

Addressing the Clinical Laboratory Workforce Shortage



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Background

Laboratory medicine is a vital component of today's complex healthcare system, providing users with essential information for the prevention, diagnosis, treatment and management of health and disease. According to the Institute of Medicine, collaboration between physicians, nurses, patients and laboratory medicine professionals can help reduce the current trend in diagnostic errors and potentially prevent unnecessary deaths.¹ Medical laboratory professionals provide a vast amount of cost-effective objective information used in clinical decision making. Including credentialed medical laboratory professionals as a vital partner on the clinical care team brings laboratory expertise in test selection and interpretation, and can reduce diagnostic errors by avoiding unnecessary or inappropriate testing and incorrect test interpretation. In addition, now that many patients have access to online portals to obtain timely results of their medical tests, most do not receive enough information to help them understand their test results.² As a service, the ASCLS Consumer Response Team interprets laboratory test results for patients, health care providers and the general public who ask questions through the LabTestsOnLine website. This valuable patient advocacy role emphasizes the need for medical laboratory professional expertise on the clinical care team.

Medical laboratory professionals have been described by various terms, and sometimes placed into one broad category, regardless of education and credentials. This makes research into the data on workforce shortages more difficult, as some organizations such as the U. S. Department of Labor, Bureau of Labor Statistics still use outdated terms. Professionals once called clinical or medical technologists and technicians should be referred to as medical laboratory scientists (MLS) and medical laboratory technicians (MLT), working in the practice field of clinical laboratory science.

According to information posted on the Bureau of Labor Statistics (BLS) website, there were 335,700 medical and clinical laboratory technologists and technicians employed in the United States in 2016. This is an estimate, because without licensure, a firm number of practicing laboratory professionals is not available. This general grouping of laboratory personnel includes generalist technologists and technicians, specialists with roles in immunohematology, clinical chemistry, hematology, immunology, microbiology, and molecular biology, and cytotechnologists, histotechnologists and histotechnicians. The BLS projects a nationwide need for a 13% average increase in medical laboratory technologists and technicians between 2016 and 2026, which is nearly double the underlying average increase in all occupations of 7%.³ Another data source, the US Department of Health and Human Services, Human Resources and Service Administration (HRSA), projects a substantial increase in demand/growth for medical and clinical laboratory technologists and technicians between 2012 and 2025 of 22%.⁴

In addition to this projected demand for additional laboratory professionals, laboratory managers continue to report high vacancy rates. The average vacancy rate is 7.2% for the 17 laboratory departments identified in the 2016-2017 ASCP vacancy survey. These vacancies are felt across the nation, with the Northeast region reporting the highest overall vacancy rate (9.4%) compared with the other regions; the South-Central Atlantic had the lowest vacancy rate (6.3%).⁵

The VA Office of Inspector General (OIG) conducted its fourth determination of Veterans Health Administration (VHA) occupations with the largest staffing shortages, and once again the Medical Technologist job code ranked as one of the largest critical needs occupations. Many VHA facilities are no longer hiring Medical Technicians due to the challenges of hiring under the current position description and compensation. The VHA has not been able to increase the net onboarding of Medical Technologists in the past year, although the absolute numbers of staff in the other four critical need occupations has increased.⁶

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With the projected increases in the need for medical laboratory professionals, and the current high vacancy rates, the profession is suffering from a workforce shortage that is approaching crisis levels for medical laboratory technicians, medical laboratory scientists, histotechnicians and histotechnologists.

Reasons for the Shortage

Several factors impact the clinical laboratory workforce shortage. These factors include, but are not limited to:

- The retirement of the aging workforce
- An increase in demand for laboratory services
- Changes in the practice of clinical laboratory science due to technology advances; and
- Vacancy rates that exceed the number of MLS and MLT graduates

Clinical laboratories are feeling the impact of the aging workforce, as experienced professionals who had delayed retirement due to economic uncertainties are now retiring, or planning to retire in the next five years, in greater numbers. For the 17 laboratory departments identified in the 2016-2017 ASCP vacancy survey, the average expected five-year overall retirement rate for all departments was 19.4%. Retirement is also impacting educational programs. In a survey of program directors for clinical laboratory science education⁷, 41.2% of the programs that responded indicated their Program Director would be retiring in the next five years. Other types of faculty retirement rates include 37% of Professors, 31.7% of Associate Professors, 15.2% of Assistant Professors, 30.7% of Instructors, 20% of Teaching Specialists, 35.9% of Preceptors and 30.3% of Lecturers.

The demand for laboratory services is increasing due to population growth, an increase in the population aged 65 or older, and expanding molecular and esoteric tests. Expanded Medicaid coverage and an increase in primary care visits due to population growth have caused an increase in acute, chronic, and preventive primary care services.⁸ A rapid and significant increase in the aging population over 65 years of age, projected over 18 million in the 10 year span 2015 – 2025⁹, will also increase the demand for services¹⁰, including an increase in chronic disease management. With a shift towards personalized medicine and greater interests in genomics and proteomics, the market for molecular and other esoteric testing continues to grow. The National Center for Biotechnology Information’s Genetic Testing Registry lists more than 54,000 genetic tests related to over 11,000 conditions. These numbers have risen approximately 300% and 200% respectively over the past five years.¹¹

It is difficult to determine the exact number of laboratory tests that are currently available for clinical use in the U.S. Large independent laboratories like Mayo Medical Laboratories report the availability of over 3,000 tests and pathology services.¹² Technological advances can increase efficiencies and potentially reduce staffing levels. Some of the large volume testing is now performed with fewer staff using high-throughput automated systems. This can shift the need from MLS’s to technicians to perform routine testing, allowing more highly trained MLS’s to focus on verifying out-of-range results, performing more specialized testing, and providing consultative services. However, other major advances in sophisticated technology and techniques require specialized knowledge and a greater skill set for those that perform and interpret new and evolving methods used for diagnosis and management of disease. This includes advanced molecular and genetic testing which is increasing rapidly in use. Of the laboratories surveyed by CMS, 6 of the top 10 cited deficiencies were associated with personnel qualification requirements for individuals working in laboratories performing moderate or high complexity testing.¹³ Moreover, the dramatic increase in point-of-care testing has increased the need for regulatory compliance and over-

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sight responsibilities of laboratory staff, as testing is performed outside of the laboratory by nurses and other non-laboratory personnel.⁶ These oversight responsibilities in both personalized medicine testing and point-of-care testing have the effect of reducing technologic gains in efficiency.

Vacancy rates are the reflection of difficulties in recruiting new professionals and retaining current staff. Efforts to improve recruitment include signing bonuses, loan forgiveness, tuition reimbursement, and other incentives. These are not permanent solutions, and with reductions in laboratory reimbursements, may not be fiscally feasible. The clinical laboratory professional is limited in career mobility, as it can be challenging to advance in the laboratory without taking on management or other non-testing responsibilities. In addition, the clinical laboratory is a high stress environment, and there is little wage equivalency with other similarly educated healthcare professions. This can lead to retention challenges as these well-trained professionals leave the clinical laboratory environment for positions in other areas of the facility (e.g. information technology, process improvement, quality management or biosafety), take positions as technical specialists or analyzer maintenance and repair staff for laboratory vendors, or return to school to advance to another healthcare profession, such as physician assistant.¹⁴

Although U.S. institutions are becoming more efficient in training medical laboratory scientists and technicians, the enrollment and graduation of medical laboratory professionals is not keeping up with the rapidly rising demand⁸, as the profession is educating less than half of the number of laboratory professionals needed. Constant threats of closure for MLS and MLT programs due to scrutiny from college and university leaders making financial decisions puts programs in jeopardy, primarily due to the high costs associated with operating these academic programs. In 2000, there were 263 MLS programs and 248 MLT programs¹⁵, graduating 2333 and 2469 graduates, respectively¹⁵. In 2017, there were fewer accredited MLS (234) and MLT (244) programs¹⁶, but higher numbers of MLS (3932) and MLT (2886) graduates in 2016.¹⁷ This is a decrease of 6.5% in total accredited programs from 2000, but an increase in total graduates of 42.0%.

That increase in total graduates is reflected in the steady increase in individuals certified through the ASCP Board of Certification (ASCP BOC). Between 2000 and 2017, the annual number of MLT certificates issued grew from 1,370 to 2,484 (81% growth) and MLS certificates grew from 1,990 to 3,619 (82% growth). However, a significant number of MLS certificates are issued to MLT certificate holders who are advancing their careers, which mitigates the impact on laboratory workforce growth.

According to data obtained from the ASCP BOC,¹⁸ between 2013 and 2017, 2,607 MLT became MLS, an average of 521 per year. This pathway represents, on average, 14% of the newly certified MLS per year. This particular group adds to the total number of MLS laboratory personnel when they become certified, however, because they were already MLT, they do not add to the total number in the pool of laboratory technologists and technicians.

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Between the increased need for additional laboratory professionals, the medical laboratory scientists and technicians needed to replace those exiting the workforce, the increased demand for services, and changes in clinical laboratory practice, there is a total demand that exceeds current educational output by more than double. It appears that the laboratory workforce shortages will be present for the foreseeable future unless the profession moves to improve these outcomes.

Impact of Workforce Shortage on Clinical Laboratory Settings

The workforce shortage has made career prospects excellent for medical and clinical laboratory technologists and technicians who complete an accredited education program and earn professional certification.³ However, for hiring managers, recruitment is challenging. The top challenges in laboratory recruitment cited by managers are better pay offers from other employers (47.2%), increasing competition for well-trained personnel (41.9%), and applicants' lack of education and skills to perform the work (37.3%).⁶ Stated reasons for difficulty in retaining laboratory personnel are insufficient job classifications and a lack of a clearly defined career ladder. The lack of funding for continuing education, advanced education, and tuition reimbursement also affects recruitment and retention. Currently, only 39.6% of employers pay for continuing education and only 38.9% for advanced education.¹⁹

When recruitment and retention efforts fall short, vacancies lead to employee stress and burnout. When vacancies occur, in order to cover the 24/7 schedules required in hospital settings, staff must extend working hours to double shifts and overtime^{6,20}, and expand their duties and responsibilities to meet laboratory and patient needs. These expanded duties can include cross-training in other disciplines within the laboratory to provide more flexibility and improve efficiency, or taking on additional responsibilities such as overseeing safety, quality improvement or training programs. Although cross-trained staff may feel more valued, cross-training to fill vacancies has the potential to dilute in-depth core knowledge and expertise necessary for solving complex issues. The shortage of medical laboratory professionals has largely gone unnoticed outside of the field. It is likely the full impact has not yet been felt, as medical laboratory professionals will continue to do what is necessary to provide quality results, at the expense of their work/life balance.

Technological advances have significantly improved diagnostic capability through improved detection and faster results, increased preventive screening, and improved therapeutic regimens based on an individual's genome. This specialized testing, previously sent to referral laboratories, can now be performed in hospital-based laboratories resulting in significant improvements in patient care, reduced lengths of stay, and better patient outcomes. However, these advances require new skill sets. Recruitment and retention of medical laboratory professionals can be enhanced as roles on clinical care teams are expanded to provide consultative services and ensure tests are ordered appropriately and interpreted correctly. Being a member of a clinical care team can improve job satisfaction and professional acknowledgment by healthcare peers.

Impact of Workforce Shortage on Patient Care and Access

Even with the best quality management systems in place, quality results are difficult to ensure with inadequately trained staff, frequent turnover, and scheduling problems. Despite the workforce shortage, laboratories must ensure patient care and access to quality healthcare services. Facilities unable to hire permanent staff have filled vacancies with traveler MLS and MLTs provided by nationwide healthcare staffing companies. The disadvantage with traveling laboratory personnel is that they are employed under short-term renewable contracts and are trained on immediate needs. They rarely can contribute to all areas of need within the laboratory. Small, rural labs may be staffed by a majority of travelers, which creates a constant time-intensive training situation and impacts the consistency of protocols and procedures. This costly temporary situation does not alleviate the need for a permanent solution.

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In states without licensure, where certification is not a requirement, laboratories may hire staff with bachelor's degrees in biology or chemistry, but no clinical laboratory experience, and provide on-the-job training. No other healthcare profession trains on-the-job, as clinical experience through an internship or residency is essential for meeting professional standards. This practice may reduce the quality of laboratory results, as completion of a formal clinical laboratory science program has been cited as an important contributor to producing quality laboratory results.²¹ The lack of adequately trained staff can impact patient wait times, the availability of laboratory services, and pose a potential threat to the safety and quality of health care.²² Hiring managers should look to medical laboratory certification as the benchmark for appropriately educated and adequately trained staff.

Impact of Workforce Shortage on Educational Facilities

Although educational facilities have increased the number of MLS and MLT graduates, the demand still exceeds the supply. The lack of visibility of the profession and salaries that are not comparable with the education level of other healthcare fields hamper the recruitment of students into MLT and MLS programs. While many college science students might be candidates for the profession, many fail to enter the profession merely because they were unaware of it.²³ Students graduating with bachelor's degrees in biology and chemistry may not be aware of the 4 + 1 option offered by many schools to obtain the education and training needed for credentialing. High school and middle school students are also unaware of the clinical laboratory science practice field. Clinical laboratory science is not currently included in STEM programs, which must be rectified so that grant funding opportunities are available to our profession. Recruitment efforts will be enhanced if we improve the visibility of the profession, promote recognition, and showcase the medical laboratory profession as a vital and promising health care career, with many opportunities. This effort should begin early in the educational process, potentially as soon as middle school, and in cooperation with STEM programs, to bring awareness of the profession to students as well as K-12 educators.²⁴

Beyond financial and geographical barriers for didactic courses and the growing shortage of educators, the biggest challenge affecting enrollment and graduation rates of medical laboratory professionals is securing available clinical sites for the student practicum experience. Many hospital laboratory managers with workforce vacancies have refused to take on student interns due to limited capacity and burn out of staff.²⁵ Because the clinical laboratory experience is an essential part of the training of a laboratory professional, non-traditional approaches to expand clinical laboratory training, such as off-shift internship opportunities as well as virtual or simulation laboratory training have been suggested as means to solve limited clinical training opportunities. Categorical certifications is another approach to dealing with the lack of clinical internship sites and warrants further discussion among the profession. With the consolidation of microbiology and immunohematology into core laboratories, there are fewer clinical training sites available for these disciplines, and there may be value in training and certification in all areas except microbiology and immunohematology. Due to the limited number of available clinical training sites, it is imperative that all available clinical placements are filled across the nation through some type of national matching program, to maximize the number of students that accredited programs are training and graduating.

To meet the demands of our complex healthcare system, in addition to educating medical laboratory scientists and technicians, institutions offer advanced degrees, and are beginning to offer a Doctorate in Clinical Laboratory Science (DCLS). There are currently two institutions offering the DCLS degree with more institutions in the planning stages. This practice change also impacts the shortage of clinical laboratory science educators as there

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will be an increased need for doctorate level educators to educate at this level. Educational facilities are actively recruiting and efficiently training students to prepare them for the changing clinical laboratory environment, but there is much more to be accomplished to meet the demands of the workforce shortage.

ASCLS Position Statements

- ASCLS believes that we will only be able to address the critical workforce shortage of medical laboratory professionals with a coordinated commitment from all stakeholders to include laboratory and medical professional organizations, clinical laboratory and hospital administrations, educational institutions, the laboratory industry, and federal and state government agencies.
- ASCLS supports the need for a congressional study through the U.S. Government Accountability Office to identify the nature of the ongoing workforce shortage in clinical laboratories and the impact on the healthcare system and offer solutions.
- ASCLS supports the expansion of Title VII Authorization, which federally funds education for healthcare professions, to specifically include clinical laboratory science.
- ASCLS supports the continued efforts of the Coordinating Council for the Clinical Laboratory Workforce (CCCLW) in their mission to address the workforce shortage.
- ASCLS supports the CLIAC recommendation that the HHS Secretary issue a recommendation to the US Department of Education to include laboratory science professions in STEM programming so that grant funding opportunities can be made available to our profession.
- ASCLS supports engaging in outreach opportunities that promote the clinical laboratory science profession within middle and high schools, including guidance counselors and science teachers, and partnering with STEM education activities.
- ASCLS supports efforts to improve the visibility of the profession, promote recognition, and showcase the medical laboratory profession as a vital and promising health care career.
- ASCLS believes that clinical laboratory training is an essential part of educating medical laboratory professionals, and innovative ways to provide this clinical laboratory experience should be explored.
- ASCLS supports establishing an electronic clearinghouse for programs to advertise unexpected vacancies in MLS and MLT clinical laboratory training sites.
- ASCLS believes that medical laboratory certification is the benchmark for appropriately educated and adequately trained staff.
- ASCLS encourages members in the profession to undertake research studies, surveys, and to look more closely at existing data to publish information about the state of the laboratory profession, including workforce challenges, patient safety, quality, and the impact of the profession on healthcare.
- ASCLS supports the promotion of the consulting role of laboratory professionals as an integral part of the clinical care team to patients, health care administrators, providers, educators, policy makers, and the public at large.
- ASCLS supports the promotion of the DCLS in addressing gaps in the patient care continuum.
- ASCLS supports the promotion of a career ladder for staff recruitment and retention, as outlined in the ASCLS Model Career Ladder position paper, 2004.

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