Earn up to 20 SAM credits at the ASCP Annual Meeting.
Medical laboratories are facing a severe workforce shortage. The profession has been sounding the alarm for many years, and now is the time for action.

ASCP has led the profession with its thorough documentation of the workforce shortage. The latest statistics will be published in the January 2009 issue of LAB MEDICINE. This issue of Critical Values outlines the many ways ASCP is addressing the shortage, through advocacy, career resources, and scholarships. And the Society is certainly not acting alone. Organizations representing every aspect of the profession are working hard to reverse the tide, and ASCP is working with them. As the world leader in education and certification of laboratory professionals, however, ASCP believes it must guard against the temptation to lower standards to attract more workers. Lower standards will compromise the quality of laboratory service and put patient safety at risk.

As individuals, we cannot rely exclusively on our professional organizations to solve the problem. We can and must take steps of our own. Kay Doyle knows how to motivate people to act locally; her list of action items (p. 10) may give you some ideas. As we all know, salaries are key to attracting new people to the profession. In this issue, the chief executive officer of an independent laboratory explains how he reduced turnover and costs by increasing salaries (p. 11). Perhaps others will catch on.

Individual and organizational efforts to raise high school students’ awareness about the profession would likely yield a positive return on investment, according to a recent survey by the Recruitment Workgroup of the Coordinating Council on the Clinical Laboratory Workforce. We are pleased to present the preliminary findings of that survey (p. 15).

In May 2008, the Centers for Disease Control and Prevention released Laboratory Medicine: A National Status Report, which "provides a detailed overview of the key factors affecting the field of laboratory medicine today and those that will shape the field in the coming decades." An excerpt from the Executive Summary of that report, focusing on the value of laboratory medicine to health care and the laboratory medicine workforce, appears on page 12.

The United States is not the only country facing shortages of laboratory professionals and health care workers overall. As Andrea Bennett reports (p. 23), the World Health Organization estimates that 36 countries in Africa have fewer than 2.3 health care professionals per 100,000 people. This issue highlights opportunities to provide service abroad through Pathologists Overseas (p. 25) and describes how three laboratory professionals from Kenya defied the brain drain phenomenon and took their U.S. training back to their homeland through the efforts of PAPS Team International (p. 27).

In other news, Elizabeth Wagar shares her perspective on the evolution of the critical values concept, touching on the differences between critical tests and critical values and between urgent findings and significant findings (p. 30). The regular Arts in Culture section, exploring the intersection of art and medicine, features the astonishing work of pathologist-turned-professional photographer Mark Alberhasky (p. 28).

Finally, we welcome your feedback and ideas. Have you solved an IT challenge that has improved your recording and reporting of test results? How are you “greening” your laboratory? Have you seen pathology and laboratory medicine depicted, positively or perhaps critically, in popular culture? Let us know. And look for articles about the value of communication in January.

Dr. Hilborne is president of ASCP.
Number of technologists and technicians needed to replace retirees by 2014: 81,000

Number of technologists and technicians needed to fill new positions by 2014: 68,000

Average age of the laboratory workforce: 49.2 years

Percent of workforce within 10 years of retirement: 40%

Percent of laboratories experiencing difficulty hiring: 44%

Number of NACCLS-accredited medical technology education programs in 1975: 770; In 2007: 222

Number of accredited cytotechnology training programs in 1994: 65; In 2008: 39

Number of CLS/MT program graduates in 1977: 6,519; In 2005: 2,141
Laboratory Workforce Shortage

ASCP Battles Workforce Shortage on Many Fronts:
President’s Perspective
Lee H. Hilborne

What You Can Do
Kathleen (Kay) Doyle

Higher Pay Reduces Costs
David W. Glenn

From Laboratory Medicine: A National Status Report
12

Awareness—The ‘A’ Factor
Paul L. Epner

The Future Laboratory Professional: Health Care’s Secret Weapon
18
Paul L. Epner

New CLS Program Opens in Chicago
Michelle Moy

Outlook Bright for Resident Fellowships and Jobs
20
Thomas J. Bollinger

International Shortage

Shortages Abroad Pose Threat of Global Pandemics
23
Andrea Bennett

Pathologists in Ghana
25
Jason Heese

Taking Their Work Home—to Kenya
27
Terri Yablonsky Stat
Bring Back On-the-Job Training Programs

I can’t say what the future solution to the lab staffing shortage will be, but I believe that looking into the past for ideas might be helpful. Future laboratorians are out there. Maybe we just have to make getting into the lab a little easier.

When I was about to graduate from high school, the teacher in my health assistance class gave me information about an on-the-job training program at The South Side Hospital of Pittsburgh, Pennsylvania. I sent in my transcripts, completed an application, and took a manual dexterity test in preparation for the interview and selection process. I was chosen and began in July 1977. For the next year, I did phlebotomy rounds each morning, then rotated through departments doing hands-on tech work, followed by classroom work in the afternoons. I subsequently became CLA(ASCP) certified in 1978 and was hired at the hospital full time in the chemistry department. I studied for ASCP’s MLT exam and took the test when I qualified with 5 years experience. I stayed in the lab as a generalist for the next 16 years. I moved into an LIS manager position in 1994 and have worked in IT since then.

I believe that offering on-the-job training programs should be reconsidered. I can say without hesitation that my entire laboratory career has been great. How it all started was perfect for my personality and learning style. I think many teens finishing high school would be attracted to a program like this, and many seasoned laboratorians would be happy to share their knowledge as instructors. I hope you will consider it as a possible solution to the staffing problems laboratories face.

Kimberly O’Neal, MLT(ASCP)
Hospital CPU Interface Specialist
Quest Diagnostics National Group, Tampa, FL

ASCP President Lee H. Hilborne responds:

Thank you for your note about how to attract others to the laboratory profession. On-the-job training and career paths are among the avenues ASCP has identified as priority areas to attract people to the field. We are interested in working with laboratory education programs to develop additional venues for those considering laboratory careers. Perhaps we could work with industry and other organizations to identify opportunities for students in school to work at laboratories and gain some experience—ultimately translating into seeking a laboratory career. Let’s continue to think together about additional strategies to address the workforce shortage.
For the past decade, ASCP has made the workforce shortage a top priority. The first step in addressing a problem is to define it. ASCP members should all be proud of the fact that the ASCP Wage and Vacancy Survey produces timely and widely cited trended data highlighting the magnitude of the shortage. The current survey is under way now. ASCP also is an instrumental force in a coalition of laboratory medicine organizations working together to address the workforce shortage.

I feel very passionate that as the largest and most respected organization in the laboratory community, ASCP must take a leading role on this issue. I recently met with the top leadership of the American Hospital Association (AHA) to discuss the laboratory professional workforce shortage. Our discussion covered a number of issues, including salaries for trained laboratory professionals relative to other professions. Our letter to the editor was published in USA Today when an article addressing laboratory issues did not recognize laboratory professionals. On behalf of ASCP, I wrote a substantial editorial that specifically called attention to the crisis for the June 2008 issue of Modern Healthcare, a publication that reaches the desks of most health care executives throughout the country.
Capitol Hill Day

In April, ASCP took the laboratory workforce crisis to Washington, D.C. ASCP volunteers met with more than 70 congressional representatives on Capitol Hill to advocate for laboratory professionals. Some lawmakers were aware of the profession’s concerns—those that weren’t are now. Change at the federal level is not likely before the November election, but ASCP will continue to push the workforce issue as a top priority both nationally and locally. I was very proud of ASCP volunteers for their courage and determination in “assaulting” lawmakers in Washington with a critical message for patient care. This is part of the effort to create growing recognition of the current crisis. The health care community cannot afford to let the workforce situation deteriorate further.

ASCP is pushing hard, very hard, on this issue. It will be difficult for any organization to go it alone. Nurses have been very successful in galvanizing their membership, patients, and others to clamor about their workforce shortage, and they have seen action. Pathologists must do the same. ASCP is working to encourage its members to make their concerns known while collaborating with other laboratory medicine professional organizations and the government to call increasing attention to the workforce shortage. All ASCP members should be involved in these efforts. Laboratory professionals have both a dedication to their patients and a passion for laboratory medicine. These are exactly the qualities needed in a cadre of volunteers who will speak up. Let’s continue the dialogue while we work on the issues.

Advocacy

In June 2008 ASCP reported that the Health Professions and Nursing Education Coalition (HPNEC), of which ASCP is a member, is seeking congressional support for full funding for health professions education. Specifically, the group is targeting the House of Representatives Committee on Appropriations to provide at least $300 million for Title VII health professions programs in the FY 2009 appropriations bill being crafted by the Labor, Health and Human Services and Education Committee. During the 2008 ASCP Capitol Hill Day, funding for Title VII was among the issues advocates carried to the Hill. Since drastic cuts were made to these programs in the FY 2006 budget, as much as 51%, even incremental funding increases over the years have failed to bring these programs to funding levels necessary to maintain programs.

Quality Patient Care

A workforce shortage can put pressure on employers to fill positions with unqualified workers, thereby putting patients at risk. ASCP advocates for quality patient care by providing gold standard certification of laboratory professionals. ASCP Board of Registry certification, which is voluntary, ensures that laboratory personnel possess appropriate academic and clinical training, pass competency-based examinations conducted by an approved national certifying organization, and participate in continuing education programs. Certification mandated by the Federal Government would raise the standard of care for all patients and in the long run would result in higher salaries for laboratory professionals. In turn, higher salaries would attract more of the best and brightest to serve patients in medical laboratories.
ASCP BOR certification is the only certification that has approval in all 13 states that require licensure for laboratory personnel, including, most recently, New York and California. ASCP will work with states considering licensure requirements to develop appropriate laws that best serve patients and the public.

Career Resources
ASCP encourages students to pursue careers in the laboratory professions by exhibiting and presenting career resources at a variety of national meetings, including those of the National Science Teachers Association, National Association of Biology Teachers, and Health Occupations Students of America. ASCP has distributed more than 20,000 copies of its newest brochure, *Careers in Pathology and Medical Laboratory Science*, over the past two years. The brochure, classroom posters, and salary information are also available at www.ascp.org/MainMenu/laboratoryprofessionals/CareerCenter.aspx.

Scholarships and Student Recognition
ASCP awards scholarships to students enrolled in their final clinical year of study in Cytotechnologist, Histotechnician, Histotechnologist, Medical Laboratory Technician, Pathologists’ Assistant, or Medical Technologist programs, and to students enrolled in or recent graduates of approved phlebotomy training programs. In 2007, ASCP received 296 applications and awarded 41 scholarships. ASCP presents Siemens Healthcare Diagnostics (formerly Dade Behring) Student Scholarships of $2,500 each to students in their fourth or final clinical year of a National Accrediting Agency for Clinical Laboratory Sciences- (NAACLS-) accredited Medical Technologist/Clinical Laboratory Scientist (MT/CLS) program. ASCP also presents the Siemens Healthcare Diagnostics Legacy Student Scholarships of $5,000 each to five students who are the children, grandchildren, or siblings of clinical laboratory professionals and who continue their family legacy by pursuing associate or bachelor's degrees in NAACLS-accredited MLT/CLT or MT/CLS programs. In addition to scholarships, ASCP recognizes exceptional laboratory students with its National Student Honor Award. For more information, visit www.ascp.org/MainMenu/programdirectors/Laboratoryprograms/Scholarships.aspx.

Collaboration
ASCP actively partners with numerous organizations to address the workforce shortage. ASCP is an active participant on the Coordinating Council on the Clinical Laboratory Workforce (CCCLW) and the Labs Are Vital™ campaign. ASCP leads a coalition of organizations promoting National Medical Laboratory Professionals Week: AABB, AACC, American Medical Technologists, American Society of Cytopathology, American Society for Clinical Laboratory Science, Association of Public Health Laboratories, CLMA, College of American Pathologists, and National Society for Histotechnology. ASCP also works with state pathology societies and other organizations to raise awareness of issues in laboratory medicine.

By the Numbers

| Number of technologists and technicians needed to replace retirees by 2014: 81,000 |
| Number of technologists and technicians needed to fill new positions by 2014: 68,000 |
| Average age of the laboratory workforce: 49.2 years |
| Percentage of workforce within 10 years of retirement: 40 |
| Percentage of laboratories experiencing difficulty hiring: 44 |
| Number of NACCLS-accredited medical technology education programs in 1975: 770; In 2007: 222 |
| Number of accredited cytotechnology training programs in 1994: 65; In 2008: 39 |
| Number of CLS/MT program graduates in 1977: 6,519; In 2005: 2,141 |
By Kathleen (Kay) Doyle, PhD, MT(ASCP)CM

Editor’s Note: This list is excerpted from Dr. Doyle’s presentation, “The Clinical Lab Scientist Shortage: What You Can Do About It!” to the Massachusetts Association of Blood Banks, April 23, 2008.

Retain Current Workers
- Adopt flexible work schedules.
- Require less physically demanding work.
- Utilize and value skills.
- Provide mentors for new employees.
- Increase wages for longevity.

Support Your Local Programs
- Establish clinical affiliations.
- Accept more students for internships.
- Write letters of support to administrators calling for more space, more faculty and staff positions, and more operating funds.
- Educate program administrators by inviting them to tour your laboratory or company.

Help Programs Recruit Good Students
- Make a presentation at career days.
- Have a student “shadow” you for a day.
- Invite students to tour your laboratory.
- Participate in science fairs: be a judge, sponsor awards.
- Give a presentation at high school science and guidance counselor professional meetings.

Educate Professionals and Administrators in Your Institution
- Take part in medical rounds.
- Schedule regular presentations on new topics in laboratory medicine/instrumentation.
- Conduct a monthly/weekly tour of your laboratory.
- Integrate the laboratory in employee orientation.
- Use National Medical Laboratory Professionals Week to educate all who come to the hospital or laboratory.

Educate the Public and Health Care Consumers
- Conduct laboratory tours for patients and the public.
- Give presentations to civic groups on the role of the laboratory in disease diagnosis, prognosis, and treatment.
- Engage in a continual dialogue with physicians about vacancy data and quality.
- Encourage patients to talk to their physicians.

Educate Your Federal, State, and Local Government Officials
- Arrange a tour of your laboratory.
- Inform officials about the role of the laboratory.
- Explain the latest employment data.
- Encourage budgets and legislation to support educational programs.
- Encourage support for affordable education, that is, scholarships, loans.

Educate the Media
- Be a guest on your local radio talk show or cable TV show.
- Write letters to the editor of the local newspaper.
- Encourage your local news media to write articles about the shortage of laboratory professionals and the role of the laboratory in the medical decision process.

Dr. Doyle is Professor, Program Director, and Chair of the Department of Clinical Laboratory and Nutritional Sciences at the University of Massachusetts Lowell.
By David W. Glenn, MT(ASCP)

The cost of employee turnover is high. In our lab we spend at least three months orienting and training new personnel, resulting in the trainer and trainee doing the work of one employee for most of those three months. Adding to that the costs of separation pay, overtime, recruiting, interviewing, background checks, administrative functions, supplies, and materials results in an estimated turnover cost of almost 50% of an employee’s annual salary.

When we created the company, our philosophy was to pay the best wages and benefits in the service area in order to attract and retain the best technologists and technicians. This philosophy has proved to be cost-effective (saving money and reducing errors) as turnover in the professional/technical staff has been zero during the past four years. In addition, the longer the laboratory professionals work with customers, the stronger the relationships they develop. Customer loyalty for reference laboratories is very important because customer turnover is very costly.

However, this has not been the case with the laboratory’s customer service personnel. Retrospectively I now realize how this happened. The laboratory was previously part of a hospital-based reference laboratory, and when the decision was made to create a separate, independent reference laboratory, two superior customer service staff members were hired from the hospital laboratory. As the laboratory grew, it was expected that others could be recruited and trained to do the job as well as these two individuals.

Anyone can be taught to answer the phone. However, in the laboratory that person must also know how to transfer questions to the professional staff correctly. For instance, a call requesting information about a Pap test should not be routed to histology. In addition to answering phones, these people perform order entry of specimen requisitions into the laboratory information system (LIS). This adds a whole new level of knowledge; that is, customer service personnel need to know how to use the LIS, decipher handwritten requisitions, select the correct tests, and convert diagnoses into the proper ICD-9 codes. The longer these personnel work in the laboratory, the more they learn through experience, the fewer mistakes they make, and the more valuable they become.

When the laboratory opened, few patients came in for phlebotomy and the technicians were able to keep up with the demand. However, as the business grew, customer service personnel were asked to learn phlebotomy. Laboratorians are big on acronyms, so these staff members were given the title CSREP to recognize their duties, which are Customer Service, Requisition Entry, and Phlebotomy. As the role of CSREPs expanded, their pay was not increased accordingly, so the turnover rate for these employees escalated. Since the total personnel turnover for the laboratory was less than 10% annually, retention did not appear to be a problem. However, when it was realized that most of the turnover was CSREPs, a solution was sought.

Recruiting excellent personnel is like panning for gold—a recruiter has to sort through a lot of possibilities to find an actual nugget, and sometimes the find is “fool’s gold.” The laboratory had been losing a CSREP on the average of every nine months. This created severe “labor pains” as the process of recruiting and then training a new person for the position became continuous.

The recruiting process found a few “nuggets,” but some of them left as they acquired skills that were valued more by other employers. The problem was that the laboratory was paying entry-level wages comparable to those of fast food restaurants. When one of the original CSREPs hired from the hospital was offered a position with a 50% raise, I realized just how much we were undervaluing these people.

The laboratory strives to retain excellent personnel by providing bonuses and generous pension and profit-sharing plans. However, an employee has to be with the laboratory for one year before he or she receives these benefits. Since many of the newly hired CSREPs were leaving before a year was up, they couldn’t appreciate these plans.

Many management gurus talk about the importance of providing employees with interesting, fun work; treating them with respect; and showing appreciation for them. Nevertheless, the most important factor is good pay that will get them in the door and keep them from looking elsewhere for higher wages. Once the pay for CSREPs was raised significantly, our laboratory received better applicants. Now we can hire great employees from employers that undervalue what they had.

Everyone is important in a successful laboratory operation. It’s been a year now since our laboratory has experienced personnel turnover. In addition, there have been numerous compliments about the CSREPs from customers. Order entry mistakes have fallen dramatically, and this helps reduce the costs of correcting errors and improves patient safety.

Higher pay reduces laboratory costs!

Mr. Glenn is the CEO of Pathology Services, P.C., in North Platte, NE. He can be contacted at dwg@pathologyservices.com.
The Value of Laboratory Medicine to Health Care

Laboratory testing has a major effect on clinical decisions, providing physicians, nurses, and other health care providers with information that aids in the prevention, diagnosis, treatment, and management of disease. Despite this scope of influence, spending on laboratory services accounts for only 2.3% of U.S. health care expenditures and 2% of Medicare expenditures.
Laboratory tests provide objective data about patient health that enable screening for risk factors, accurate and early diagnosis, determination of disease severity and likelihood of recovery, selection and monitoring of treatment, and evaluation of potential adverse outcomes. Some laboratory tests are vital to patient self-management of chronic conditions.

Information provided by laboratory testing is critical for maintaining quality and safety, including the prevention of adverse reactions. For managing medication, testing provides information for maintaining optimum drug levels, helps to detect and recover from medication errors, and enables use of genetic information to guide personalized prescribing. Laboratories protect the blood supply from pathogens and accurately match patients and blood products.

Services provided by clinical laboratories are critical to public health at the individual and population levels by identifying nosocomial infections, antimicrobial resistance, infectious disease outbreaks, exposure to toxic substances, and chemical and biological threats. Laboratories also help to mitigate the effects of natural disasters by enabling rapid turnaround of tests used during triage and emergency care of individual patients as well as tests to confirm the presence of communicable diseases that threaten the population.

Laboratory medicine supports the practice of evidence-based medicine and is being incorporated into clinical practice guidelines, which assist practitioners and patients in making decisions about individuals’ health care in specific circumstances.

Laboratory testing is one of several important indicators for assessing quality of care, particularly for national priority health conditions such as diabetes, heart failure, and colon cancer. Laboratory data can be used in support of value-based purchasing.

Greater attention by providers and payers to evidence-based medicine, practice guidelines, and quality indicators is contributing to more appropriate use of laboratory tests, diminishing both overuse and underuse of tests.

The evidence base for the cost-effectiveness of laboratory tests, and the broader therapeutic regimens and other interventions of which they are a part, is growing. This evidence is helping to inform appropriateness of test selection and sequencing, technology acquisition decisions, formulary design (including for pharmacogenomic-mediated therapies), and screening and other population-based interventions. It is also being considered in selected coverage and payment policies of some health plans and other third-party payers.

Laboratory Medicine Workforce

Comprising pathologists, doctoral-level laboratory scientists, technologists/scientists, and technicians, the laboratory medicine workforce has a vital role in the health care system, managing and applying evidence-based, scientific testing techniques to support patient care and protect against public health threats. However, there is growing concern about shortages in the number of laboratory professionals entering the workforce. The shortage could become pronounced with the forthcoming retirement of many laboratorians. At the same time, the demand for laboratory services continues to increase. Innovative technologies are changing the practice of laboratory medicine, educational requirements and staff qualifications.

In 2005, there were an estimated 19,339 pathologists in the U.S., including 80% in community practice. Minorities are under-represented in the discipline of pathology, with 10% identified as Asian, 3% Hispanic, and 1% African American. Slightly more than half of pathology residents are female.

An estimated 160,760 medical technologists/scientists (including cytotechnologists) and 144,710 technicians were employed in the U.S. in 2006. While nearly three-fourths of this workforce is female, it is more representative of the diverse ethnic makeup of the population, i.e., 12% Asian, 11% African American, and 7% Hispanic. By type of region, 58% of technologists/scientists work in an urban setting, 24% in suburban, and 18% in rural.

The number of technologist/scientist and technician education programs has declined by more than 50% since 1970, with the most dramatic decline in technologist/scientist programs, 71% of which closed between 1970 and 2007. In contrast, the number of phlebotomy training programs increased sixfold from 1987 to 2003.

Current enrollment in specialized technologist/scientist and technician educational programs is lowest in blood banking and histotechnology. Recent recruiting efforts appear to be effective, specifically those targeted at recruiting minorities and males.

The shortage of technologists/scientists and technicians is expected to worsen over the next decade with demographic changes and retirements. Although personnel vacancies were highest in 2000 (11-22%), they remained steady from 2002 to 2005 at an annual rate of 4-7%. Vacancies vary according to staff position, laboratory type and size, and geographic location.

Technological advances will change the qualifications required of the next generation of laboratory professionals. The laboratory sector needs to clearly redefine staffing qualifications and workforce level requirements accordingly.
Debates about the clinical laboratory workforce abound. Issues include the need for certified laboratory personnel in states that do not legislate certification; the use of associate- versus baccalaureate-trained individuals for specific positions; and the most appropriate educational preparation for future medical laboratory professionals (MLP) given an ever-expanding body of knowledge. However, there is a high level of consensus about the anticipated shortfall in the size of the future laboratory workforce.

Most professionals recognize that the average age of the laboratory workforce is increasing—in fact, the average laboratory professional is believed to be almost 50. Given the number of new laboratory professionals needed due to increasing requirements for laboratory services and the number of employees within 5–10 years of retirement, demand is expected to far exceed the number anticipated to be available for hire.
Recruitment Workgroup Conducts Survey

The expected gap between exiting and entering laboratory professionals led to the formation of the Coordinating Council for the Clinical Laboratory Workforce (CCCLW). The CCCLW is a coalition of about a dozen laboratory associations, large employers, and laboratory-related organizations, including in vitro diagnostics (IVD) vendors, whose focus is on resolving the projected shortage. Accepting as fact the premise that “insufficient numbers of students are entering the field,” CCCLW created the Recruitment Workgroup in April 2007. The workgroup established as its mission the development of a comprehensive strategy and implementation plan for maximizing the pipeline of potential laboratory professionals. As a starting point, the group sought to identify factors that influenced existing laboratorians to enter the profession.

The workgroup used an Internet-based survey to determine the paths by which people chose to become MLPs. Eligible participants were newly employed laboratory professionals or those studying to become laboratory professionals. Newly employed laboratory professionals were defined as those who had less than 5 years of laboratory experience. Those studying to become laboratory professionals were defined as students currently enrolled in an accredited laboratory educational program or a graduate program in a related discipline. The survey was pilot-tested with a group of 12 respondents from each of these two groups and, following a debriefing and revision of the survey, was fielded nationally. The survey was announced through notices to accredited programs as well as to laboratory associations. This was not a random sample and therefore is not generalizable to the entire U.S. population of laboratory professionals. However, it is worth pointing out that of the more than 6,000 individuals who responded, more than 4,700 (78.3%) met the eligibility qualifications and completed the survey.

Analysis of the complete data set is beyond the scope of this interim report. Here, the career-planning paths of medical laboratory professionals are highlighted, and recommendations that would mitigate the anticipated shortage are presented. Subsequent publications will examine issues of career awareness, the evolution of career choices, the job attributes most attractive to potential recruits, and changes in career satisfaction during the early years of employment.

Career-Planning Paths

A significant finding is that the vast majority of high school students are unaware that the medical laboratory profession is a viable career choice. Of the 3,960 respondents who were asked about when they became aware of the medical laboratory profession, more than 76% reported that they heard about the career option only after leaving high school. This is noteworthy because it suggests that post-high school educational choices are typically made without consideration of whether post-secondary institutions have programs to educate laboratory medical professionals.

In fact, only 37% of respondents reported that the availability of a laboratory science program was a requirement in their college selection process. However, among respondents who were aware of (but not necessarily committed to) the laboratory profession in high school, 62% reported choosing schools that had a laboratory profession program. With fewer than 500 accredited programs in the United States and with most students making decisions about college without considering laboratory science careers, it is very likely that students will choose colleges without laboratory science programs. As a result, once they become interested in a laboratory career, such students will be forced to transfer to a new institution, adding a fifth year of education, or even forced into completing a second degree program. Perhaps even more likely, they will not pursue a laboratory career at all because these options are too burdensome.

These results are even more striking when considering that the respondents were all training to be laboratory professionals or already employed as laboratory professionals. If this cohort is unaware of the career in high school, it is easy to extrapolate and conclude that the general high school student population is even more uninformed.

Clearly, it is imperative that all high school students become aware of the medical laboratory profession before graduation in order to ensure that those best suited to become MLPs have a straight shot at doing so. The CCCLW survey offers direction in how this should be done.
Mechanisms that led respondents to first become interested in a career as a medical laboratory professional include, in decreasing order of frequency: a relative or friend (31.2%), a college catalog or college visit (7.2%), a high school science teacher (7.2%), a tour of a medical laboratory (7.2%), personal research that included career counseling tools and Internet searches (6.1%), and, finally, career fairs (6.0%). Less common means were volunteer activities at a local hospital, military recruiters, part-time jobs, the high school counselor’s office, personal health care visits, and the media. Note that this list addressed only the awareness-building mechanisms of those who ended up in the profession. There might be better ways to reach those who were not aware of the profession but would have chosen to join had they known about it.

Awareness building is necessary but may not be sufficient. Moving students from awareness to a career decision cannot be taken for granted. To increase the commitment of aware students, it is important to nurture their interest in the laboratory profession. Targeting those efforts to all students would likely prove inefficient. When asked to recall their career interest when graduating from high school, respondents listed medical and nonmedical researcher most frequently (15.4% of respondents), followed by doctor (15.2%), MLP (13.8%), nurse (6.6%), pharmacist (5.1%), and multiple other health professionals combined (13.7%). Focusing efforts on students with any of these career interests could be a significant first step in expanding the pool of students considering the profession. Further analysis of the survey results will provide guidance on the career attributes with the greatest appeal for prospective laboratory professionals and can form the basis for promotional messages.

Laboratory Incumbents Can Take Steps

However, the current findings provide a clear call to action for laboratory incumbents willing to help recruit a new generation of laboratorians, as follows:

- Find opportunities to introduce students to the profession.
- Use as many different mechanisms as possible to cast the widest net, recognizing that potential recruits have a broad range of career interests.
- Seek out venues, at the high school level, in particular, focused on other aspects of health care, such as nursing, pharmacy, and medical doctors.
- Expand beyond the school into clubs and organizations such as Boy Scouts, Girl Scouts, and 4-H.
- Consider offering programs for hospital volunteers; place brochures in patient waiting areas; show up at a variety of school programs; and promote the profession to school faculty.
- Recognize that the most significant conduit for information is friends and relatives.
- Ensure that targeted messages are provided at community events and meetings of religious organizations and parent groups.

Further research is necessary to broaden the current findings beyond laboratory students and laboratory professionals. It would be useful to identify the most effective methods for presenting the profession to potential candidates. Of course, increasing the number of interested students would not solve the workforce shortage, because an influx of applicants would quickly overwhelm the capacity of existing education programs and clinical rotation sites. However, those problems will probably not be addressed until demand for education exceeds supply. Expanding awareness is the first step towards that end.

Mr. Epner is Director, U.S. Healthcare Improvement Initiatives, Abbott Diagnostics. Members of the CCCLW Recruitment Workgroup were Sharon A. Bobryk, CLS(NCA), MT(ASCP); Karen A. Brown, MS, MT(ASCP); David Butcher, MBA, MT(ASCP)/SM; Valerie H. DeFor, MHSA; Kathy Doig, PhD, CLS(NCA), CLSp(H); Susan Gross, MS, MT(ASCP); Patricia K. Knebel, MT(ASCP); Kyle Riding, CLS(NCA); Ann F. Sosnowski, MS, MT(ASCP); and Carmen Wiley, PhD, DABBCC, FACB.
The future of health care holds both promise and trepidation. New technologies offer safer and more effective diagnosis, treatment, and monitoring of diseases, traumas, and degenerative processes. These trends boost confidence about the future. However, they are counterbalanced by a lack of access to quality health care for millions, rising and unsustainable health care expenses, and medical errors that occur too often and sometimes with devastating consequences.

Currently and increasingly, the clinical laboratory is viewed by major stakeholders—clinicians, hospital administrators, governments, private insurers—as a factory with inputs and outputs. Some laboratory colleagues refer to diagnostic testing as a commodity. In many hospitals the laboratory’s role is to simply turn out an accurate result at the lowest cost and, if requested, in the shortest possible time. With ever-rising health care costs and concurrent efforts to lower those costs, laboratory professionals confront ongoing demands to do more with less. There are unfortunately by-products of this model: unnecessary tests are requested; necessary tests fail to be requested; test results are misapplied; and processes break down. Each of these by-products can have adverse consequences for patients.

The overlooked, underestimated laboratory professional may be one of the last major untapped resources in the battle to combat the health care system’s ills. First, laboratory professionals should assume ownership for the total testing process—from the time a clinician considers the diagnostic question until the results of laboratory testing are interpreted and applied. This does not mean tallying how many short-fills or missing sample labels have occurred. It means exerting the same level of ownership for pre- and post-analytical process breakdowns as for process problems within the walls of the laboratory.

Second, the rapid growth and sophistication of diagnostic knowledge coupled with increased complexity in the delivery of health care make it critical that laboratory professionals assist clinicians in decisions about appropriate testing, whether through individual consultations or more general educational offerings. It is unreasonable to expect clinicians to keep abreast of cutting-edge developments.

Third, rather than merely accepting requisitions for every test ordered, laboratory professionals should set up data-mining regimens to identify variations in the application of evidence-based diagnostic medicine, and they should work with clinicians to improve the appropriate order sets, both in the generic development of clinical pathways and the specific application of orders versus presumed diagnosis for individual patients.

Finally, laboratory professionals need to ensure that they play a collaborative, leadership role in quality improvement. An amazing number of electronic medical records systems have been adopted that have had little or no input from the laboratory, and this in turn has led to unpleasant surprises when analytes tested with different methodologies were trended on the same graph or when interpretive comments and reference ranges failed to get past the interface.

If leadership, ownership, collaboration, and patient centeredness become the hallmark of the laboratory professional of the future, the result will be improved patient outcomes, a safer, more cost-effective healthcare system, and a more satisfied, professionally enhanced laboratory community.

Correction
An article in the April 2008 issue of Critical Values incorrectly stated that the Labs Are Vital™ campaign is supported by the Abbott Fund. Labs Are Vital is supported by Abbott Diagnostics.
New CLS Program Opens in Chicago

By Michelle Moy, MAEd, MT(ASCP)SC, CLS(NCA)

As more and more hospitals are faced with an aging laboratory workforce, a critical shortage of educational programs, and a small number of qualified candidates in the field, the time seemed right to bring allied health education, specifically clinical laboratory science education, into the professional education arena at Loyola University Chicago (LUC).

The School of Continuing and Professional Studies (SCPS) has responded to the deepening crisis by developing a university-based Clinical Laboratory Science (CLS) program, which opened in the fall of 2008. With only two other university-based CLS programs in greater Chicagoland (Rush University and Northern Illinois University), another program clearly was needed to address the 12% vacancy rates in CLS positions predicted by the U.S. Department of Labor over the next 10 years.

With the recent changes in social, economic, and educational environments, SCPS provides an important alternative to traditional academic programs in CLS. The collaborative effort between the Loyola University campuses (Lakeshore/Water Tower and Maywood) will allow these students to learn from and work with medical technologists and clinical laboratory scientists in the clinical setting as well as benefit from the traditional college experience.

SCPS hopes to attract the adult student who may be contemplating a career change, as well as the conventional student in biology or life sciences programs with the skills and dedication to become a clinical laboratory scientist. As stated on the Web site, the CLS program is “ideal for career changers with some clinical laboratory experience; those who hold a bachelor’s degree in the health sciences or sciences, but who lack clinical experience; and mid-level technicians possessing an associate’s degree” (www.luc.edu/scps/about.shtml).

“Another reason to base this program at Loyola University Health Systems (LUHS), and why I chose CLS as the first allied health program to pursue, is twofold: the broad base of support I received from medical administrators and the chairs (past and present) of the Department of Pathology at the Stritch School of Medicine,” said Dr. Jeffrey Rosen, Dean of the School of Continuing and Professional Studies.

“Such high-level administrative support is not incidental, but rather fundamental to our being able to create a program so swiftly and to draw upon some very expert faculty.”

Specifically, Rosen named the following administrators and faculty as those who made the program possible: Paul K. Whelton, MB, MD, MSc, LUHS President; John Lee, MD, PhD, FCAP, Dean, LUC Stritch School of Medicine; Mary Klotz Walker, RN, PhD, FAAN, Dean, LUC Marcella Niehoff School of Nursing; and Jeanine M. Walenga, PhD, Stephen E. Kahn, PhD, DABCC, FACB, and Paul Schreckenberger, PhD, all professors in the LUC Stritch School of Medicine Department of Pathology.

Choosing CLS for an academic program in the health professions can be “seen as a foundation from which a student can excel and advance to higher level health careers,” Rosen added. “That is to say, in the continuing education parlance, CLS is the first step in a career path to advanced professions, like cytotechnology, histology, and molecular microbiology. The most popular major at LUC is biology, and CLS provides an effective and clear choice to gain practical experience in the field for these majors.”

Ms. Moy is Director of the Clinical Laboratory Science Program at the Loyola University Chicago School of Continuing and Professional Studies.
Outlook Bright for Resident Fellowships and Jobs

By Thomas J. Bollinger, MD, MPH

The resident fellowship and job market continues to improve, and fellowship opportunities remain competitive, according to the 2008 ASCP Resident Council Fellowship and Job Market Survey.

Of residents and fellows applying for jobs, 85% received job offers (up 9% from last year and up 1% from 2006). Of those applying for fellowships, 87% received offers (down from 94% last year and down 1% from 2006). This decrease in fellowship offers and increase in job offers might be explained by late effects of the reduction in the length of pathology residency training from five years to four years that occurred in 2006.

This is the twelfth year in which the ASCP Resident Council has tracked the resident fellowship and job market, and the third year it has been conducted in conjunction with the Resident In-Service Exam (RISE) administered by ASCP.

Demographics

Of the 2,512 individuals surveyed, 86% were in a dual anatomic pathology/clinical pathology (AP/CP) program, while 11% were solely AP and 3% solely CP. Fifty percent were in a university-owned public hospital, 26% in a university-owned private hospital, 18% in a community based teaching hospital, 2% in a military hospital, and 4% in other institutions.

Sixty-six percent of the respondents were U.S. medical graduates; 27% were international medical graduates; 3% were U.S. international medical graduates; and 4% responded “other.” Of the respondents, 25% were program year 1 (PGY1), 25% PGY2, 25% PGY3, 22% PGY4, and 3% fellows.

Subspecialty Grants

ASCP sponsors subspecialty grants for study at outside institutions in the subspecialty fields of the participant’s choice. This marks the third year in which survey participants were asked to identify the subspecialties they would choose if they were to apply for a grant. The top five selections this year were

- Hematopathology (17%)
- Gastrointestinal pathology (13%)
- Dermatopathology (11%)
- Cytopathology (8%)
- Breast pathology (6%)

For more information about the ASCP Resident Council Subspecialty Grant Program, refer to the 2008–2009 ASCP Pathology Resident Handbook in print or online at www.ascp.org.

Job Market

Of this year’s survey participants, 620 were PGY4 or greater. Of those, 268 (43%) either had already applied or were planning on applying for a job; 142 of the job applicants also applied for or intended to apply for a fellowship.

Of the 268 job applicants, 174 formally applied for jobs, i.e., sent in a CV or resume. Of those, 64% applied for 1–3 jobs; 19% for 4–6 jobs; 10% for 7–10 jobs; and 7% for >10 jobs. Eighty-one percent (142) of those 174 applicants formally interviewed for jobs, with 85% interviewing for 1–3 jobs, 15% for 4–6 jobs, <1% for 7–10 jobs, and one person interviewed for more than 10 jobs. Of the 174, 148 received job offers, with 57% receiving at least one offer, 26% receiving two offers, and 17% receiving three or more offers.

Of the 148 job hunters, 89% searched for less than 6 months before finding a job: 41% of them found a job in less than a month; 28% found a job in 1–3 months; and 20% found a job in 3–6 months. Of the 148 respondents pursuing a job, 88 (32%) were offered positions in their own residency/fellowship program: 36% of them declined this position for another offer; 38% accepted and planned on staying at their institutions.
program; and 26% accepted but continued to look for other offers.

Factors in Job Search

Type of Practice. According to the survey results, 36% of respondents indicated a preference for an academic practice position, while 33% sought community group practice jobs, 17% had no preference, and 2% wanted a reference laboratory job. These interests are reflected somewhat in the anticipated job market, where 43% of 267 respondents thought that academic practice held the most job openings; 40% thought community group practice offered the most opportunities; and 2% thought reference laboratories were most available.

Practice Position Desired

<table>
<thead>
<tr>
<th>Practice Position</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Position</td>
<td>36%</td>
</tr>
<tr>
<td>Community Group Practice</td>
<td>33%</td>
</tr>
<tr>
<td>No Preference</td>
<td>17%</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
</tr>
<tr>
<td>Reference Laboratory</td>
<td>2%</td>
</tr>
</tbody>
</table>

Geographic Region. Of 267 job hunters, 62% restricted their job search to a specific region. The most common reason for their restriction was “lifestyle/family issues” (44%), with spouse’s job (26%), area nativity (25%), and professional contacts in the region (5%) being mentioned as other reasons. The most popularly searched region was the Southeast United States (23%), with other regions’ popularity as follows: 20% Northeast, 15% Southwest, 14% Midwest, 13% Canada, 10% “other,” and 5% Northwest.

Reasons Job Search Restricted to a Geographical Region

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifestyle-Family Issues</td>
<td>44%</td>
</tr>
<tr>
<td>Spouse’s Job</td>
<td>26%</td>
</tr>
<tr>
<td>Professional Contacts</td>
<td>5%</td>
</tr>
<tr>
<td>Area Nativity</td>
<td>25%</td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
</tr>
</tbody>
</table>

Other Factors. For those seeking a job, multiple job factors rank at varying levels of importance to each applicant. The applicant’s perception of staff and institution was ranked highest in level of importance, with family factors, job

Salary

A question regarding the range of starting salaries (excluding benefits) was answered by 121 respondents. Of those, 17 indicated that they received a starting salary of more than $250,000, while 40 participants indicated they were offered $150,000–$250,000, another 40 participants stated they received offers in the $100,000–$150,000 range, and 24 respondents were offered less than $100,000.
availability in geographic regions, long-term job security, and opportunity to practice a subspecialty next in importance. Salary considerations, fiscal pressures (e.g., loan repayments), research opportunities, and career advancement opportunities were secondary.

Referrals. When searching for a job, applicants ranked referrals from faculty and word of mouth as most helpful, at 77%. Random mailings/calls were ranked next in importance (19%), followed by College of American Pathologists (CAP) listings (15%), ASCP Job Finder (8%), the American Journal of Clinical Pathology (6%), executive recruiters (5%), and the New England Journal of Medicine (3%). The Internet also played a pivotal role in finding job opportunities for residents, with 107 respondents identifying sites such as mdconsult.com, careerweb.com, and monster.com as most helpful.

Fellowship Market

Of 2,241 respondents not pursuing job opportunities, 59%, or 1,327, applied for or intended to apply for fellowships. Of the 1,034 fellowship applicants who formally applied, 49% applied for 1–3 fellowships, with 21% applying for 4–6, 12% for 7–10, and 18% for more than 10. Of those, 53% received 1 offer, 20% 2 offers, 9% 3 offers, 7% >3 offers, and 11% no offers.

The majority of prospective fellows (69%) finalized their plans in their third year of residency, with 13% in the second year, 12% in the fourth year or later, and 6% before or during the first year. Of those who were offered fellowship positions, 80% accepted the offer and did not seek a job, while 11% accepted the offer and received no job offers, 7% accepted the fellowship and declined a job offer, and 2% accepted the offer but later took a job.

Most prospective fellows sought fellowship for long-term career interests (69%), while 27% thought it was required for employment, and 2% did so because the job they had wanted was not available after their residency.

Prospective fellows were most interested in the following fellowships:

- Surgical Pathology (34%)
- Gastrointestinal/Hepatic Pathology (25%)
- Hematopathology (32%)
- Dermatopathology (19%)
- Cytopathology (27%)

Fellowship Application Process. There has been much discussion about a perceived need among pathology department chairs, residency and fellowship program directors, and fellowship applicants for a uniform application process. In 2007, a majority of residents applying for fellowship (63%) thought there should be a uniform sign-up day, while 61% thought that there should not be a formal National Resident Matching Program-supported match day. This year that percentage went up, with 81% of 1,456 respondents indicating that there “should be a universally accepted fellowship application.” And 81% also indicated that there “should be a universally accepted timeline for fellowship applications.” Most respondents (73%) preferred to apply during PGY3, from October to December or July to September, and preferred to finalize fellowship plans during PGY3 (57%) or PGY4 (39%) during the first quarter (44%) or second quarter (24%).

Resident Participation in National Organizations. This year, a question about support for resident participation in national organizations was added to the survey. Of 2,510 respondents, 98% indicated that their residency program supports participation in national organizations, such as ASCP and CAP.

Dr. Bollinger is in residency training at the Orlando, Florida, Regional Medical Center and has been a member of the ASCP Resident Council for two years.
The United States is far from alone in seeking solutions to workforce shortages in the health sector. The World Health Organization (WHO) estimates that 57 countries worldwide are experiencing a critical shortage of health care workers, equivalent to a global deficit of about 4 million physicians, nurses, midwives, pharmacists, laboratory technicians, and other health care workers. The most severely affected region is Asia, where, according to WHO figures, 3 million of those 4 million health care workers will be needed to bridge the gap in care.

Thirty-six of these 57 grossly understaffed countries, defined by the WHO as having fewer than 2.3 health care professionals per 100,000 people, are in Africa. Zambia, for example, has approximately 650 physicians for 12 million people, while Malawi has only 265 for the same population. Other seriously affected regions include some Caribbean and South American nations, and the eastern Mediterranean.

The critical shortage of health care workers in sub-Saharan Africa or Southeast Asia not only causes suffering for thousands of people in some of the poorest countries in the world, but also could have just as devastating an impact on the United States and the rest of the world. Insufficient numbers of well-trained health professionals impede the abilities of the affected countries to contain diseases that could become global pandemics. Solving this crisis requires a determined and sustained commitment from governments, educators, international development partners and donors, local partners, and the public and private sectors.

Worker shortages have long been a problem in less developed countries, but the severity of those shortages went largely unnoticed until recently when the dramatic increase in spending on HIV/AIDS, tuberculosis, and malaria added significant new stress to health systems that were already overburdened. Subsequently, WHO, the Joint Learning Initiative on Human Resources for Health and Development, the Working Group on Global Health Partnerships for the Health Millennium Development Goals, the Joint United Nations Program on HIV/AIDS (UNAIDS), the Institute of Medicine (IOM), and others have begun to focus efforts on alleviating the critical shortage of health care personnel.

The reasons for these chronic shortages are numerous and complex. Low salaries are exacerbated by poor benefits, and delayed or even nonpayment of salary are common problems and primary causes for attrition. Difficult working conditions (inadequate facilities and lack of supplies, equipment, clean water, and electricity) accompanied by poor housing and living conditions seriously undermine recruitment and retention efforts.

Low pay and poor working and living conditions have resulted in geographic migration of health care workers, typically within countries or across borders, but the “brain drain” through international migration is a growing trend that threatens to increase as the aging populations in wealthier nations create an increased demand for health care workers.

Health care in poorer countries is a high-risk profession, because workers are vulnerable to infection and illness, and shortages of supplies and training create unsafe working conditions. In addition, health care workers, like the communities they serve, have also been hit hard by HIV/AIDS. In some high HIV-prevalent areas, AIDS is often the leading cause of attrition in health care workers.

Resource-limited countries experiencing critical shortages typically spend less than 10% of their national budgets on their national health systems, with distribution of resources usually skewed toward urban areas. In addition, dated restrictions on public spending imposed by international financial institutions have had the unintended consequence of limiting spending on health programs and hiring. Such policies have been eliminated in recent years as many African nations have pledged to increase health spending to at least 15%, and yet
only two or three countries are on the path to reach that goal. However, even if the health professions presented an attractive career choice and resources were available to attract and hire the needed health professionals, few countries, including the United States, have the capacity to train all the health professionals they need.

Among the health professions in short supply is laboratory medicine. ASCP is facilitating activities to strengthen existing laboratory training programs in countries experiencing a dire need of qualified laboratory technicians and technologists. This process involves a review of existing curricula to identify any gaps in training that may exist, the development of requested subject-specific materials for program enhancement, and extensive support during implementation. This strengthening initiative is the result of a collaborative effort among the in-country faculty and administrators and ASCP member consultants. The first such collaboration began in Tanzania last year.

ASCP recently facilitated Curriculum Review Workshops in Ethiopia, Kenya, and Rwanda. Nigeria and Cote d’Ivoire have also expressed interest in having ASCP’s expertise and support in evaluating and revising pre-service curricula for their training programs in laboratory medicine.

“The promise of this ASCP project lies in the sustainability of curriculum enhancement through faculty development, in-country technical assistance, and partnership with stakeholders over a minimum of 24 months,” said Wendy Arneson, MS, MT(ASCP), ASCP Pre-service Training Workgroup Chair.

ASCP's efforts to bolster training programs in developing nations support recommendations in the May 2008 report from the WHO Global Health Workforce Alliance, titled Scaling Up, Saving Lives. Drawing on examples from ten country case studies, the Alliance recommended that training programs utilize community-, competency- and team-based curricula that support country health priorities and disease burden, and become an integral part of health service delivery. Immediate practical activities such as training trainers, increasing the number of qualified faculty, and maximizing the use of facilities in order to reduce attrition of both teaching staff and students are cited as essential first steps. ASCP education and training activities are based on the country’s health plans and priorities with the appropriate balance between pre-service education and in-service training.

“With concerted action at the national, regional, and global levels, the global shortage of health workers could be a thing of the past,” said Dr. Mubashar Sheikh, Executive Director of the Global Health Workforce Alliance. “[This report shows us how] effective and comprehensive interventions can reverse the current reality. But we have no time to lose. We must all work together and act immediately.”

Ms. Bennett is ASCP Senior Program Manager for Membership and Public Policy in Washington, DC.
Pathology in Ghana

By Jason Heese, MD, FASCP

One year ago I knew next to nothing about Ghana, let alone pathology in Ghana or the rest of the world. All that changed with a few phone calls to Heinz R. Hoenecke, MD, FASCP, President of Pathologists Overseas, and Thomas D. Coppin, MD, the pathologist leading the current Ghana project. Having tried my hand at primary care in a short-term medical missionary capacity, I was excited to have found an organization and project that could use my skills and real love, surgical pathology. After speaking with Heinz and Tom, I thought participating in this two- to three-year-old project in the developing world with a bottom-up approach sounded like a worthy project to undertake.

Komfe Anokye Teaching Hospital (KATH) in Kumasi, Ghana, is a 1,000-bed teaching hospital in dire need of help in surgical pathology. For the past several years the department of histopathology has been without the guidance of a faculty pathologist; the majority of departmental duties have fallen on the shoulders of a couple of very devoted and capable residents. However, because of the demanding number of autopsies, the residents have been unable to devote much, if any, time to surgical pathology.

Previous pathologists involved in the project worked through an enormous backlog of cases and resolved some technical staining issues, to the point that on my arrival a fairly good routine had been established. One of the most amazing aspects of the work is the actual pathology material. Cases signed out during my brief two-week experience included embryonal rhabdomyosarcoma of the soft palate, high-grade sarcoma of the shoulder (probable monophasic synovial sarcoma), fibrous hamartoma of infancy, ovarian sclerosing stromal tumor, Wilms tumor, Burkitt’s lymphoma, and osteosarcoma of the jaw. For a small-town general pathologist, this was more than several lifetimes’ worth of interesting and challenging cases, all in the span of two weeks.

A working breast tumor board convenes Tuesday afternoons and again reminds me of the difference between medicine in the United States and in Ghana. While we chase ever smaller and smaller malignancies in the United States, the average breast cancer there was approximately 10 cm. A combination of factors appears to lead to this—high on the list is a lack of general health education and distrust or lack of understanding of what formal medicine can accomplish.

Another positive aspect of the project has been the support and help of the hospital administration. A well-appointed guesthouse has been provided; some meals are covered by the hospital; and a driver takes one to and from the hospital. With the help of foreign investment, a brand new, very impressive state-of-the-art pathology/mortuary building has been recently completed. The histopathology department should be moving in shortly, providing much needed relief from cramped space. Any volunteer pathologist will likely find these new facilities at least on par with and, in all likelihood, far exceeding their current work environment.

I count it a blessing to have spent part of my time at KATH with Dr. Hoenecke, a very humble and gracious man. The achievements of this man and Pathologists Overseas in helping set up surgical pathology services in the developing world are simply amazing. His efforts in Ghana in conjunction with the KATH administration and the ongoing presence of Pathologists Overseas volunteers have led to the hiring of a full-time Ghanaian pathologist for KATH. This will provide much needed leadership in the department and someone to set up the residency teaching curriculum.

On an equal par with the pathology experience was the cultural experience. The Ghanaian people were genuinely warm and friendly to me, the “Obruni” (white man). After a few days of adjustment, I felt perfectly comfortable walking the streets alone or trekking through the massive, rambling Kejetia Market. Other memories lasting a lifetime are attending local church services, visiting the West African coast and slave fort, St. George, walking through a jungle monkey reserve, and seeing a couple of well-run charitable organizations caring for homeless persons, orphans, and mentally handicapped persons.

Are you a pathologist with a desire and the heart to help a developing world pathology department get back on its feet? Do you have a sense of adventure and a willingness to engage a foreign culture and to put up with some minor inconveniences? If so, and if you will humble yourself, learn a few words of Twi (the local language), and go with an attitude that you can learn something from the people you serve, I have no doubt your experience will be similar to mine. For more information on the Ghana project and others, check out the Pathologists Overseas Web site at mypathology.org and give Dr. Coppin a call. It may just change your life.

Dr. Heese is a staff pathologist at St. Michael’s Hospital, Stevens Point, WI.
By Teri Yablonsky Stat, MA

Three medical technologists from Kenya recently studied for their gyn-certificate in cytology at Loma Linda University in California and have returned home to help screen women for cervical cancer. They now work at clinics established by Professionals Analyzing Pap Smears, Inc. (PAPS Team International), an independent nonprofit organization that sets up cervical and breast cancer screening clinics in developing countries.

Samwel Oyoo, Charles Asuga, and Charles Macharia were selected for the program based on their medical technology training and laboratory experience. All three worked as medical technologists in Kenya—Oyoo and Asuga in Baraton and Macharia at Embu Provincial General Hospital.

Oyoo and Asuga are now able to read Pap smear slides at the University of Eastern Africa, Baraton (UEAB). They verify their diagnoses with a pathologist who works 30 minutes away at Moi University in Eldoret. Macharia will work with an American-trained cytopathologist in a cervical and breast cancer clinic to be established in Embu, Kenya, in September 2008.

“It’s important that we trained for this certification because our people throughout Kenya are having difficulty getting the necessary screening for cervical cancer,” says Oyoo. “It was a privilege to train well and get skills and be able to help them. The people here have been wonderful, too.”

During the study program, the participants spent 10 hours a day in the classroom, reviewing slides, studying Kodachromes, and learning from a student informational CD, as well as receiving didactic instruction. They then went home to their dormitory to prepare further for end-of-the-week exams.

“The education system here in the United States is quite a bit different from what they are used to in Kenya, not to mention the specific manner in which cytology education is conducted on the campus of Loma Linda University,” said Mark A. Titus, MBA, SCT(ASCP), laboratory director for PAPS Team International. Screening cytology cases involves recognizing cell patterns, so this program involves using set criteria to diagnose those cytologic patterns.

Oyoo said the PAPS program is a wonderful team. “They have established a number of clinics in our country, and we believe we will be able to establish and keep the Baraton clinic running,” he said. “We need to expand and train as many health care workers as we can to screen for cervical cancer.”

All medical technologists in Kenya study the purpose of the Pap smear but do not screen Pap slides themselves.

Screening Pap smears has always been left to the pathologist. When training people for this field, there is a need to train two people from a single facility; this ensures they balance one another in diagnostic ability and accuracy.

“These men have acquired a skill that is critical to the success of cervical cancer screening in Kenya,” says Titus. “They will fill needed positions in each of their respective towns and help expand the web of cervical cancer screening that this organization has been pursuing for seven years.”

The PAPS team has made six outreach trips to Kenya to help train staff and set up cervical and breast cancer screening clinics. In 2006 they traveled to UEAB and trained doctors and nurses to perform Pap smears. This site was selected because of its qualified staff and excellent facilities for screening and diagnosing the surrounding population. UEAB has a nursing and laboratory science degree program that helps provide staff for cervical cancer screening programs.

The team also traveled to Kenya in 1999, 2001, 2003, 2004, 2005, and 2006, helping establish cervical cancer screening clinics in Tigoni and Nakuru and at Baraton University. The Baraton University site is a work in progress. While on site at these three locations, they screened approximately 3,800 women for cervical and breast disease. The Tigoni and Nakuru clinics continue to function today.

Ms. Stat is a freelance health writer in Northbrook, IL.

Supporting Organizations

PAPS Team International thanks the following organizations for their support:
- American Master Tech
- Fisher Healthcare
- Lab Safety Supply
- Loma Linda University Department of Pathology and Human Anatomy
- MarketLab
- Olympus
- Optical Calibration and Service
- Richard-Allan Scientific
- Sakura Fintek USA Inc.
- Santa Barbara Neighborhood Clinic
- Surgipath
- Thermo Electron Corp.
Life is full of surprises. No one is more sure of that than I am. A photographer since before choosing medicine, I always wondered how life might have turned out had I chosen a camera for a career instead of a microscope. Thirty years later I found out, when a vacation photo was published internationally. Encouraged by an e-mail acquaintance who was a photographer for Nikon, I decided to get serious about my craft. Serious turned out to be an understatement. Over the next two years, my images won international awards and I became a contributing photographer for Nikon and other industry clients. Juggling a pathology practice with international photo assignments proved exhausting, so I made the fateful decision to phase out of medicine. I haven't regretted the decision. For 30 years I helped patients using a microscope. Now I use a camera to touch people with my images. Both are rewarding.

Dr. Alberhasky last practiced anatomic and clinical pathology at Greenview Regional Hospital in Bowling Green, KY. He now runs his own photography company, IMAGEMA, in Atlanta. More samples of his work can be found on his Web site www.imagema.com. For his "Musings on Life with a Camera," see his blog at www.imagema.us. In his blog posting of June 29, 2008, he describes how he captured the dragonfly image.
Dragonfly
If there is a single topic likely to generate a lively discussion among laboratory professionals, it is critical values. Managing critical values in an effective, systematic, and timely way is a key element of patient care for the clinical laboratory. And yet there is a continual struggle with the best way to accomplish this task.

Historically, critical values can be traced back to an episode described by George D. Lundberg, MD, MASCP, in 1972, which resulted in a recommendation that laboratories report “panic values.” This concept was codified into federal legislation in the Clinical Laboratory Improvement Amendments of 1988, which directed laboratories to “immediately alert the individual or entity requesting the … test results when any test result indicates an imminently life-threatening condition, or panic or alert values.”

Subsequently, The Joint Commission developed Patient Safety Goals that included critical values. The 2008 Joint Commission National Patient Safety Goals state that institutions must “measure and assess, and if appropriate, take action to improve the timeliness of reporting, and the timeliness of receipt by the responsible licensed caregiver, of critical test results and values.”

Community standards for developing and maintaining critical values have remained elusive. However, several recent publications describe some potential guidelines. For example, it appears that multiple mechanisms are used by laboratories for identifying the analytes and the analyte ranges for a critical values list. Approximately one-third of laboratories use published literature sources, one-third consult with medical staff, and one-third use other sources such as internal studies or inter-laboratory recommendations. Surprisingly, at the time of this study, only 56% of laboratories had a written policy or procedure for critical values. This is probably because laboratories viewed panic values or critical values as something that historically they “just did,” not cognitive of the need to create a standard operating procedure. In addition, a set of “common critical analytes” was established from this survey (Table 1). Seventy-five percent or more of laboratories listed these analytes as present on their critical values list.

### Table 1. Common Critical Analytes

<table>
<thead>
<tr>
<th>Critical Values: &gt;75% of Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potassium</td>
</tr>
<tr>
<td>Sodium</td>
</tr>
<tr>
<td>Calcium</td>
</tr>
<tr>
<td>Platelets</td>
</tr>
<tr>
<td>Hemoglobin/hematocrit</td>
</tr>
<tr>
<td>Glucose</td>
</tr>
<tr>
<td>aPTT</td>
</tr>
<tr>
<td>PT/INR</td>
</tr>
<tr>
<td>WBC</td>
</tr>
<tr>
<td>Bilirubin</td>
</tr>
<tr>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>Magnesium</td>
</tr>
</tbody>
</table>

### Table 2. Additional Critical Analytes

<table>
<thead>
<tr>
<th>Critical Values: &gt;50% and &lt;75% of Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithium</td>
</tr>
<tr>
<td>Gram stain</td>
</tr>
<tr>
<td>Fibrinogen</td>
</tr>
<tr>
<td>Phosphorus</td>
</tr>
<tr>
<td>Blood gGases (pH, pCO2, pO2)</td>
</tr>
<tr>
<td>Creatinine</td>
</tr>
</tbody>
</table>
An additional set of analytes was reported by 50% or more laboratories, including blood gas analytes (Table 2). Another finding was that 27% of laboratories allowed reporting of critical results to clerical staff or someone other than a licensed and credentialed health care professional.

Few laboratories admit to it, but there are occurrences of “dropped calls” when calling critical results. A second survey determined that dropped calls represented 0.1–0.3% of all critical result calls and that more dropped calls occurred in laboratories that allowed critical value reporting to non-healthcare professionals.4 In addition, it was noted that laboratories that had a quality monitor for critical result calls, especially when they monitored quality for more than one year, improved their overall performance. Apparently it is true that when laboratories continuously watch their own performance, the quality of work improves.

An important aspect of making critical value calls is the time it takes to notify a responsible health care provider. The Joint Commission recently emphasized this aspect by requesting turnaround times for critical value notifications, especially to a responsible licensed health care provider.

A third study, examining only inpatient and emergency room critical value notifications, demonstrated that the median time from completion of a test to reporting and contacting someone with the critical result was 4 minutes.5 The measurement of the time interval between receipt by an unlicensed person to receipt by a responsible licensed caregiver was more difficult to define. In a review of a more limited number of reporting laboratories, 39% reported such results to a registered nurse and 34% reported the results to a physician or physician's assistant. A larger proportion did not successfully record notification, and the time interval was variable, with a time from specimen collection to licensed caregiver of 143 minutes at the 10th percentile.

In addition, The Joint Commission is monitoring the turnaround time for critical tests. How is a critical test different from a critical value? A good question. One possible way to define a critical test is as a stat test—a test the physician has a clear need for in terms of immediate care decisions. Other institutions, however, have defined a critical test as a different set of tests. Consider what is “critical” to the physicians and to the patient mix in determining how to evaluate this test category.

Many laboratories are more definitively distinguishing a result category of “urgent findings” or “significant findings.” Results such as a positive acid-fast smear or unexpected neoplasia in a tissue may fall into this category. These kinds of results may be defined in such a way as to provide results more directly to physicians, perhaps by phone within 24 hours or on the next business day—not in the middle of the night.

Critical values have come a long way since 1972. More is known about how other laboratories create their critical value lists and the importance of having a written procedure. Also, “watched behavior” improves quality. Creating and maintaining a quality monitor for critical result notification can improve a laboratory’s performance. As new metrics and definitions are developed, pathologists need to constantly review their operations and determine always what is best for their physicians and patients.

Dr. Wagar is Clinical Professor and Laboratory Director, UCLA Clinical Laboratories, Los Angeles. This article is based on Dr. Wagar’s presentation at an AACC audioconference, “Improving the Reporting of Critical Results II: Building Proactive Post-test Communications,” conducted June 10, 2008.

References
5. Valenstein, P, Wagar, EA, Stankovic AK, Walsh M, Schneider, F. Notification of critical results: a College of American Pathologists Q-Tracks study of 121 institutions.” Arch Pathol Lab Med. in press.