



The Impending Crisis

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When you are ill and consult a physician for his or her expertise, many times laboratory testing is part of the clinical workup. This testing is critical to the physician's ability to diagnose the patient's condition. What if testing was not available ... because there was no one to do the testing? Although seemingly far-fetched, this scenario could play itself out in the next ten years due to an impending manpower crisis in laboratory medicine. The profession of Medical Technology, also known as Clinical Laboratory Science, is experiencing a shortage of qualified individuals for a variety of reasons – not the least of which is the closure of almost 70% of the schools teaching this critical profession. Health care workers (HCW) rely on accurate and timely clinical laboratory results in order to make decisions for their patients. Because ~ 70% of patient care decisions are based on clinical laboratory results, it is important to have a well-trained supply of laboratory professionals. This article will give an overview of the situation and the possible causes of this shortage, and pose challenges to our profession as to how this crisis can be averted. Visibility of this profession must be a prime focus of this effort in order for the population in general to be aware of the role Clinical Laboratory Scientists play in the health care consortium. This effort should begin early in the educational process, potentially as early as Middle School (junior high school), bringing awareness of the profession not only to students but to educators as well.

PERSPECTIVE

Imagine going to your doctor for a routine checkup and the phlebotomist takes a few specimens for lab work. Nothing fancy – just basic testing for things like glucose level, cholesterol and some additional blood work. Three days later, the doctor's office calls you and asks you to come back because they need to get a few specimens for testing. Wondering if something is terribly wrong, you ask "why?" since you already gave specimens just a few days ago. The person on the phone assures you that nothing is wrong. The clinical laboratory that received your specimens did not have enough Medical Technologists to test your specimens upon arrival, and now they are out of stability (too old to test).

Does this sound unbelievable? This scenario may be a little melodramatic but across the U.S. in hospitals, clinics, commercial laboratories and doctors' offices, the clinical laboratories are experiencing a severe shortage of Medical Technologists (MT), also referred to as Clinical Laboratory Scientists (CLS), and Medical Laboratory Technicians (MLT), also referred to as Clinical Laboratory Technicians (CLT). Laura Landro, in an article entitled "Staff Shortages in Labs May Put Patients at Risk" (May 13, 2009, *The Informed Patient*, Wall Street Journal), stated that the swine flu outbreak focused a spotlight on

a looming risk for hospitals and their patients (... "a shortage of technicians to run critical lab tests"). She cited an event at Vanderbilt University Hospital's lab where staffers were pulled from other parts of the hospital and "technicians" were asked to work double shifts to test incoming patients for swine flu. She also quoted Dr. Michael Laposata, the chief pathologist, as saying that in the event of a major infectious disease outbreak, labs at smaller hospitals around the country "would never have enough expertise or resources to mount a response. This is a major patient-safety issue, right behind taking out the wrong kidney or giving 10 times the dose of a drug."

As of 2010, patient care is not in jeopardy, but who knows what the future might bring.

We should begin by explaining who these laboratory professionals are. What is a MT/CLS (a "med tech") or a MLT/CLT (a "lab technician")?

These laboratory professionals work in the pre-analytical, analytical and post-analytical phases of patient specimen testing. These phases are associated with the selection of specimens and tests, the transport of these specimens to the clinical laboratory, the testing procedures themselves and, ultimately, the interpreting and reporting of the testing results to the health care worker (HCW) (e.g., physicians, nurses, physician assistants).

The testing disciplines include microbiology, chemistry, hematology, serology/immunology, molecular diagnostics and immunohematology (blood bank testing). The microbiology discipline can include bacteriology, mycology, mycobacteriology, virology and parasitology, depending on the clinical laboratory's test menu.

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In addition to testing patient specimens, MTs/CLSs and MLTs/CLTs are taught to evaluate/interpret their findings and effectively report them to the ordering physician or HCW. Why is this process so important? Approximately 70% of patient care decisions made by the HCW are based on the results they receive from the clinical laboratory. (1, 3, 6) These laboratory professionals are like detectives in that they help HCW detect problems such as infectious agents (bacteria, fungi, viruses), diabetes, metabolic problems, blood cell problems (sickle cell anemia), and patients who are abusing drugs. They perform testing on body fluids such as blood, urine, spinal fluid, joint fluid, sputum, stool, and on other specimens, and perform tests such as CBC (complete blood count), urinalysis, CMP (comprehensive metabolic panel), ABO typing, immunology/serology studies (detecting antibodies) and culturing for infectious agents.

What is the educational background of these laboratory professionals?

An MT/CLS earns, in most cases, a bachelor's degree in "Medical Technology" or "Clinical Laboratory Science". This is a rigorous Bachelor of Science degree that has prepared many laboratory professionals for later acceptance into graduate and professional schools. The students in many of these programs attend classes for three years, followed by a clinical rotation (also for academic credit) which is usually one year. There are also post-baccalaureate programs that are especially attractive to the student who has earned a B.S. degree in a biological/biochemical/life science and, in today's setting, is unable to find employment. In some programs, the student simply joins at the point of MT/CLS-oriented courses. Occasionally, students can enter a program where they can do coursework on-line and complete their clinical rotation at a designated clinical laboratory. During the clinical rotation for either the B.S. or post-baccalaureate student, they receive hands-on training in each of the disciplines mentioned above, under the instruction and watchful eyes of a "med tech," by actually performing testing on patient specimens. In many cases these specimens have already been analyzed and reported by a MT/CLS, and students compare their own results to those results.

There are similar programs for MLT/CLT students. These are two-year programs where an associate's degree is granted and the training is geared specifically toward the laboratory sciences. These programs are especially attractive to those students who might not want to take four years to earn a degree. The testing that an MLT/CLT performs is similar to the testing that an MT/CLS performs, depending on the regulations of the state in which they work. There are a few disadvantages to the two-year degree: MTs/CLSs usually earn a higher salary than MLTs/CLTs, perform more highly-complex testing, and have more opportunities for advancement.

After being granted a degree in one of these laboratory science training programs, graduates (MTs/CLSs as well as

MLTs/CLTs) must pass a certification examination and, depending on the state regulations in which they would like to work, are occasionally required to complete an additional licensing examination. For example, national organizations such as the Board of Certification of the American Society for Clinical Pathology (ASCP) offer such certifications. (Note: Because of a recent merger of certification with the American Society for Clinical Laboratory Science, all future students will be certified as Medical Laboratory Scientists rather than Medical Technologists or Clinical Laboratory Scientists.)

THE SHORTAGE

We have referred a few times to the workforce shortage in clinical laboratories. What might be the cause of this trend? Our young students at and below the college level are not interested in the field of clinical laboratory medicine. In our opinion, this is due to the lack of knowledge of what the profession is all about. More on this topic later. As a result, the enrollment in clinical laboratory sciences programs has declined and so have the number of programs offering the degrees mentioned above. How critical is the shortage really? Below are a few facts extracted from various sources over the last decade:

- ◆ From 1975 to 2005, nearly 500 accredited MT programs were closed across the country (709–232) and the number of graduates fell from 6,121 to 2,070 during the same time period (5).
- ◆ The American Society of Clinical Pathology (ASCP) Board of Registry 2003 survey indicated 72% of the laboratory workforce (MTs, MLTs, phlebotomists) was 40 years of age or older, with the majority close to retirement.
- ◆ ASCP President Dr. Mark Stoler stated that the average age of the laboratory workforce is about 50 and each year steadily increases. He continued: "ASCP is taking steps to mitigate the baby boomer exodus from the profession. We are raising awareness in the media and on Capitol Hill..." (Western Pennsylvania Hospital News & More", June 2010).
- ◆ Nearly one half (43%) of all clinical laboratories nationwide struggle to hire laboratory personnel (2).
- ◆ The US Bureau of Labor Statistics (BLS) projects that by 2014, an additional 81,000 technologists and technicians will be needed to replace retirees; 68,000 will be needed to fill new positions (4).
- ◆ BLS estimates a 17% growth rate in the field of clinical laboratory science (reported by Mary Shedden, The Tampa Tribune, July 2009). She writes that the BLS estimates there are 167,000 medical technologists employed today in the United States and that by 2016, 21,000 more will be needed. She goes on to write that the U.S. Department of Health and Human Services predicts an additional 138,000 workers will be needed with only 50,000 expected to be trained in areas including phlebotomy and histotechnology.

Hopefully, the facts above will convince you that our clinical laboratories will not be able to fill open positions in **the very near future** unless the number of students enrolling in clinical laboratory science programs increases. One of the major reasons for declining enrollment is that we in the profession are “faceless.” The average “person on the street” does not know we exist and therefore our youth know nothing of the profession of laboratory medicine. Laboratory professionals work behind the scenes with little to no patient contact. To illustrate these points we would like to relate an incident that happened to one of us (TEB):

In 1996, I attended a social event in suburban Atlanta: rather high-end/Black Tie formal cocktail party. As part of the evening’s festivities, a caricaturist was present sketching the attendees based on their profession. The gentleman ahead of me was a lawyer. You can guess the sketch: long robe, barrister wig, gavel, etc. When my turn came, I was asked my profession. I replied, “I am a Clinical Chemist.” By this point in my career, I was used to the response: a blank look, glazed eyes, and the usual vocal response, “Oh, you’re in research, right?” I explained to him, “No ... I’m actually on the laboratory medicine side of health care. I provide clinical and interpretive information to physicians and health care workers in the area of clinical laboratory diagnostic testing.” The blank look still persisted.

*Upon completion, the caricaturist revealed the “portrait”: there I stood in a lab coat. This was good, since I wear one every day. Hanging out of my right lab coat pocket was a stethoscope. Hmmm. The last time I used a stethoscope was in 1979 when I adjusted the valve timing on my 1974 Toyota Celica GT rallye car. Then an interesting feature became apparent. My face was completely blank: no eyes, nose, mouth or any prominent feature. Puzzled, I asked him why I didn’t have a face. His reply will remain with me for the rest of my life. He said, “**Because I have no idea who you are.**”*

This is a major problem. The profession is invisible to the general public. With the advent of television shows such as “House,” “CSI,” and “NCIS,” the clinical laboratory has become somewhat more “en vogue” but is still a mystery to most individuals. To emphasize this point, consider the following series of questions and answers, and their implications for our profession:

- Q: When you are admitted to a hospital for surgery, who performs the surgery?
A: A physician/surgeon
- Q: Following surgery and during your recuperation in your hospital room, who takes care of you?
A: A nurse
- Q: To check on the results of the surgery, your physician orders an MRI. Who performs the MRI?
A: A radiation/MRI technician or radiologist

Q: Following release from the hospital, your physician orders physical therapy for rehabilitation. Who performs that service?

A: A physical therapist

And last but not least and the point of the above:

Q: When laboratory testing is ordered for you, who performs the testing?

A: (The most common answer might be the nurse or the doctor!)

THE SOLUTION

Our profession is basically unknown to many people. Even if we, as laboratory professionals, do everything absolutely perfectly (which, by the way, is the expectation), **we still remain invisible** ... except for the bill and the potential bruising at the site of venipuncture. We have presented the problem. Are there solutions? Absolutely – yes.

First, the profession must become visible and apparent to the educators of our youth. If educators do not know about the profession, how should we expect our children (otherwise known as the next generation of potential Clinical Laboratory Scientists) to aspire to this profession? Some of our colleagues believe we should start by making the colleges and universities more aware of this profession and impending staffing crisis.

While this will help, our opinion is that a focus at this educational level MAY be too late.

A few years ago the Coordinating Council for the Clinical Laboratory Workforce (CCCLW) conducted a survey of the people who were either in a laboratory science program or had been working in the field for up to five years. The survey showed that 75% of the more than 4,500 respondents were completely unaware of the profession upon graduating from high school (5).

In order to effect a change, Clinical Laboratory Science must be apparent as a career choice (other than medical school) for an individual who is looking for a cross between chemistry, biology or microbiology and patient care. If we wait until a young adult is in college, it may be too late. Consider a quote from Julius Caesar: “*Alea iacta est,*” or “*The die is cast.*” In most cases, their career choice may have already been made or they may have been pointed in a direction other than Clinical Laboratory Science. To alleviate this issue, earlier intervention must occur. Teachers at the middle school and high school levels, as well as college professors, **MUST** be made aware of the profession. Students are aware of “House,” “NCIS,” and “CSI”; why aren’t they aware of Clinical Laboratory Science? We can change this invisibility and here’s how.

- I. As a profession, we need to begin increasing the visibility of our career path. Venues such as middle and high school science fairs are excellent opportunities to bring our profession to the attention of educators... and students.

2. We must become involved in organizations such as HOSA (Health Occupations Students of America) at a local, state and national level. These students are already looking at health care as a profession and are fertile for the seeds of Clinical Laboratory Science to be planted. Personal experience with this group at a local and state level has been extremely rewarding both from the students' perspective and from our viewpoint. When exposed to this career opportunity, large numbers of these prospective health care professionals have expressed a real interest in pursuing this field as a profession and most had never heard of it until we brought it to their attention.
3. Recruiting students to enroll in clinical science programs is critical. Presentations to biology classes in middle and high schools as well first- and second-year college classes by a med tech or a student who is currently in such a program can help with career choices.
4. The National Youth Leadership Foundation (NYLF) for medicine exposes high school students during the summer to the many opportunities in health care. We have participated with the Atlanta chapter by hosting about 90 students each summer (in smaller groups) and making them aware, by informal talks and a tour of the lab, of the clinical laboratory sciences profession.

And now, the most difficult task – bringing the media into play. Television, social networking sites and the Internet must be brought into play as a method of exposing the population to this profession. The power of these tools cannot

and should not be underestimated and should be employed enthusiastically in an effort to bring awareness to Clinical Laboratory Science as a career path.

The crisis looms ahead of us and is rapidly approaching. The shortage of laboratory professionals, for the most part, has gone unnoticed outside of the field, probably because the full impact has not yet been felt. Our profession needs YOU, the nation's undergraduate microbiology and biology instructors, to help now and in the near future. Please consider this as a challenge to recruit new members to this field... for your health's sake and for the health of generations to come.

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