

# Clinical Laboratory Workforce: Who Are They?



## ROLES, EDUCATION/TRAINING AND CERTIFICATION

The six occupations investigated in this study cover a variety of roles and require a wide range of education and training. The various, typical post-secondary educational pathways for these occupations are detailed in Figure 1.

### Phlebotomists

Phlebotomy technicians, also known as phlebotomists, are the laboratory professionals with the most frequent patient interactions and are responsible for collecting, transporting, and processing blood and other specimens to be analyzed in the laboratory. They can work in a blood donor center collecting blood products for transfusion, performing health history screenings, and preparing blood products for the blood bank. Phlebotomists can enter the occupation with less than a year of education that results in a post-secondary certificate, or in some cases, through on-the-job training. Phlebotomists may be certified through several organizations (i.e., ASCP Board of Certification (BOC), American Medical Technologists, National Healthcareer Association, National Center for Competency Testing). Phlebotomists may receive

certification from ASCP BOC to become a phlebotomy technician or a donor phlebotomy technician, with the main distinction between roles being work location and purpose of blood collection.

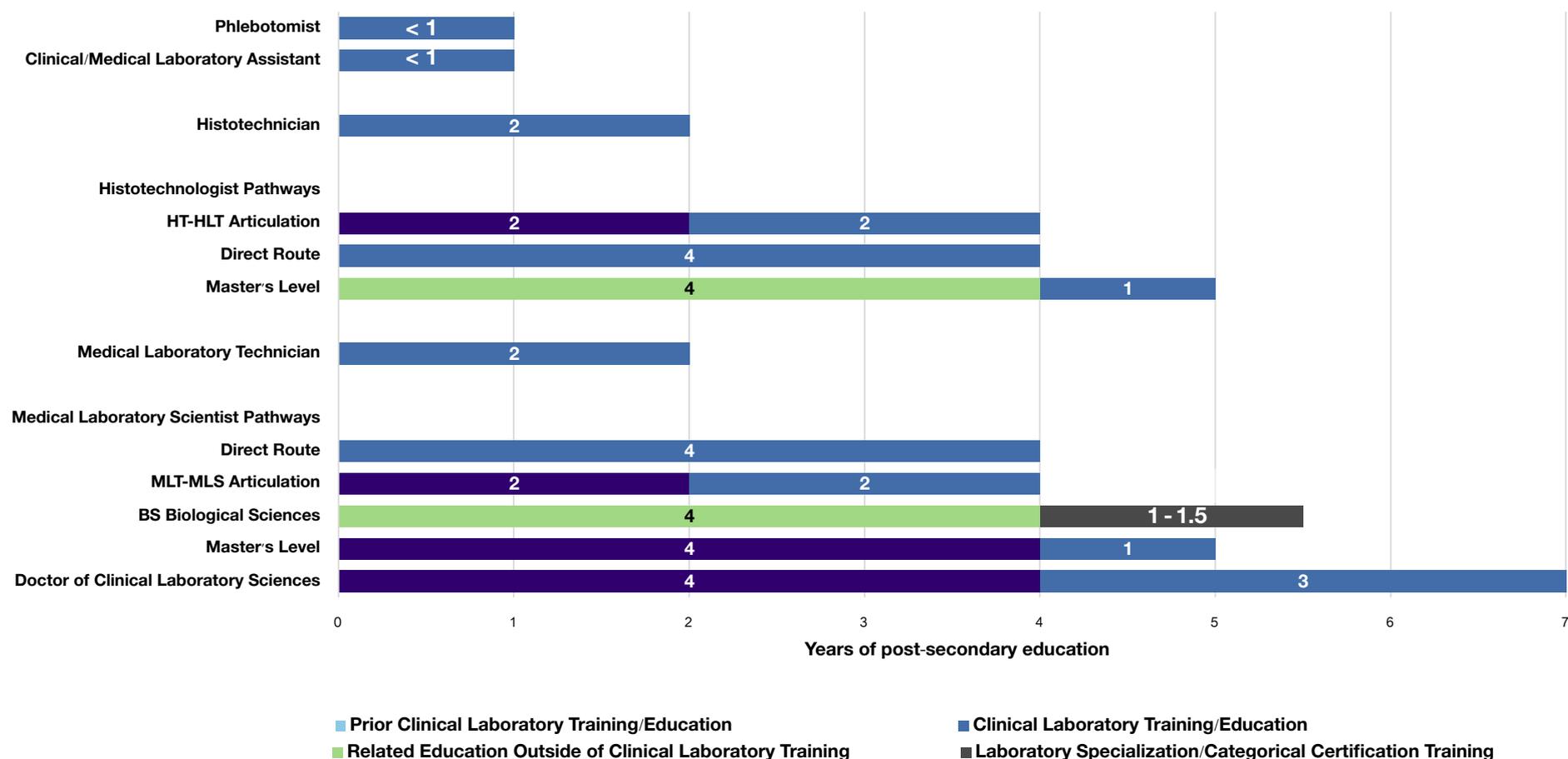
### Medical Laboratory Assistants (MLA)

Medical lab assistants play diverse roles assisting other laboratory personnel and medical providers in phlebotomy, specimen processing, quality control, and laboratory orientation and regulation.<sup>12</sup> MLAs are responsible for preparing biological specimens, recording information, performing waived and point of care testing, and performing lab maintenance tasks such as cleaning equipment and stocking supplies.<sup>13</sup> To enter this occupation, medical lab assistants typically complete a one year post-secondary certificate program, but may fulfill the necessary requirements through on-the-job training without obtaining a certificate from an academic program or certification by ASCP BOC.

### Histotechnicians

Histotechnicians or histology technicians prepare and process tissue samples for routine histologic techniques for examination under the microscope by pathologists.<sup>14-15</sup> Histotechnicians may be certified

**Figure 1. Typical Years of Post-Secondary Education or Training Required for Select Clinical Laboratory Occupations**



Data sources: National Society for Histotechnology. What is Histotechnology? About Histotechnology. Published n.d. Accessed March 11, 2021. <https://www.nsh.org/about/about-histotechnology/>; Lab Tests Online. Medical Laboratory Professionals: Who's Who in the Lab. Published January 26, 2021. Accessed March 11, 2021. <https://labtestsonline.org/articles/medical-laboratory-professionals> Coordinating Council on the Clinical Laboratory Workforce. Explore These in Demand Laboratory Science Careers. Laboratory Science Careers. Published n.d. Accessed March 11, 2021. <https://www.laboratorysciencecareers.com/careers-in-laboratory-science.html>; Nadder TS. The Development of the Doctorate in Clinical Laboratory Science in the U.S. EJIFCC. 2013;24(1):37-42. Published 2013 Apr 12.



through ASCP BOC. To qualify for the certification exam, histotechnicians can either attend an accredited program or they can train on-the-job, following completion of a two-year associate degree that includes chemistry, biology, and mathematics credits.<sup>16</sup>

## Histotechnologists

Like histotechnicians, histotechnologists are trained in the preparation and processing of tissue samples. They perform routine and complex histologic techniques (i.e., immunohistochemistry, in-situ hybridization, immunofluorescence) for microscopic review by a pathologist to diagnose disease. A histotechnologist may supervise a histotechnicians' work. Becoming a histotechnologist requires obtaining a bachelor's degree from an accredited program or through on-the-job training.<sup>16</sup> Transitioning from the two-year associate degree, a histotechnician may seek histotechnologist certification, which is an advanced certification that allows the holder to perform high-complexity testing. There are four-year programs that combine Bachelor of Science (BS) degree in clinical chemistry or biology with a histotechnology specialization, post-baccalaureate certificates in histology, and Master of Science (MS) degree programs in clinical chemistry or biology with a histotechnology specialization.<sup>17</sup> Advancement is also possible into areas such as education, test development, quality assurance, and management.<sup>18</sup> Histotechnologists may be certified through ASCP BOC.

### *Master's in histotechnology*

Few programs in the U.S. offer a post-baccalaureate degree in histotechnology. These programs are often one-year master's degree programs available to individuals with a bachelor's degree in biological or allied health science.<sup>19</sup> These individuals are prepared to enter the workforce with the same skills and knowledge to perform high-complexity testing as histotechnologists with a four-year degree.

## Medical Laboratory Technician (MLT)

Medical laboratory technicians work with phlebotomists, MLAs and MLSs to perform routine, large volume testing: the collection, processing, and analysis of biological specimens; the performance of lab procedures; the maintenance of instruments; and relating lab findings to common diseases/conditions.<sup>20</sup> Prospective medical laboratory technicians typically must complete at least a two-year associate degree program.<sup>15</sup> Most associate degree programs can be completed in two academic years, but fast-track certificate programs are available to those who already have training or professional background in a related healthcare field, such as nursing or phlebotomy.<sup>20-21</sup> Medical laboratory technicians may be certified through ASCP BOC, with some states requiring licensure.

## Medical Laboratory Scientists (MLS)

Medical laboratory scientists (also referred to as medical laboratory technologists in SOC codes by the Bureau of Labor Statistics and CIP codes by IPEDS)<sup>a</sup> have extensive knowledge and skills in the laboratory field which includes the areas of blood banking, clinical chemistry, hematology, immunology, microbiology, and molecular biology. They not only perform sophisticated analyses and laboratory procedures, but also evaluate the results, integrate data, problem solve, consult, conduct research, and develop new test methods.<sup>20</sup> Medical laboratory scientists may also assume quality assurance or quality control roles and may supervise other laboratory personnel. These professionals often have a bachelor's degree in medical laboratory sciences and may be certified through the ASCP BOC. Professionals with a bachelor's degree in biological or chemical sciences with additional training and/or on-the-job experience may also become certified through the ASCP BOC as a medical laboratory scientist or a technologist in an area of the clinical laboratory (i.e., Blood Banking, Chemistry, Cytogenetics, Hematology, Microbiology or Molecular Biology). Because not all states require medical laboratory scientist licensure, employers often do not require individuals to be credentialed or certified in their field. In ASCP's 2018 Vacancy Survey, most medical laboratory scientist respondents reported preferring a credential or certification for employment across these occupations.<sup>5</sup> Medical laboratory scientists may be certified through ASCP BOC.

### *MLT to MLS Articulation*

Individuals who have completed a NAACLS-accredited medical laboratory technician program may be eligible to obtain a bachelor's degree in medical laboratory science, from some programs, without repeating courses common to both degrees.<sup>20</sup> Portions of the curriculum and clinical practicum may be waived in areas where proficiency has been demonstrated.

### *Advanced Degrees in Medical Laboratory Science*

For those with a bachelor's degree in medical laboratory science, opportunities to earn a master's or doctoral degree in the clinical laboratory field are increasing. Master's programs emphasize core laboratory subjects such as clinical chemistry or microbiology, while also focusing on research, leadership development, and management skills.<sup>22</sup> The Doctorate of Clinical Laboratory Science is a 3-year post-baccalaureate program for those with a bachelor's of science in medical laboratory science that focuses on patient care management, education, applications of research, health care policy development, and health care services delivery and access.<sup>23</sup> The doctor of clinical laboratory science will be equipped to provide input to medical providers during rounds and provide quality assurance and control in point of care testing, serving a critical role as intermediary between medical providers and the clinical laboratory.

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a There is a disconnect noted by professional organizations representing the clinical laboratory workforce between the federal standardized occupation codes and job titles and requirements and what is recognized by the field. The ASCP Board of Certification and the American Society for Clinical Laboratory Sciences propose making "medical laboratory scientist" the standardized job title for all who have graduated with a bachelor's degree and have successfully met the requirements of a national certification program. Source: [www.ascp.org/boc/standardize-professional-title-of-MLS](http://www.ascp.org/boc/standardize-professional-title-of-MLS)





Individuals in clinical laboratory occupations with MLS degrees, and related bachelor's or graduate degrees not in laboratory sciences (such as master's degree in public health, business administration, education, or public administration), may seek certification or specialization in laboratory sciences in categorical areas (i.e., blood banking, chemistry, hematology, microbiology, molecular biology, or cytogenetics).

### Accreditation and Certification Organizations

NAACLS<sup>a</sup> is the main accrediting organization for academic programs in the clinical laboratory sciences. The Commission on Accreditation of Allied Health Education Programs accredits programs for specialists in blood banking and cytotechnology programs. In 1977, the National Certification Agency for Medical Laboratory Personnel (NCA) was formed as an independent certification body for individual laboratory personnel. In 2009, the NCA and the American Society for Clinical Pathology (ASCP) Board of Registry unified to become a single certification agency, now known as the ASCP Board of Certification (BOC).<sup>24</sup> Certification for recent entrants to these professions is recommended by academic

programs and accreditors, employers, and professional associations, but may not be required in some states or by some employers for licensure purposes.

Individuals who received formal education in clinical laboratory sciences, on-the-job training in clinical laboratories (anyone from phlebotomists to medical laboratory scientists), or individuals with relevant backgrounds in biological sciences (including those with bachelors to doctoral degrees in biology, chemistry, epidemiology, or medical degrees) may be eligible to seek certification in a laboratory field. The ASCP BOC offers certifications in the clinical laboratory areas of blood banking, clinical chemistry, cytometry, hematology, microbiology or molecular biology, and the anatomic laboratory areas of histology and cytotechnology.

There are other laboratory personnel not specifically described by this study, often filling roles within specialty laboratories (i.e., cytology, cytogenetics, pathologists' assistant). These personnel are often at the medical laboratory scientist level and are often certified in the specializations listed above

a For more information about NAACLS, see: <https://www.naacls.org/about.aspx>.

Use the QR code to the right to find the right academic program for you in the medical laboratory sciences

