancies. These two factors highlight the value of accredited laboratory training programs and their role in examining where skill gaps exist in order to address the shortage. There is also an increasing preference for laboratory professionals who are certified. Continuing education (eg, Credential Maintenance Program) and exam preparation offerings provided by the ASCP Board of Certification, for instance, help assure competence and boost the number of certified medical laboratory personnel.

2. There are higher vacancy rates in the Far West and South Central Atlantic regions, and some of the states in these regions do not have training programs. Increased availability of distance learning curriculum and/or advocacy for opening training programs in these areas may alleviate future workforce needs.

For more information, read the full report of ASCP’s 2014 Vacancy Survey in the September 2015 issue of the American Journal of Clinical Pathology. Additional figures for this article can be found in the October digital issue of Critical Values.

**References**


Ms. Garcia is Senior Manager, Scientific Engagement and Research, for ASCP.
Simulated Environments, Real Improvements

By Kelly Swails, MT(ASCP)
Educators are constantly in search of new ways to teach and inspire their students. For professors in the laboratory medicine fields, this need is further compounded by the essential duty of teaching students complex material while also developing leadership and communication skills. How can the latest innovation in healthcare education—simulation centers—help laboratory science and pathology educators achieve those goals?

Simulation is the process of recreating a complex, real-world scenario in an artificial environment. Whether practicing phlebotomy on a mannequin arm, performing a complete blood count on an unknown “patient” specimen, or dissecting a human heart to find an anatomic anomaly, clinical laboratory science and pathology programs have been doing simulations for years. And while simulation exercises allow students to learn in a safe environment, simulation centers take that artificial environment to the next level.

According to Chad Epps, MD, associate professor in the Schools of Health Professions, Nursing, Medicine, and Engineering at the University of Alabama at Birmingham and the president-elect of the Society for Simulation in Healthcare, “Simulation centers typically include classroom space, clinical space, areas to practice practical skills such as lumbar puncture, and space for debriefings.” These types of amenities give educators plenty of opportunities to demonstrate proper techniques and procedures for their students. Jon Lomasney, MD, associate professor of Pathology at the Feinberg School of Medicine at Northwestern University, Chicago,
adds that, “Centers provide simulation with enough fidelity to facilitate learning through immersion, reflection, feedback, and practice in a setting without risks.” If a student makes an error, in other words, it’s a learning experience, not a patient incident report.

**Improving Education**

According to Jane Lindsay Miller, PhD, director of the Academic Health Center Simulation Center and Interprofessional Education and Resource Center at the University of Minnesota, Minneapolis, 50 years of research—such as Dr. Howard Barrow’s work with problem-based learning and simulated patients—and a National Institutes of Health meta-analysis on simulation-based education—indicates that education programs that include simulation are more successful than lecture-only programs. With simulation centers, “We’re not only teaching people the content, we’re applying the content,” she explains.

It’s this application that encourages deeper learning, according to Dr. Lomasney, who uses Northwestern’s simulation center to teach cardiac pathology. “It’s not uncommon for a medical student to be so focused on the proper dissection of a heart that they’re not really focused on the anatomical structures,” he says. “I want the students to be able to hear a blowing holosystolic murmur, for instance, and be able to picture what is causing the sound. Until they can feel and see that pathology, it’s hard to get a deep learning of the concept.”

Pathologists aren’t the only members of the laboratory team who can benefit from using a simulation center. Michelle Brown, MS, MLS(ASCP)SM|SBB|CM, assistant professor at the University of Alabama at Birmingham’s Clinical Laboratory Science Program, believes that these centers are an important part of clinical laboratory science education. “In our student labs, we focus on the technical skills and psychomotor skills of performing a test. We use the simulation center to expand our students past just analyzing a specimen. In the student lab, a student might be given one sample and asked to perform a type and screen. However, when we run an interprofessional simulation, we provide multiple specimens for multiple departments on multiple patients. The students have to learn to prioritize and communicate critical values.”

Dr. Miller notes that simulation centers are an effective way to teach and practice communication. “The great thing is, there are people who study the best way to disclose an error to a colleague,” she says. “The approach is the same whether you’re a laboratory professional calling a doctor or a doctor talking to a patient. There are better and worse ways to make that disclosure so you don’t undermine your credibility but at the same time communicate what happened so everyone can move on.” Medical and nursing students can also practice how to convey a sense of urgency to the laboratory, and laboratory science students can learn the best way to list their priorities for a clinician so everyone is on the same page.

What’s interesting about the simulation model is that most of the learning happens once the gloves are off and the lab coats have been put away. The debriefing period at the end of a simulation gives students the opportunity to reflect on the performance, sometimes assisted by watching a video of the simulation. Techniques are discussed and performances are explored. Students and faculty can talk about what worked, what didn’t, and what needs to happen differently in the future. “Not only can we approximate a scenario,” notes Dr. Lomasney, “we can model how an expert would approach that patient or scenario and reason their way through it to get a diagnosis and initiate therapy.”

**Building a Team One Simulation at a Time**

Cultivating teamwork is an additional benefit of using a simulation center. Historically speaking, the laboratory—and the professionals who work there—have been hidden in the metaphorical (and sometimes literal) basement of the healthcare facility. Ms. Brown says that “role clarity” has emerged as a benefit of performing simulations. “Understanding the nurse’s role, the physician’s assistant’s role, or the clinical laboratory scientist’s role comes to life when everyone has an active part in the decisions being made. The immersive environment really does make a difference. We can use simulation centers to establish that type of communication with students so everyone will have a greater comfort level in the real world,” she says. In this way, simulation centers provide a way to teach laboratory professionals and pathologists how to be a part of the clinical care team.

The laboratory medicine field is evolving in such a way that pathologists and laboratory professionals act as consultants rather than as someone who only looks at a slide or runs a test. And with this evolution, Ms. Brown takes the importance
of simulation one step further: “There’s a movement toward medical diagnostic teams, and the laboratory needs to be a part of that. Simulation is important for promoting ourselves.” Simulation centers can also help change an outsider’s perception of the laboratory, says Dr. Epps. “I’ve been on the side of patient care where there’s a negative perception of laboratory professionals or the laboratory by clinicians. Through simulation and debriefing, however, clinicians begin to truly understand the workload of laboratory professionals. In addition, clinicians and laboratory professionals learn to communicate needs and priorities in an effective way.”

According to Dr. Lomasney, a medical student might normally be exposed to a pathologist only in the classroom, but simulation centers can change that. “I think this is an important opportunity for our field. Medical students need to see that lab medicine is not a black box and that values don’t just spit out of a machine,” he says. There’s no other specialty that touches every single patient who comes into a health system like pathology and clinical laboratory science does. I don’t think most trainees or students recognize that. Simulation centers introduce that idea.”

**Sounds Wonderful! It Also Sounds Expensive.**

Developing a facility like a simulation center that encompasses several departments requires a significant financial investment. Besides the clinical equipment, supplies, and mannequins, simulation centers also require audio-visual equipment to record simulations. However, these costs can be offset by the benefits such a center provides. According to Dr. Epps, “If you compare the financial investment of a simulation program to the avoided costs of errors, you would quickly see that there is a large return on investment.” The return on investment—better patient outcomes and fewer errors—makes the investment worthwhile.

Dr. Miller agrees. “An upside is the value for the cost. People hear ‘simulation center’ and immediately think, ‘Oh that will cost too much,’” she says, and explains that while a mannequin can cost tens of thousands or hundreds of thousands of dollars, that cost is not a direct indicator of cost to the users. “We create simulations that cost between 10 and 37 dollars per learner, so it’s not a huge amount of money,” Dr. Lomasney concedes that developing a simulation center is more costly in terms of education, but adds that it’s important to remember that “it’s more efficacious in terms of education dollars, improvements to patient safety, and patient outcomes.”

**Using Simulation Centers in the Future**

Education doesn’t stop once someone has earned a diploma or passed a board or certification exam. Simulation centers can be a place for working professionals to practice communication skills, perform tasks for competencies or maintenance of certification needs, or learn new skills they can take back to the bench.

“I could see simulations having a great deal of utility in terms of helping programs demonstrate that their students really have mastered critical skills as well as their knowledge,” says Dr. Miller. “Simulation can be used not only to strengthen and cultivate those skills, but to demonstrate that students have achieved whatever level of mastery their program deems necessary.” Dr. Epps agrees that centers have uses outside of student education. In anesthesiology, he notes, simulation is already being used for maintenance of certification purposes. Dr. Lomasney argues that simulation can also be used for a subject near and dear to laboratory professionals’ and pathologists’ hearts: proper test utilization. “Imagine simulating proper use of the laboratory in an emergency department scenario,” he says. “What labs do you want to order and when? What results should come back in 30 minutes? Something of this nature would be useful for our colleagues who either over- or under-utilize laboratory services.”

Competency assessments and maintenance of certification simulations take advantage of the centers that exist today. But moving forward, how can we expand the usefulness of this type of facility even more? Is there a way to get more return on investment? According to Dr. Epps, large-scale opportunities exist. “We can build simulation facilities that reflect our health-care delivery system in its entirety, to the extent that they look like and operate like a hospital,” he says. “We can have an emergency department, intensive care unit, patient care areas, laboratory, radiology. We can bring people in for an abbreviated shift and go through situations and test systems. A new laboratory process can be tested before real patient samples are ever brought in. That’s where I see this heading.”

Change is the only constant in health care, and it’s imperative that clinical laboratory science and pathology education keep pace with changes in the industry. Using simulation centers will be a key component of programs in the future to promote deep learning and better prepare students for the challenges they’ll face in the real world. In addition, simulation centers will play a role in integrating laboratory medicine with the clinical care team and moving laboratory professionals and pathologists beyond the laboratory’s four walls.

**References**


Ms. Swails is a laboratory professional and Web Editor of the Lab Medicine website.
ASCP 2015 Long Beach, to be held Oct. 28-30 in Long Beach, Calif., will provide an extraordinary array of specialized education sessions that pathologists and medical laboratory professionals will be able to draw on immediately upon returning to their labs. Attendees will also expand their knowledge through practical, hands-on learning, which will include 19 hours of interactive video-microscopy sessions taught by experts. Leading pathologists and laboratory professionals will present the latest scientific innovations and give their perspectives on how laboratory medicine can enhance patient-centric care.

“Our members will hear from globally recognized change agents about critical issues and emerging trends that are affecting our profession and industry today,” says Zubair Baloch, MD, PhD, MASCP, chair of the ASCP Annual Meeting Education Committee.

Sanjay Gupta, MD, the Emmy Award-winning chief medical correspondent for CNN, will headline the keynote presentation on Oct. 30 with his speech on Medicine & the Media. In addition to serving as assistant professor of Neurosurgery at Emory University and associate chief of Neurosurgery at Grady Memorial Hospital in Atlanta, Dr. Gupta has had a distinguished career in the global public health arena. He has reported from Iraq and Kuwait as he traveled while embedded with the U.S. Navy’s “Devil Docs” medical unit to Baghdad, where he provided live coverage of the first operation performed during the war.

Dr. Gupta will also join Rajesh Panjabi, MD, MPH, co-founder and CEO of Last Mile Health, for an invigorating discussion about the recent Ebola crisis and the future of laboratory preparedness for pandemics. Dr. Panjabi, an associate physician in the Division of Global Health Equity at Brigham and Women’s Hospital and an instructor in Medicine at Harvard Medical School, Boston, has been on the front lines in Liberia to fight Ebola. He will share his firsthand experience to examine how the recent Ebola crisis was handled and what public health officials have learned to improve their response to future pandemics.

Dr. Panjabi fled his home country of Liberia at age 9 to escape a civil war. He later returned to serve the people he had left behind, co-founding Last Mile Health, which works with the Liberian government to save lives in the world’s most remote villages by giving village health workers the training, equipment, and support they need to perform as professionals.

Last Mile Health’s work has been recognized by President Bill Clinton, Liberian President Ellen Johnson Sirleaf, and Big Bang Philanthropy. Dr. Panjabi is also an adviser in global health to the Clinton Global Initiative.

Cancer: The Emperor of All Maladies

On Oct. 29, Barak Goodman, director/producer of the acclaimed PBS documentary series “Cancer: The Emperor of All Maladies,” will share his unique perspective on advancing the practice of medicine and the vital role that pathologists and laboratory professionals play in the diagnosis and treatment of cancer. Mr. Goodman, who worked with Ken Burns on the documentary, has become one of the most prolific and acclaimed nonfiction filmmakers in America.

After his presentation, Mr. Goodman will join renowned pathologist Carl June, MD, who was featured in the cancer documentary, and journalist Lizzie Stark for a panel discussion that shines the spotlight on recent advances in the fight against cancer, as well as challenges and ethical issues that arise out of the remarkable progress that has been made. Dr. June is director of translational research at the Abramson Cancer Center at the University of Pennsylvania, Philadelphia. A graduate of the U.S. Naval Academy in Annapolis, Md., and Baylor College of Medicine in Houston, he completed graduate training in immunology and malaria with Dr. Paul-Henri Lambert at the World Health Organization, and post-doctoral training in transplantation biology with Dr. E. Donnell Thomas at the Fred Hutchinson Cancer Research Center in Seattle. He founded the Immune Cell Biology Program and was head of the Department of Immunology at the Naval Medical Research Institute from 1990 to
1995. Today, he also maintains a research laboratory that studies various mechanisms of lymphocyte activation that relate to immune tolerance and adoptive immunotherapy.

Ms. Stark, 33, is a journalist and author of two books, including the critically acclaimed Pandora’s DNA, which tells the story of the history, science, and legal battles around the BRCA genes through the lens of her family tree. Named an American Library Association Notable Book of 2015, Pandora’s DNA combines a memoir of Stark’s experience growing up in a BRCA1 family with meticulous reporting on the history of medicine and gene patenting, and how the feminist movement shifted breast cancer treatment.

Ms. Stark discovered that she carries the same mutation on her BRCA1 gene that led her great aunts, grandmother, and mother to develop pre-menopausal breast cancer (and for some of them, ovarian cancer). She will share her dramatic story about her decision to have a double mastectomy of her healthy breasts at age 28, less than a year after she got married, in order to prevent the cancer that has lurked in her family tree.

“For the patient, the fight against cancer begins when you get the diagnosis that you have cancer or that you have inherited a susceptibility to cancer,” Ms. Stark says. “Pathologists are Ground Zero for making a cancer diagnosis. So it is very exciting to be able to address this group at ASCP 2015.” After her oncologist presented her with the options, she made the decision on her own. Her decision took into account medical recommendations, her research into current science, and her family and medical history.

Improving Genetic Literacy

If Ms. Stark has one message for healthcare providers in this evolving era of care delivery, she says, it would be this: “There needs to be better genetic literacy among physicians. It’s a scary thing for me, as a journalist and a patient who has done extensive research, to feel more informed about genomics than some physicians.”

That message is not lost on ASCP, which has incorporated numerous education sessions focusing on molecular medicine. A Molecular Diagnostics Primer—a collaboration with the Association for Molecular Pathology—will be presented on Oct. 28 by Cecilia Yeung, MD, and Nilesh Dharajiya, MD, for laboratory technologists who have little or no exposure to molecular diagnostics. The session will also review new advances and applications for molecular diagnosis in infectious disease, pharmacogenomics, genetics, and oncology.

As pathologists increasingly take on the role of consultants guiding clinicians in the use of molecular tests, they may also find themselves in the role of “gatekeeper” because the molecular tests are expensive. “It is easy for clinicians to read about the tests or hear about them at a meeting and say, ‘Oh, that test sounds great. Let’s order it,’ and they don’t know the specifics of the cost, either to the patients or the healthcare system,” says Kristin Jensen, MD, FASCP, assistant professor of Pathology at Stanford University School of Medicine, Stanford, Calif., who will co-present a session on Oct. 28 titled, “Breast Pathology Review: Morphologic Immunohistologic and Molecular Review and Dilemmas of Clinical Management.”

As molecular testing plays an increasing role in the practice of laboratory medicine, what role will more traditional classifications play in the diagnosis of disease? Dara L. Aisner, MD, PhD, assistant professor of Pathology at the University of Colorado School of Medicine, Aurora, Colo., and co-director of the university’s Molecular Correlates Laboratory, will co-present a session on Oct. 30 titled, “You Want Me to Send What to Where? What the Pathologist Needs to Know in Selecting Material for Molecular Analysis.”

“It is always important to know what type of cancer we’re looking at from the traditional histological classification,” says Dr. Aisner. “But when we do more and more molecular classification of cancers that we previously thought unrelated, we’re finding these cancers may share genetic features which could impact therapy.”

Training Residents in Genomics

For the third consecutive year, ASCP and the Training Residents in Genomics (TRIG) Working Group are developing innovative education to teach pathology residents about the rapidly expanding field of molecular medicine so they are able to engage patients in decision making and improve care. The in-depth, all-day workshop will take place on Oct. 31. The TRIG Working Group—comprising experts in molecular pathology, medical education, medical genetics, and genetic counseling—has been working to develop a national genomic pathology curriculum and tools for implementation. Funded by an R25 grant from the National Cancer Institute and with educational design support from ASCP, the TRIG Working Group has created genomic pathology workshops and online modules with evaluation using validated assessment tools.

Additionally, for the first time, a separate TRIG session, Genomic Pathology for the Practicing Pathologist: An Interactive Workshop, will be held on Oct. 30, for all Annual Meeting attendees. Both sessions will use a case-based, interactive small-group approach to present principles related to the development of genomic assays and interpretation of results. The workshop will also include practical hands-on instruction with the use of online genomic pathology tools.

Meanwhile, ASCP is also pioneering state-of-the-art approaches to multidisciplinary education, positioning pathologists and medical laboratory professionals as the consultants on best practices and treatment. The Society for Hematopathology/ASCP Day will kick off on Oct. 28 with several specialized education sessions focusing on the role of pathologists as consultants to the multidisciplinary care team. Sessions will focus on the latest breakthroughs in the diagnosis and treatment of often-deadly diseases, such as T-cell lymphoma, and...
myelodysplastic syndromes (MDS), a heterogeneous group of diseases of the blood and bone marrow. The MDS program will bring together the multidisciplinary team for a comprehensive, case-based discussion of the clinical approach, diagnosis, classification, and treatment of MDS.

### Identifying Hereditary Cancers

This year, ASCP is also pleased to welcome internationally renowned researcher Maria J. Merino, MD, FASCP, who will present “The Morphology of Renal Cell Carcinoma as a Tool for Gene Discovery” at the Arthur Purdy Stout Lecture for Pathologists on Oct. 30.

“If you think back to when researchers discovered that approximately 15 to 20 percent of breast cancers diagnosed were hereditary, that was an incredible discovery,” says Dr. Merino, chief of the Translational Surgical Pathology Section and principal investigator at the National Institute of Health’s Center for Cancer Research in Bethesda, Md. “It is the same with the discovery that many kidney cancers are hereditary. It helps us to identify families that are at higher risk.”

A former president of the Arthur Purdy Stout Society of Surgical Pathologists, Dr. Merino says she is particularly honored to present the keynote address at ASCP 2015 Long Beach. “It is a true honor to give this lecture, a dream come true,” she says.

As part of ASCP’s named lecture series, John R. Snyder, PhD, MT(ASCP)SH, FASAHP, will present “Top of Scope Practice: Medical Laboratory Professionals as Knowledge Workers” during the Barbara Castleberry Lecture for Laboratory Professionals on Oct. 30. The lecture honors Dr. Castleberry for her pioneering work in modern laboratory medicine.

“Laboratory medicine, in today’s practice, is about generating accurate and reliable test results—the right test at the right time on the right patient,” says Dr. Snyder, professor of Health and Rehabilitation Sciences in the College of Medicine at the Lima campus of Ohio State University. “We have to think beyond the process of performing analysis and making sure we have good results leaving the laboratory: How are the data being used? Who will use this information? That will take a mind shift.”

### Enhancing the Value of Lab Professionals

On Oct. 30, the Michele D. Raible Lecture for Residents, “How Do We Deal with Information Overload in Pathology?” will be presented by Henry Rinder, MD, FASCP, professor of Laboratory Medicine and associate director of the Pathology Residency Program at Yale University School of Medicine in New Haven, Conn. The lecture honors Dr. Raible’s commitment to delivering superior medical education and creating a lasting impact on the lives of medical residents.

All three days of this year’s meeting offer time to relax and network with colleagues from all over the globe. The popular Mixology Lab takes place on Friday night and features the poster winners’ closing awards ceremony, presentation of the Top Five 40 Under Forty honorees, and more opportunities for networking.

As part of its commitment to building the laboratory workforce of the future, ASCP will launch its inaugural NEXTPO event in conjunction with its annual “Building the Laboratory Workforce for the Future Day” on Oct. 30. NEXTPO is part of ASCP’s exciting nationwide initiative designed to elevate awareness of careers in the medical laboratory profession. Students from a local high school will be invited to take part in a full day of activities led by ASCP Career Ambassadors, who are part of an outreach program sponsored by Roche. ASCP President William G. Finn, MD, FASCP, will present the Third Annual ASCP STEM Student Scholarship to a talented high school student who is interested in pursuing a career in the medical laboratory profession. The website www.whatsmynext.org will feature an interactive educational tool, “Lab Hero Challenges,” to show students how laboratory professionals are changing the world by understanding disease states.

ASCP 2015 Long Beach packs an energizing array of more than 180 education sessions into three days in a unique, fun, and exciting atmosphere where pathologists and laboratory professionals can come together to interact and prepare for the evolving needs of the medical laboratory. To learn more about the ASCP 2015 Annual Meeting offerings or to register, visit www.ascp.org/2015-annual-meeting/register.html. See you in Long Beach!

### LMU Expands with Advanced Courses

In April, ASCP and the American Pathology Foundation (APF) launched a second on-demand Laboratory Management University certificate program, LMU Advanced, an expansion of the highly successful LMU. LMU Advanced includes 10 online courses on advanced laboratory management topics, and a 15-credit Portfolio Development course, which guides participants through the creation, setup, and deployment of their own Web-based professional portfolio to illustrate their capabilities and achievements.

“In two years’ time, the LMU Fundamentals program has grown to almost 7,000 participants worldwide, providing laboratory professionals, pathologists, and residents alike with the foundation and practical skills they need to elevate their careers, with real results,” says ASCP President William G. Finn, MD, FASCP.
ACE Meeting Illuminates New Opportunities for Cytotechnologists

The inaugural Advanced Cytopathology Education (ACE) program—a collaboration between ASCP and the American Society of Cytopathology (ASC) to help cytotechnologists improve their scope of practice in an evolving profession—provided “greater clarity to the increasing role that molecular pathology will play in tumor diagnosis and treatment,” says Mary Dorsey, PBT(ASCP)CTCM, president of the New Jersey Association of Cytology, who attended the two-day ACE meeting in June in Philadelphia.

Attendees came primarily from the East Coast and southeastern states, but a few traveled from as far as Seattle and Denver. Providing key leadership to the ACE program were Amy Wendel Spiczka, MS, SCT(ASCP)CM,MB(ASCP),HTLCM, manager of Anatomic Pathology in the Laboratory Medicine and Pathology Department at the Mayo Clinic, Scottsdale, Ariz., and primary facilitator for the ASC/ASCP Workgroup: Focusing on Emerging Roles in Cytopathology; and Zubair Baloch, MD, PhD, MASCP, professor of Pathology and Laboratory Medicine at the University of Pennsylvania, Perelman School of Medicine, Philadelphia. The two leaders secured renowned experts to provide educational content that was custom designed for this meeting.

For expanded coverage of the meeting, download and read the digital October issue of Critical Values.

2015 Fellowship & Job Market Surveys Inform Enhanced Resources for New Pathologists

About 40 percent of fourth-year pathology residents do not feel prepared to practice the “business side” of pathology, according to findings of the 2015 ASCP Fellowship & Job Market Surveys released in July at the Association of Pathology Chairs Annual Meeting in San Diego.

“The ASCP Fellowship & Job Market Surveys provide valuable information on national trends regarding medical education, residency training, and the job market, which is closely reviewed by pathology residents and fellows,” says Karen Frank, MD, PhD, FASCP, chair of the ASCP Resident In-Service Examination (RISE) Committee.

ASCP, which administered the surveys as part of the 2015 Spring RISE and fellowship in-service exams, has used these data to develop new resources, such as Lab Management University, which was created in 2013 to fill the educational gap identified in pathology business and management training.

To read the complete report, visit www.ascp.org/Residents/Resident-Resources#tabs-1.

JAMA Publishes ASCP Letter Raising Concern About Flawed Breast Biopsy Study

On July 7, the Journal of the American Medical Association (JAMA) published a letter to the editor authored by ASCP President William G. Finn, MD, FASCP, and CEO E. Blair Holladay, PhD, SCT(ASCP)CM, raising concerns about flaws with a recent study by JG Elmore, MD, et al. published in JAMA. That study examined levels of diagnostic concordance among pathologists with regard to their interpretation of breast biopsies.

Drs. Finn and Holladay also argued that the design of the study did not reflect the way pathology is actually practiced and that this resulted in artificially lowering the concordance rate reported in the study. This, they argued, raises erroneous concerns about the quality of work provided by pathologists. For more, visit http://jama.jamanetwork.com/article.aspx?articleid=2382972.

PFS Proposed Rule Increases Allowed Charges for Laboratory Medicine

On July 8, the Centers for Medicare & Medicaid Services (CMS) released its annual Physician Fee Schedule (PFS) Proposed Rule, containing Medicare payment rates and policies proposed for calendar year 2016. This year, many of the policies stem from recently enacted legislation, including the Protecting Access to Medicare Act of 2014 (PAMA) and the Medicare Access and CHIP Reauthorization Act of 2015 (MACRA). Notably, thanks to MACRA’s successful repeal of Medicare’s flawed Sustainable Growth Rate payment formula, this is the first year in nearly two decades that providers aren’t faced with the looming threat of drastic cuts to their reimbursement. Instead, the law replaces the SGR with a 0.5-percent payment update.

In addition, CMS did not propose regulations, as had been widely expected, to implement PAMA’s required revaluation of the entire Clinical Laboratory Fee Schedule. As previously reported in ePolicy, PAMA required CMS to finalize these regulations by June 30, 2015. Since PAMA requires laboratories to begin reporting data on payment rates and volume for services reimbursed by private insurers by Jan. 1, it is unclear when CMS will release these regulations and whether the delays in releasing the rule will deprive laboratories of the time needed to meet the data reporting requirements.

Review of the Regulatory Impact Analysis within the Proposed Rule reveals that independent laboratories and pathologists are anticipated to benefit the most from the payment rates and policies proposed for CY 2016. Specifically, independent laboratories are anticipated to see a 9 percent increase in their Medicare allowed charges, while pathologists are anticipated to experience an 8 percent increase. Conversely, the Rule appears to have a neutral impact on most other specialty types, while gastroenterology and radiation therapy centers appear to be taking the biggest hit.

For a more detailed analysis, read the September ePolicy at www.ascp.org/Newsroom/ePolicy.
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