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UPMC Altoona
School of Medical Technology/Medical Laboratory Science
2020-2021 Handbook

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Introduction

There are two questions that are inevitably asked when a laboratorian is questioned as to his profession, and they are: "Medical Laboratory Scientist sounds good, but what do you DO?" and, "Are you one of those vampires who draws the blood?"

A deeper look into the general public's lack of awareness of the Medical Laboratory Scientist's role in the care and treatment of the sick makes it somewhat easier to understand. When a patient is admitted into the hospital, he is virtually surrounded by persons to whom his well-being is their primary concern. Dedicated nurses see to his every need, from baths in the morning to sleeping pills at night. Concerned physicians visit him regularly to see to his recovery and recuperation. Dieticians ensure that his food is nourishing and appetizing. Even paramedical professions such as respiratory therapy and environmental services are part and parcel of the patient's everyday life when confined to the hospital.

And then there's the Lab.

Generally, the sole contact that the patient has with the laboratory is some person in a white coat coming at him with a needle. The phlebotomist constitutes the patient's only awareness of the fact that the hospital has a Laboratory at all and this knowledge, coupled with the reply, "We haven't gotten the Lab tests back yet," to his frantic questions concerning his condition, does not make for particularly good public relations.

The following, then, is an endeavor to explain, both to the public and to the prospective student, precisely who and what a Medical Laboratory Scientist is, and what his function is in the diagnosis and treatment of disease.

Definitions

Many definitions have been proposed for the term medical technology but perhaps the best is attributed to a Medical Technologist named Fagelson, who added an important dimension to the profession when she defined Medical Technology as "that branch of medicine concerned with the performance of the laboratory determinations and analyses used in the diagnosis and treatment of disease and the "MAINTENANCE OF HEALTH."

These laboratory determinations and analyses are performed in the clinical laboratory by the Medical Laboratory Scientist, a person who has obtained a sound foundation in the scientific principles involved and a proficiency in the performance of the test procedures.

The term clinical will be used throughout this discussion to refer to that which pertains to or is founded on actual observation and treatment of patients, as distinguished from

theoretical or experimental. While several Medical Laboratory Scientists are employed in research facilities, it is the general purpose of this school to prepare individuals to serve their fellow man in the diagnosis of his disease, the treatment thereof, and the prevention of illness.

The director of the clinical laboratory is usually a pathologist. A pathologist is, first, a physician. His specialty is pathology, which is defined by the American Board of Pathology as "that specialty of the practice of medicine which contributes to diagnosis, prognosis and treatment through knowledge gained by laboratory applications of the biologic, chemical or physical sciences to man, or material obtained from man."

All this means is that the laboratory director is an individual who has graduated from medical school and who has served a four-year residency period learning to diagnose disease states from laboratory test results and data obtained from patient specimens removed at surgery and at autopsy (the examination of the human body after death).

In the Final Report of the Commission on Medical Education (1934) is found this statement:

> "The more scientific laboratory determinations become, and the wider the field of their application, the more thoroughly trained must the physician be to interpret, correlate and utilize the findings of the laboratory in relation to the problem of the individual patient."

The years since this report have seen marked increase in the variety of laboratory procedures available. New procedures are added as new knowledge and equipment make them possible. The extreme complexity of these procedures makes it necessary for the attending physician to rely on the pathologist for assistance. The pathologist performs the role of interpreting and correlating for the physician the results obtained by the Medical Laboratory Scientist in order that the physician may use them in the diagnosis and treatment of the patient.

Thus, the pathologist and the Medical Laboratory Scientist work together with the attending physician as members of a team whose goal is better patient care.

Qualifications

Medical Laboratory Science is a profession. Becoming a professional is a gradual process; there are basic qualifications one must be met to be an accepted, established professional. To fulfill the requirements of the profession, members must jointly strive to:

A. Acquire differential technological expertise
B. Establish and maintain standards of excellence
C. Formulate a code of ethics
D. Establish and enforce rules of conduct
E. Establish and enforce minimum qualifications for entrance into the profession
F. Allow opportunities for human service
G. Set criteria for recruitment and training
H. Develop a sense of responsibility to the profession, to colleagues and to society as a whole
I. Insure a measure of protection for members
J. Establish collective control
K. Endeavor to elevate their profession to a position of dignity and social standing in society
L. Organize and develop a professional, qualifying association

There are a number of organizations within the field that strive to ensure these goals and ideals are met. These include:

American Society of Clinical Pathologist (ASCP)
College of American Pathologist (CAP)
American Society of Clinical Laboratory Science (ASCLS)
(Formerly American Society for Medical Technology)
American Medical Technologists (AMT)
International Association of Medical Laboratory Technologists (IAMLT)
International Society of Clinical Laboratory Technology (ISCLT)

History

Where does one look for the beginning of a profession? Herrick, a medical technologist, traces the beginning of medical technology back to 1500 B.C. when intestinal parasites, such as taenia and ascaris were mentioned in writings. She also notes that in the Ebers Papyrus (a "recipe" book for treatment of diseases in ancient Egypt) there is a description of the three different stages of hookworm infection.

Probably the most commonly performed test in the modern clinical laboratory is the urinalysis. Examination of the urine dates back to antiquity. Early Hindu doctors made the "scientific" observation that the urine of certain individuals attracted ants, and that such urine had a sweetish taste. During the Medieval period, urinalysis was a fad. Quacks calling themselves doctors reaped fortunes from diagnosing diseases by the appearance of the urine. In most cases the correlation between the diagnosed disease and the condition of the patient must have been coincidental.

The writings of Hippocrates, who lived from 460 to 370 B.C., indicate he had knowledge of tuberculosis, malaria, mumps, anthrax and purpural septicemia (childbed fever). His observations, however, were clinical rather than pathologic.

Other individuals prefer to date medical technology from the 14th century when a prominent Italian physician at the University of Bologna employed one Alessandra Giliani to perform certain tasks that would now be considered those of the technologist. It may be of interest to note that this young lady died from a laboratory-acquired infection.

During the 16th century, Ambroise Pare contributed materially to the advance of anatomy, pathology, medicine and surgery. He made pathology popular in France through his many postmortem examinations, which included at least three members of royalty -- Henry II, the King of Navarre, and Charles IX.

The 17th century saw the invention of the microscope. Leeuwenhoek is often associated with this invention, but compound microscopes had already been developed prior to his work. However, he improved the lenses and was the first to classify bacteria according to shape.

In the 19th century, the cell theory was established; pathology was placed on a cellular basis; chemistry witnessed the rapid discovery and isolation of numerous elements; organic chemistry came into existence, to be followed rapidly by physiological chemistry that paved the way for the newer blood chemistry. Laboratory tests were greatly improved, moving from qualitative (presence or absence) to quantitative (how much). In 1848, Fehling performed the first qualitative test for urine sugar.

With the production of aniline dyes about the middle of the 19th century, it became possible to stain bacteria and to study them under the microscope. Concurrently, the rapid advancement in the knowledge of chemical compounds and reactions laid the groundwork for the development of modern clinical chemistry.

Perhaps the first chemical laboratory related to medicine to be opened in this country was in 1844 at the University of Michigan. This was a small, one-story building that was not hospital-connected, but was primarily for the use of students at the University's medical school.

The first hospital laboratories were termed "ward" laboratories because they consisted of no more than a kitchen table, a shelf for reagents and a spirit lamp, and were set up in various hospital wards for testing "on the spot."

World War I was an important factor in the growth of the clinical laboratory and produced a great demand for technicians, especially bacteriologists. So far as we can

determine, one of the first schools for training laboratory workers was established at the University of Minnesota around 1923. Certainly, this university was the first to offer a degree level program.

Once again, a war had a marked effect on laboratory medicine. World War II saw an increased use of blood, and the "closed system" of blood collection was widely adopted. Although the methods for determining the Rh factor were still crude, this test added to the transfusion process. The rapid advance in instrumentation probably produced the most obvious effect. With instruments capable of accurately measuring the intensity of color production, dozens of new chemical tests became possible. The first automated equipment appeared. Quality Control programs became commonplace. Laboratory medicine moved into a new era of sophistication.

Today, large laboratories, as well as the smaller ones are automated to a great extent and are staffed by qualified and trained personnel.

Individuals primarily interested in the performance of "benchwork" or direct performance of tests may complete a two-year program for an associate degree in Medical Technology and, upon passage of a national certification examination become certified as Medical Laboratory Technicians.

The program at the UPMC Altoona is termed a "3 + 1" or “4+1” program and is available for those interested in more advance theory and understanding of laboratory testing and principles, supervisory, administrative and/or test development positions. These individuals have completed three or four years of college and have taken their clinical internship year here at the hospital, successful completion of which entitles them to a baccalaureate degree in Medical Laboratory Science or a Certificate of Completion. When he/she passes the national certification, examination offered by the American Society of Clinical Pathologist, he/she is certified as Medical Laboratory Scientist, designated by MLS(ASCP) after one’s name.

Philosophy and Goals

The Medical Laboratory Scientist functions as a vital member of the health care team by performing laboratory tests on patient specimens that aid in the early detection, diagnosis and treatment of disease, and in the maintenance of health. The ever-broadening scope and diversity of tests performed requires that the technologist have a sound background in the biological, chemical and physical sciences. UPMC Altoona plays an indispensable role by providing the facilities and structured clinical learning experience whereby the medical technology student can gain the requisite knowledge and skills needed to perform as a competent Medical Laboratory Scientist.

As a member of the health care team, the Medical Laboratory Scientist plays a part in meeting the physical, emotional, spiritual and cultural needs of the patient. Coordination and communication with other health care professionals is sought to continually improve the quality of patient care. The quality of patient care is enhanced by the presence of educational programs in the hospital, since it provides an academic environment that stimulates and challenges the regular staff.

It is recognized that education and professional development is a lifelong process, and that students must recognize and assume responsibility for their continued education. Accordingly, the heuristic approach to learning is encouraged so that students will be capable of coping with the ever-changing profession of Medical Laboratory Science and with society. Not only must the Medical Laboratory Scientist be expert in clinical activities, he/she must be capable in such areas as education, supervision, management, research and development.

In order to keep pace with the current trends, the curriculum will be continually revised to adequately prepare students to meet the varied demands of their chosen profession. As a result, courses in molecular diagnostics, management and supervision, teaching principles, computers and instrumentation have been integrated into the traditional curriculum.

Overall Objectives and Career Entry Competencies

It is the primary goal of the program to provide excellent undergraduate professional education in medical laboratory science. When a student has completed the program in medical technology offered by the UPMC Altoona School of Medical Technology, the student is expected to display the following competencies at career entry level.

Objectives: Objectives are used by this school to aid both the students and the instructors in organizing learning and teaching efforts and activities. The objectives given are minimal and may be enlarged upon according to the ability and interest of the student.

Cognitive Domain. Upon completion of the program, the student will:

1. Recognize the role of the clinical laboratory as it relates to patient care, i.e. diagnosis and treatment of disease.
2. Gain knowledge of principles, procedures and techniques of all routine and some special laboratory procedures.
3. Correlate obtained patient data with other laboratory results and demonstrate ability to make judgments about the validity of laboratory results.
4. Apply knowledge of quality control and standards in maintaining accuracy and precision.
5. Evaluate new methods and procedures with minimal assistance.
6. Apply a problem-solving approach in all areas of endeavor in the clinical laboratory.
7. Demonstrate ability to exceed stated minimum performance level in all areas of didactic and clinical performance.
8. Demonstrate the use of computers in specimen processing, reporting results, and data inquiry.
9. Interpret results which provide data for diagnosis and treatment.
10. Demonstrate leadership characteristics and basic supervisory skills.
11. Demonstrate teaching abilities and recognize that teaching is the responsibility of each Clinical Laboratory Scientist.
12. Obtain certification as a clinical laboratory scientist from a nationally recognized certifying agency.

Affective Domain: Upon completion of the program, the student, as a professional in training, shall:

1. Comply with biosafety regulation by practicing proper disposal of biohazardous material, as evidenced by complying with established safety regulations.
2. Exhibit interest in the laboratory assignments and lecture discussions by participating.
3. Help maintain a neat, clean, and orderly work area in all the departments without being asked.

4. Demonstrate respect for the rights of the patient through proper collection and handling of specimens and through prompt and responsible reporting of results to the appropriate persons.
5. Demonstrate attitudes of compassion, concern and cooperation for all patients, co-workers and allied health care personnel.
6. Maintain confidentiality of all information concerning patients. The professional will not discuss or divulge any knowledge of patients or hospital business to unauthorized persons; or hold discussions of patients in any place, in or out of the hospital, where unauthorized persons may overhear such conversation.
7. Learn to recognize and accept personal limitations and potentials as a functioning member of the medical laboratory team.
8. Demonstrate proper care and use of laboratory equipment, as evidenced by lack of breakage.
9. Attend classes (lecture) regularly and be punctual.
10. Assume responsibility of professional pride through active involvement in opportunities for continuing education.
11. Demonstrate preparedness for the laboratory by following directions and completing the tasks assigned with little need for additional instruction.
12. Cooperate by communicating with and helping other students.
13. Demonstrate an awareness of professional limitations and understanding when to request assistance.
14. Demonstrate a willingness to apply principles of leadership and supervision within an assigned role.
15. Demonstrate an understanding and reasons for aiding in education of others in the profession by presentation of formal demonstrations and lectures at the direction of the program director.
16. Assume a mature outlook in interpersonal relationship with patients, hospital staff, counselors, and physician staff often under stress and duress.
17. Demonstrate integrity by recognizing and repeating questionable results.
18. Act responsibly.
19. Perform all assignments honestly
20. Accept instruction and constructive criticism maturely.
21. Show respect for other students, instructors, and patients.
22. Comply with all hospital universal precautions, fires, security, safety, and parking regulations
23. Comply with the UPMC Altoona dress code
24. Abide by any additional regulations from the Laboratory Director, Program Director, or Hospital Administration.

<u>Psychomotor Domain</u>

1. With coordination and manual dexterity, accurately perform productive laboratory determinations.
2. Develop a technical expertise by familiarizing themselves with laboratory procedures.

Career Entry Competencies

1. Collect and safely handle biological specimens for analysis.
2. Perform accurate laboratory testing.
3. Evaluate and interpret laboratory test data.
4. Identify problems and take corrective action.
5. Use quality assurance to monitor procedures, equipment, and technical competency.
6. Comply with established laboratory safety regulations.
7. Operate equipment properly and perform preventive and corrective maintenance.
8. Use computers and laboratory software effectively.
9. Evaluate the efficacy of new procedures and instrumentation for a given setting to include point of care testing.
10. Demonstrate ethical behavior and maintain confidentiality in terms of patient results.
11. Interact professionally with patients and other healthcare personnel.
12. Apply principles of educational methodology.
13. Apply principles of management.

Education and Training

The student contemplating the profession of medical technology should possess certain qualities and aptitudes. Eric W. Martin has suggested the following qualifications as desirable for any professional person working in the health care field:

1. **Vision** - With creative talents, he visualizes the important attainable goals for himself, and those he serves. This gives him a basis for planning a productive future.

2. **Perspective** - With breadth and depth of understanding, he relates himself to his environment and realizes fully how he fits into the total scheme of life. This gives him points of reference and a sense of direction.

3. **Motivation** - With inspirational ability, he actuates himself and others to take the necessary logical steps toward the achievement of the established goals. This gives him the initiative needed to undertake the tasks that lie ahead.

4. **Dedication** - With thoughtful planning, he wholeheartedly devotes himself to his professional duties and responsibilities. This gives him the persistence needed to complete each task he tackles.

5. **Stability** - With calm and patient effort, he persistently, conscientiously, at times, courageously, applies his talents as fully as possible. He takes care not to dilute his efforts by succumbing to hatred, cynicism, fear, or other negative emotions, but attempts to promote good human relationships. Emotional stability gives him quiet dignity that commands respect, fosters close rapport, and makes people attentive to what he says and does.

Perhaps these seem somewhat formidable to a prospective student and are more expressive of the qualities he might expect to develop as he/she progresses toward his professional goal. What personal qualities are then immediately relevant?

The prospective student should possess a certain amount of manual finger dexterity. Ordinarily this dexterity is demonstrated by an active interest in the various kinds of handcrafts. In other words, he likes to "work with his hands". The student must be able to accept responsibility, for often, quite literally, he is responsible for the life of a patient. This is easily illustrated by the daily work in the blood bank where the Medical Laboratory Scientist prepares blood for transfusion to a patient, and where an error may have serious or fatal consequences. The student must have an intellectual integrity, a high degree of persistence, and attention to detail.

With the heavy emphasis on the academic requirements in chemistry and biology, it naturally follows that the student must like the sciences. He/she must like people. A dislike for human beings enjoying reasonably good health almost always precludes the ability to tolerate ill individuals. Although it is possible to work in certain kinds of positions in Medical Laboratory Science where one almost never sees a patient, nevertheless the procedures done in a hospital or doctor's office represent patients, not inanimate objects. Treatment or diagnosis may be based on the results of the tests; therefore, the technologist must feel that he is contributing in an essential way to patient care and service.

This contribution begins as a student as he learns to apply his abilities and capabilities in the clinical laboratory. He puts into action one of the primary qualities needed - the desire to work in a "***helping***" profession.

Academic Programs

The student must arrange his college course work so that he can (1) meet the requirements for graduation of the institution in which he is matriculated and (2) meet the requirements for certification examination. The pre-professional years of college work should give the student a sound background in chemistry, biology, competence in written expression, an increased understanding of the nature of man, and sufficient sensitivity to the world in which he lives so that he will be able to meet the problems of a changing environment.

The academic programs at colleges/universities vary so widely that no typical course outline can be presented. Hopefully every program provides the elements of a liberal education. Certification requires completion of a minimum of 90 semester hours of academic credit prior to the clinical internship. Courses must include 16 semester hours (24 quarter hours) of biological science (with one semester in microbiology), 16 semester hours (24 quarter hours) of chemistry (with one semester in organic or biochemistry), one semester (one quarter) of mathematics and an approved course in immunology.

The 3 + 1 Program

The program in Medical Laboratory Science at UPMC Altoona entails the completion of at least three years of academic preparation prior to admission. The school is affiliated with seven colleges and universities, but occasionally students are selected from non-affiliated institutions.

The student's training is under the supervision of the Program Director of the laboratory and must be a cooperative effort with the college/university, by which the college/university agrees to grant the baccalaureate degree to the student upon successful completion of the internship year. Criteria for "successful" completion are established by the school and adhered

to by the college/university. Granting of the degree will not be contingent upon passage of any certification and/or licensure examinations.

There exists a liaison between the college/university and the School of Medical Technology/Clinical Laboratory Science to ensure that the pre-clinical work is satisfactory to the school, and that the practical, clinical work, including didactic instruction, meets the collegiate requirements for a degree.

The advantage of this type of program is that the clinical year tends to become a "way station" in the process of transformation from student to professional. While any work performed in the laboratory must be reviewed by a working technologist, the student is given the opportunity to experience the "feel" of what it will eventually be like to work as a professional on his or her own.

Clinical Training

The year of clinical training should teach excellence in performance, and control of procedures. A good program will also foster leadership, professionalism, and a maximum degree of self-actualization.

With the large number of approved schools, each operating in a different physical setting, the number of different laboratory schedules for the training period roughly approximates the number of schools. There are no general requirements on time to be spent in each department, but the plan of instruction for each school is subject to approval by the National Accrediting Agency for Clinical Laboratory Sciences. Ordinarily, instruction and experience are provided in chemistry, microbiology, hematology, and blood banking. Instruction in mycology, parasitology, urinalysis, serology, education in medical technology, and management and supervision are included, and are included in the departments listed previously.

Students are in training a total of 2,000 hours, or 40 hours per week for 50 weeks. The *Standards of Accredited Programs for Clinical Laboratory Scientist*, published by NAACLS, outlines the general procedures to be followed in this training period, "The instruction should follow a planned outline and include text assignments, lectures, discussions, demonstrations, supervised practice, practical examinations, and quizzes, both oral and written."

Rotation in the laboratories varies with the institution. At UPMC Altoona, there are generally at most two students each in Blood Bank (which includes Serology), Hematology/Coagulation, Chemistry (which includes Phlebotomy), and Microbiology (which includes Urinalysis, Mycology and Parasitology) at one time.

Each instructional area contains lecture material on principles of the procedures to be done (contained in the department's policy and procedure manuals), practice in these procedures, outside readings, quizzes and a final examination. While in each department, the student is under the supervision of a medical technologist assigned to these duties. Students are given rotation checklists, objectives and reading assignments at the beginning of each rotation.

Clinical laboratory science is becoming increasingly specialized, but the student should always be aware of the patient and of the fact that the laboratory tests represent a contribution to the care of that patient. This awareness is best developed in the clinical setting through the performance of routine work. It is in the clinical laboratory that the student should be demonstrating those qualifications mentioned previously - vision, perspective, motivation, dedication and stability. He/she should be in the process of becoming a professional.

Departments of the Clinical Laboratory

The clinical laboratory is usually divided into several departments. Students learn to do many of the tests in each department, learn the principles underlying the procedures, and learn the use and maintenance of instruments and equipment.

BLOOD BANK (IMMUNOHEMATOLOGY) - Blood for the patient use at UPMC Altoona is procured from the American Red Cross Greater Alleghenies Region in Johnstown, PA. All prospective donors are carefully questioned on their medical history to determine if there are any reasons why they should not give blood. Their blood pressure, temperature and pulse are taken, and the hemoglobin content of their blood is determined. After the blood is drawn, it is typed, and several tests are performed to detect in apparent infections that could be transmitted to the recipient of the blood. A patient needing blood is typed and his blood is cross matched with the blood from the bank. All of these procedures require extensive records. The Blood Bank also identifies the factors responsible for incompatibilities between patient and donor and between maternal and fetal blood.

The Blood Bank also has on hand special blood products or components, including fresh frozen plasma, cryoprecipitate, irradiated and/or specially screened packed red cells, single donor platelets, and anti-hemophilic factors. Available from the Johnstown Red Cross Center are frozen blood cells and additional special products.

The Blood Bank is the department in which the technologist exercises the greatest individual responsibility. The pressures are probably more constant and more intense than in other areas, and certainly there are many dramatic moments. The combination of these pressures makes the Blood Bank a most satisfactory work area because of the height of personal satisfaction that comes from contribution so directly to patient care.

SEROLOGY - Test for rheumatic fevers, syphilis, rheumatism, infectious mononucleosis, febrile and cold agglutinins are included in this area.

HEMATOLOGY/COAGULATION - In the Hematology Department, blood counts are done to include: red cells, white cells, platelets, reticulocytes, hemoglobin determinations, hematocrits and red cell indices. At UPMC Altoona, these counts are performed electronically. The different kinds of white cells seen on a stained blood slide are identified (differential). Bone marrow smears are studied to determine the kinds of cells being produced in the blood making sites. This department also performs the coagulation studies used in the diagnosis and treatment of blood clotting problems. Special procedures, such as erythrocyte sedimentation rates, special stains for leukemia's, tests for abnormal hemoglobin's and cell counts on various types of body fluids are also done in this department.

HISTOLOGY - Tissues that are removed by the surgeon plus those that are removed at autopsy are prepared in the Histology Department for diagnosis by the pathologist. Each tissue

is cut into thin (7 ***micra***) section, mounted on glass slides, and stained with special dyes so that the cellular structure can be discerned.

CYTOLOGY - Single cells, rather than sections of tissues, are studied in the Cytology Department. One of the principles used in the diagnosis of cancer of the cervix, is the familiar "Pap" (Papanicolaou) smear. Cytologic studies also play an important part in the diagnosis of lung cancer. The cytologist does all the preliminary smears, and marks suspicious cells. The pathologist checks these suspicious smears and random negative smears.

CHEMISTRY - The most rapid expansion both in test volume and in the variety of procedures has occurred in the Chemistry Department. It is also the most highly automated section, but some procedures are still done "by hand". In most laboratories, the work in the Chemistry Department doubles approximately every five years. New assays and methodologies are added so rapidly that it is perhaps unwise to estimate the numbers of different procedures done. However, the Chemistry Department at UPMC Altoona does close to one hundred different procedures. Because of the sheer volume of work, multiphasic screening may revolutionize the Chemistry Laboratory. UPMC Altoona's Chemistry Department contains instruments capable of performing from six to thirty tests on a single specimen.

MICROBIOLOGY - Blood, body fluids, excretions, swabs from wounds, throats, etc. are cultured in the Microbiology section to isolate and identify the microbial agents causing infection. After the causative agent(s) have been identified, the microbiologists will assist the physician in selecting the antibiotic most likely to be effective in treating the patient by testing the organism against antibiotics to find those which will inhibit or kill the bacteria. Cultures and smears are also made for identification of yeast, molds and acid-fast bacilli.

Included in the Microbiology Department are:

PARASITOLOGY - This department searches for and identifies ova or cysts and adult parasites. Blood parasites, such as malaria, are also identified in this laboratory. Descriptions of parasites have often included a classification by geographic area, such as the continent in which they are commonly found. More extensive travel and wars have increased the varieties of parasites seen and have brought a concomitant increase in the importance of work done in this department.

URINALYSIS - Many technologists and technicians dislike the work in this department, probably because a normal urine specimen is not very exciting. Yet, in all probability, no single test is capable of yielding as much information as a urinalysis. Besides its value in diagnosing and managing kidney disease, the urine examination may aid in the diagnosis of liver dysfunction, errors in metabolism, diabetes, transfusion reactions, and drug intoxication. A urinalysis, complete with careful microscopic examination of the sediment, should be a part of every medical examination.

Interpersonal Relationships

The student entering the clinical portion of his training finds himself in a new role in an environment with new sights, smells, and duties. His status as a student changes as he learns to combine classroom activities with actual work conditions. He finds he must effectively relate to the many people who contribute to his development as a Medical Laboratory Scientist.

The Student and the Pathologist

In some laboratories, the student seldom sees the pathologist. The pathologist may deliver only a few lectures, turning most of them over to his associates or to the pathology residents. In another laboratory, he may be in the working area every day. In either situation, he is the Director of the Laboratory and is entitled to the respect of all students. Since there is not a working relationship, perhaps the best analogy to describe the relationship between the student and the pathologist would be the relationship between the student and the dean of his college. The pathologist is available for any guidance or assistance that the Program Director cannot give. The pathology staff of UPMC Altoona Department of Laboratory Services consists of a Director and three Associate Directors, all of whom are clinically and anatomically board certified by the College of American Pathologists.

The Student and the Physician

The MLS Intern will probably have little direct contact with the staff physicians. But, through observation, he should be learning how to cope with the various types of problems that may arise between the physician and the laboratory. He/she should be learning to act with discretion and tact. Perhaps the single most valuable interpersonal skill that the student technologist can acquire during his period of training is that of working smoothly with staff physicians. He/she should be observing the techniques of suggesting the need for further laboratory investigation of an apparent abnormality, in a diplomatic manner. All these are facets of interpersonal relationships in which the technologist must become skilled if he or she expects to be considered for promotion.

The Student and the Medical Laboratory Science Program Director

It is the Program Director who expects the student to work, study, write papers, do projects, take examinations, and then to start the cycle over. The Program Director attempts to guide the student into doing better than he thinks he can and tries to lead him "to the threshold of (his) own mind". All instructors should be accorded the same respect given to the Program Director. Hopefully and ideally the student is the reason for the Program Director's being, and hopefully and ideally the student responds with willingness to learn.

The Student and the Laboratory Scientist

A student is a student during his training year. He is not a Laboratory Scientist; he is becoming one. The student should regard every technologist as a teacher, being fully aware that some will be better teachers than others. The student has the right to be taught and the responsibility to learn. The student has the right to be treated as a human being. He must remember that his education is not being completed; it is just beginning. Unless he realized his working years must be a continuous process of learning, he will find himself helplessly mired in the slough of yesterday's knowledge. Eagerness and enthusiasm are highly desirable virtues, and probably have the most immediate effect and make the most desirable impression on technologists. Most people are human enough to be flattered by questions, especially questions they can answer. On the other hand, the same people are not interested in answering questions that should have been answered by reasonable attention to reading assignments. In other words, the technologist usually will be happy to answer questions or to indicate sources where answers may be found, but he will not do the student's homework.

Enthusiasm to acquire knowledge must be tempered with tactful understanding of the problems of the technologist. The student should be capable of self-effacement when it seems to be the judicious action to take. For example: The afternoon request comes to the Blood Bank for 18 units of type B, Rh negative blood for a patient with a dissecting aneurysm. This is not the time to ask for an explanation of anomalous isoagglutinins, especially when the Blood Bank has only 2 units of B negative blood on hand. The student should "get out from under foot" - retreat to a quiet corner and wait for the crisis to be over. Of course, he can use the time to good advantage by getting some reference books and looking up anomalous isoagglutinins.

A student should be reliable, willing and cooperative. He should realize before he reaches the clinical laboratory that illness is not geared to a 40-hour week. The student should expect to be responsible for the completion of any work he starts, but he should not be expected to finish the work of the technologists. He should keep his working area clean. He should treat instruments with care and his supplies with a view to economy.

With even a modicum of attention to these precepts, the student should have no difficulty maintaining a good rapport with the technologists.

The Student and Other Hospital Personnel

In his book Teaching Tips for college teachers, McKeachie titled one of his chapters "How to Win Friends and Influence Janitors". Every student should take this as a tip too. He should try to influence, favorably, of course, janitors, maintenance men, nurses and the staff in the business office. Every department in the hospital is important, in some way, to the work of the laboratory.

The ASMT *Personnel Relations Handbook* contains a succinct statement on the relationship of the technologist to the members of the allied health fields. It is included

because it is equally applicable to students. "Medical Technologists should treat all persons in the allied health fields with the respect and courtesy due them by their knowledge, skills, training and position. The field of medicine is strengthened, improved and advanced toward the purpose of optimum patient care through mutual respect and reciprocity of conduct."

A cooperative head nurse or unit manager can make the collection of the blood chemistry specimens much easier. The cleaning people will do a better job if it is explained what can be moved and what cannot. The electronics shop will help get that recalcitrant instrument back in working order. Essential to the accuracy and efficiency of the clinical laboratory is the work of every employee - from that of the hospital director down to the man who cleans the halls. Remembering this will make life in the laboratory easier and much more pleasant.

The Student and the Public

Medical Laboratory Science is about as well known to most people as is Sanskrit. The laboratory is an unknown wilderness where strange tests are done, from which unpleasant odors emanate, and where many kinds of machines can take in some blood at one end and spitting out an answer of some kind at the other end. Almost the only thing that everyone knows for certain is that whatever laboratory work is ordered is expensive. The student must learn to define his work in order to talk about it intelligently. He must begin as a student to "talk up" clinical laboratory science, especially to high school students. He must begin as a student to think about career and science fairs. Students can be much better ambassadors than working technologists, for they have the vocabulary of their peers to "tell it like it is".

The student should be cautioned that to some, his status as a member of a medical institution and the donning of a uniform immediately causes some people to endow him with certain new abilities. The student may be asked to make diagnoses from lists of symptoms and/or to prescribe for all sorts of ailments. Such temptations should be politely, but firmly, resisted.

The Student and the Patient

The patient arriving at the hospital immediately finds himself in what he is likely to consider a hostile environment. The patient is given an ID Band that he cannot easily remove. He may be put into a room with one or more "roommates" he has never met before and with whom he must share the most intimate details of living. The patient may be expected to wear the highly impersonal hospital gown that he will find unattractive from every angle and entirely inadequate for the purpose for which it was intended. He may be uncomfortable, ill, or in pain. He is lonely, apprehensive, and even fearful. He is reacting normally to this abnormal world.

The student technologist comes into the picture as one who will do nothing to alleviate a patient's pain, and may even add to it, and who will even question his identity by asking his name. The patient is not likely to extend a warm welcome. The student should be pleasant.

He should approach his work with confidence, and a minimum of bustle or as one author expressed it, with "conservatism of manner". The student who lacks confidence should remember that confidence and poise are the products of practice. The student should not appear too casual - an appearance of friendly interest is important to the patient. The patient is entitled to an explanation of what is going to be done but doesn't need a lecture on the possible causes of elevated glucose levels.

It must be remembered that children are people too, and a condescending manner toward a child of 7 or 8 years old will make the next approach much more difficult. Students should be aware that children are most perceptive and react - sometimes violently - to any indication of falseness in the technologist's explanation. The child, too, is entitled to know what is going to be done, including the probability that it may be a somewhat painful procedure.

Patients are interesting people to students. They sometimes have fascinating case histories and diagnoses. Often the student is aware of the confirmation of the diagnosis before the attending physician has received it. Two cardinal rules **MUST** be observed by every student:

1. No interpretation of the results of laboratory procedures is made to the physician or the patient.
2. The information learned about patients is privileged, not public information. The student must keep all such information in strictest confidence.

Often one of the best places to hear this confidence being flagrantly disregarded is on the hospital elevators. Apparently, the medical jargon is considered sufficient protection. This may have been true at one time, but today the public is familiar enough with medical terms to understand or perhaps grossly misinterpret the conversation overheard.

No student should flaunt his knowledge about the patients or his newly acquired technical vocabulary in public.

Occasionally a patient will attempt to get information from the technologist through subterfuge, indirect questioning, or, rarely, coercion. The patient's usual approach is a demand that his rights are recognized. He has paid for the tests; therefore, the right of ownership makes disclosure mandatory. Such requests should be automatically referred to the attending physician.

Even more important than all these important patient relations are the principles that should guide every student and every technologist - the patient is the reason, and only reason, for his professional existence.

Code of Ethics

American Society for Clinical Laboratory Science

Pledge to the profession

As a clinical laboratory professional, I strive to:

- Maintain and promote standards of excellence in performing and advancing the art and science of my profession
- Preserve the dignity and privacy of others
- Uphold and maintain the dignity and respect of our profession
- Seek to establish cooperative and respectful working relationships with other health professionals
- Contribute to the general wellbeing of the community

I will actively demonstrate my commitment to these responsibilities throughout my professional life.

Nondiscrimination of the Basis of Disability

UPMC Altoona and the School of Medical Technology do not discriminate as to age, sex, race, religion, color, marital status, ancestry, national origin or qualified handicap. Reasonable accommodations will be provided to qualified students on an individual basis. The educational and safety needs of the student and the patients must be considered.

Federal Law (Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990) provides that no qualified disabled person shall, based on a disability, be excluded from participation in, be denied the benefits of, or otherwise be subjected to discrimination under any program or activity that received or benefits from federal financial assistance. This provision of law applies UPMC Altoona, and an effect of this law is to ensure that:

The physical handicaps that would require little or no improvisation include hearing loss, cardiac disorders, poliomyelitis compensated by braces, and speech defects. Total deafness or deafness with a lack of understanding speech, paraplegia, abnormally short stature, or a handicap requiring the use of crutches or a wheelchair all call for changes in training pattern which UPMC Altoona's School of Medical Technology is ready and willing to provide.

Partially sighted individuals would find laboratory work difficult, if not impossible. Vision corrected to near normal or normal by glasses or contact lenses presents no problem. Certain types of color blindness also preclude a career in medical technology.

The Pathologist and the Program Director will provide step stools or a sit-down working area, to adjust workloads, or to exempt the student from certain requirements as circumstances demand. Lectures and instructions may have to be written out for the deaf student. But if the staff of the laboratory is cooperative and the student has a realistic self-concept, most of the difficulties can be overcome.

The handicapped student who is not overly dependent, who does not make unreasonable demands on the time and attention of other workers, and who does not indulge in self-pity should have no great problem fitting into the routine of a teaching laboratory.

No one may be excluded from any course, or course of study, on account of a disability.

Classes may be rescheduled for students with mobility impairments if they are scheduled for inaccessible classrooms.

Academic degree or course requirements may be modified in certain instances to ensure full participation by disabled students.

Certain hospital rules and regulations may be waived if they limit the participation of disabled students.

Housing opportunities, employment opportunities, and other opportunities for disabled students are equal to those of non-disabled students.

Accreditation

The UPMC Altoona School of Medical Technology/Medical Laboratory Science is accredited by The National Accrediting Agency for Clinical Laboratory Sciences, 5600 N. River Road Suite 720, Rosemont, IL 60018, Tele: 773.714.8880.

The Laboratory and its sundry sections are accredited by:

The College of American Pathologists
The Joint Commission of Accreditation of Hospitals
The American Association of Blood Banks
The Federal Drug Administration
The Pennsylvania State Department of Health

Affiliations

UPMC Altoona School of Medical Laboratory Science is affiliated with seven institutions of higher learning. They include:

Clarion University of Pennsylvania, Clarion, PA
Indiana University of Pennsylvania, Indiana, PA
Lock Haven University of Pennsylvania, Lock Haven, PA
Seton Hill University, Greensburg, PA
Shippensburg University of Pennsylvania, Shippensburg, PA
Slippery Rock University of Pennsylvania, Slippery Rock, PA
St. Francis University, Loretto, PA

The universities/colleges are members in good standing with the Middle States Association of Colleges and Secondary Schools and have been found to provide adequate preparation for the student wishing to pursue a career in Medical Technology/Clinical Laboratory Science. Students attending any institution must have their transcripts evaluated by the College or University before being considered for admission into the Altoona Regional Health System School of Medical Laboratory Science program.

The school embraces a 3 + 1 program, in which students spend the first three years of their college careers at an accredited institution in a Medical Laboratory Science curriculum, and the fourth, or clinical internship year in a hospital laboratory. College credit for this senior year is assigned by the institution granting the degree upon successful completion of the internship year, and is sufficient to guarantee a baccalaureate degree in Medical Laboratory Science Individuals who have already earned a degree in Biology, Chemistry or some other related science are also considered for admission into the program.

Students at affiliated institutions are given priority over those student applicants from non-affiliated schools. Admission of a student from a non-affiliated school will not result in the exclusion of an equally qualified student from an affiliated program.

Faculty

In compliance with NAACLS recommended format for "Fair Practices in Education" and Civil Rights Act VII, the selection of faculty does not discriminate with respect to race, color, creed, sex, age, handicap, or national origin.

Mushtaq Khalid, M.D., Directory of Laboratory Services
Marc J. Clapper, D.O., Associate Pathologist
Barbara L. Walton, M.D., Associate Pathologist
Jeremy Klapper, M.D., Associate Pathologist
Joseph Pufka, MT (ASCP), Administrative Director
Heidi Beecham, MS, MLS (ASCP), Quality Manager
Andrew Baughman, MHS, MLS (ASCP), Program Director
Penny Kliener, MT(ASCP), Section Head - Chemistry
Richard Knab, MT(ASCP) SM, Section Head - Microbiology
Joshua Krug, MLS(ASCP), Section Head-Blood Bank
Emily Burns, MT (ASCP), Assistant Section Head - Blood Bank
Deb Fisher-Mardula, MT (ASCP), Assistant Section Head – Hematology
Nicole Ritchey, MLS (ASCP), Assistant Section Head - Chemistry
Barb Elli, MT (ASCP), Point of Care Coordinator
Faith Ford, CMA, Laboratory Office Manager
Amanda Holtz, MT (ASPC)
Mary Ritchey, MT(ASCP)
Sharon Gochnour, MT(ASCP)
Sue Eckenrode, MT(ASCP)
Marty Burket, MT(ASCP)
Laurie Miller, MT(ASCP)
Stephanie Baker-Stirk, MT (ASCP)
Mary Ann Brown, MT (ASCP)
Brittany Hoover, MLS (ASCP)

Course Descriptions

AH 402 - Clinical Chemistry

Includes the theory and operation of the major classes of instrumentation, the theory and application of biochemistry, fundamental analytical principles and laboratory calculations, anatomy and physiology of the endocrine system, enzymology, lipids, carbohydrates, proteins, electrolytes, ABG's, acid/base, toxicology, vitamins, liver function, tumor markers, NPN's, molecular diagnostics, Point of Care Testing and Safety.

AH 404 - Urinalysis

Includes anatomy and physiology of the renal system, renal pathology, safety, routine physical and chemical tests, sediment examination, and correlation of test results, quality control; also includes examination of the feces and body fluids.

AH 405 - Bacteriology

Includes morphology, cultural characteristics, secondary identification, specimen collection, and interpretation of results for gram positive and gram negative cocci, gram positive aerobic and anaerobic rods, enteric and other gram negative rods, mycobacterium, and miscellaneous organisms; also includes media preparation and reagents, quality control, safety, antibiotics and sensitivity testing, epidemiology, and viruses.

AH 406 - Immunohematology

Includes a discussion of the immune process as it applies to blood banking, donor selection, processing of blood, blood collection, blood components, preparation and administration of blood, quality control, safety and other general blood banking considerations.

AH 407 - Hematology

Includes the anatomy and physiology of the circulatory system, formation, function, enumerative procedures, basic tests, normal and abnormal peripheral blood and bone marrow morphology for the formed elements of the blood; also includes coagulation theory, quality control, safety, and pathologic states.

AH 409 - Medical Parasitology

Includes the morphology, life cycles, source and collection of specimens, pathological states and various types of parasitic organisms, quality control and safety.

AH 411 - Immunoserology

Includes discussions of natural immunity and immunologic substances, antigens and antibodies, humoral and cellular immunity, complement, autoimmunity, and delayed hypersensitivity; also includes serologic tests for syphilis, non-syphilitic serodiagnostic tests, quality control and safety.

AH 422 - Medical Mycology

Includes morphology, cultural characteristics, secondary identification, specimens, and interpretation of results for yeast, molds, yeast-like molds, quality control and safety.

AH 424 - Education in Medical Technology

Includes job entry indoctrination, education techniques and terminology, knowledge of research design/practice enough to evaluate published studies, continuing education for laboratory employees, interdepartmental rotation, in-service education, and effective mechanisms of teaching.

AH 425 - Laboratory Management, Supervision and Phlebotomy

Includes discussions of principles and practices of quality assurance/quality improvement as applied to the pre-analytical, analytical and post-analytical component of laboratory services. Application of safety and government regulation and standards as applied to laboratory practice. Principle of interpersonal and interdisciplinary communication and team-building skills will be covered. Laboratory budgeting, personnel, laboratory space, supplies, equipment, ethics and medical/legal matters will be discussed.

The phlebotomist is the individual who performs phlebotomy. Phlebotomists often assist in the collection and transportation of specimens other than venous blood (e.g., arterial blood, urine, tissues, sputum) and may perform clinical and technical functions. However, the primary function of the phlebotomist is to assist the health care team in accurate, safe, and reliable collection and transportation of venous blood for clinical laboratory analysis. The MT intern will be in training for a two-week period followed by approximately 40 hours of actual clinical experience.

Curriculum

COURSE NUMBER	COURSE TITLE	CREDITS	LECTURE HOURS*	LAB HOURS
AH 402	Clinical Chem	8	78	270
AH 404	Urinalysis	2	18	102
AH 405	Bacteriology	6	46	150
AH 406	Immunohematology	4	70	270
AH 407	Hematology	6	60	324
AH 409	Medical Parasitology	1	12	36
AH 411	Immunoserology	2	12	52
AH 422	Medical Mycology	1	16	36
AH 424	Laboratory Education	1	8	
AH 425	Laboratory Management	1	8	

*****Medical relevancy is achieved by the Pathologist by doing case history studies and review of patient's charts during post-mortem exams with the students.

Classes are held Mondays and Thursdays. Prerequisites for these courses are included in the curriculum of the institution granting the baccalaureate degree and/or curriculum approval by the National Accrediting Agency for Clinical laboratory Sciences.

Faculty members include Pathologists who are certified in Clinical and Anatomic Pathology by the College of American Pathologists, experienced medical technologists, members of the house staff and other members of the community.

In the event that a decision to discontinue or restructure the program occurs, the Program Director will notify all college/university affiliates. Students currently enrolled and students already accepted will be provided the opportunity to complete the program.

Academic Admissions Standards

1. Graduation from an accredited high school or the equivalent.

2. Prerequisites for admission are satisfactory completion of at least three years in an accredited college or university. (90 semester hours or 135 quarter hours). . Prerequisite content areas are listed below. Survey courses do not qualify as fulfillment of chemistry and biological prerequisites. Remedial mathematics courses will not satisfy the mathematics requirements.

A. Sixteen (16) semester hours or twenty-four (24) quarter hours of Biology credit, including a course in Microbiology or Bacteriology, which is acceptable toward a degree in Biology.

B. Sixteen (16) semester hours or twenty-four (24) quarter hours of Chemistry credit, including a course in Biochemistry and/or Organic Chemistry, which is acceptable toward a degree in Chemistry.

C. A Minimum of one (1) semester of college mathematics.

D. An approved course in Immunology.

E. Recommended are courses in Anatomy and Physiology, Genetics, Physics, Statistics and Computer Science.

3. A grade point average of not less than 2.5 overall, and a grade point average of not less than 2.5 in the sciences. Preference will be given to students who have a GPA of 3.0 or higher in their sciences.

4. Acceptable transcript evaluation by the College or University (If applicable).

Admission Criteria

Selection of students is made first from applicants that apply from affiliated colleges/universities. Consideration is then given to applicants who have received appropriate college/university credits in biological sciences from non-affiliated colleges/universities. The program does not grant advanced standing to applicants with prior clinical experience. UPMC Altoona is an Affirmative Action/Equal Opportunity employer and supports the concepts of equal opportunity based on merit. Minorities, females, and handicapped individuals are encouraged to apply. Students must meet the following criteria:

1. Successful completion of all application requirements.
   A. completed application and application fee
   B. at least three letters of recommendation (university/college)
   C. official transcript
   D. transcript evaluation (if applicable)
   E. cover letter and resume

2. A personal interview, during which the applicant's intellectual skills and aptitudes, motivational characteristics, knowledge and experience, and personality traits are assessed.

3. Careful consideration of references, especially those from the college instructors and advisors.

4. A complete physical examination, drug screen and background check, provided by the hospital during the first week of class.

Foreign Students

Graduates from foreign universities or colleges must also send a copy of their official transcript to an appropriate evaluation agency, plus a service fee for the evaluation. Acceptable evaluation agencies for foreign transcripts may be obtained from: ASCP Board of Registry, 53 W. Monroe St. Suite 1600, Chicago, IL 60693.

An official transcript evaluation demonstrating approval of completed requirements and U.S. Degree equivalency must be received prior to admissions. Proof of course completion is necessary if deficiencies are indicated. This would include any course work completed more than seven years ago.

Student Expenses

Tuition for the School of Medical Technology is presently set at one thousand, two hundred and fifty dollars ($1,250.00). Four hundred twenty-five ($425.00.) of which is due the first week of the first semester, and the remaining six hundred twenty five ($625.00) the first week of the second semester. A deposit of $150.00 is required at the time of final acceptance. This deposit of $150.00 will be deducted from the $625.00 tuition which is due the first week of the first semester. This is subject to change.

Books will be provided by the UPMC Altoona School of Medical Laboratory Science at an approximate cost $1000.00. Payment is due on the first day of the first semester.

Housing for one year costs the average student approximately five thousand four hundred dollars ($5,400.00). However, many of the students from prior years have opted for rooming together, which decreases expenses.

Meals may be purchased in the hospital cafeteria at employee prices.

Protective gear including laboratory coats must be worn while the students are in the clinical rotations. This protective gear will be provided by the hospital. A $150.00 laboratory fee will be assessed to the student and will be due the first week of school. Uniforms (scrub tops, pants, shoes, etc.) that are worn during the clinical rotations are to be provided by the student.

A second $150.00 activity fee will be assessed to the student. This fee will cover the cost of additional educational materials and graduation and will be due the first week of the second semester.

Tobacco Usage

UPMC Altoona is a tobacco free institution and a tobacco free employer. There are no designated areas on Hospital Property for smoke or smokeless tobacco use (including electronic cigarettes).**The use of any tobacco products, including, but not limited to cigarettes, chewing tobacco, cigars, etc., on any health system owned or leased property is strictly prohibited.** Students violating this policy will be subject to disciplinary action. Policy HS-HR0744

Non-Solicitation

UPMC Altoona has a non-solicitation policy and the School of Medical Laboratory Science endorses that policy. Students may, for specific reasons, conduct fund raising activities. The Director must clear the activities and students must adhere to the non-solicitation policy and guidelines of UPMC Altoona. Any questions regarding interpretation of the policy should be referred to the Program Director.

Parking

All cars must be registered with the Security Department. All students will be required to park in the areas assigned during orientation.

Students must obey hospital traffic signs and regulations. Carpools are encouraged because of limited parking facilities. Failure to park in designated areas may result in disciplinary action.

Personal Property

The School assumes no responsibility for loss of personal property. Students are advised to take necessary security precautions. Any losses must be reported immediately to a staff member and the Security Department, extension 2121. Students should secure all personal property in their assigned locker.

Withdrawals

A student who wishes to withdraw from the school should discuss his/her intentions with his/her family and the Program Director.

A letter of resignation should then be submitted to the Medical Technology Program Director and the student is terminated.

POLICY FOR TUITION REFUND FOR WITHDRAWAL

Students who withdraw from the UPMC Altoona School of Medical Technology after the beginning of the term will be given a refund for tuition paid as follows.

Within 1-10 days	Refund 75%
Within 11-15 days	Refund 50%
Within 16-30 days	Refund 25%
Over 31 school days	No Refund

The $150.00 lab fee and $150.00 activity fee are also non-refundable after 31 school days are completed.

Dress Code

Students are always required to be in uniform during school hours. The dress code guidelines were developed to promote a positive professional image of UPMC Altoona employees/students and prevent occurrences of the spread of infection. All students must follow the hospital's dress code. Laboratory uniforms may be purchased from Ravine, Inc. located at 610 7th Street, Altoona, PA 16602, via their website www.altoona.upmcstore.com or call 814-946-5006 or 866-613-0201. Laboratory personnel must wear royal blue tops and bottoms imprinted with the UPMC Altoona logo. (Logo can be embroidered on scrubs by the Ravine, Inc. for a nominal fee/item). A selection of uniforms can be found on the Ravine website by clicking on "Job Title" and then "Certified Medical Assistant/Outpatient/Tech." Clean sneakers or duty shoes are required footwear. For reasons of safety, open-toed shoes are not permitted in the Laboratory. Protective gear that is provided by the Laboratory must be worn during clinical rotations.

Hours, Holidays, Vacation

The school week consists of five eight-hour days, Monday through Friday. The school year runs for twelve consecutive months to provide approximately 2,000 hours. In order to document a record of their hours in the Laboratory, students are required to record their *time-in* and *time-out*. Individual log sheets will be kept in the student class room. Students report to the Laboratory by 7:00 a.m. and are dismissed at @ 3:00 p.m., with a half-hour during that time for lunch and one hour for free study time.

Vacations are allotted according to the day of the week on which the holiday falls. These holidays include Labor Day, Thanksgiving, Christmas, New Years' Day, Martin Luther King Day, Good Friday, Memorial Day and the 4th of July.

Each student is allowed five (5) sick /personal days per year. The student who is absent from class for any reason is responsible for work missed. Students should understand that excessive absences may jeopardize their grades and may lead to dismissal. Students are to notify the laboratory office @ **889-2161** and the Program Director @ **889-2835** prior to 7:00 a.m. of the day they will be away from the Laboratory because of illness or any other unavoidable reason. The office will then notify the supervisor of the section through which the student is rotating.

Student Health Insurance

The student and/or his family must provide health insurance for him in order to be enrolled in the Medical Laboratory Science Program.

If a student suffers a needle puncture or other accident, the accident is reported to the appropriate supervisor and the Program Director. The student is then referred to the Employee Health nurse for appropriate treatment. If the accident occurs on a weekend or after hours, the student will be evaluated by the Emergency Department with follow-up at Employee Health.

Paid Time

While the laboratory is in no way obligated to provide hours for the student to work, students may be given the opportunity to work on certain days of the week and on weekends. In compliance with NAACLS requirements, these working hours are assigned on a voluntary basis, are paid no less than the minimum wage scale, and are directly supervised by a working technologist.

Student interns under the direct supervision of a technologist are permitted to release laboratory results. The section supervisors will review all worksheets daily.

It is recommended that all students participate if possible, in these after-school work hours. The experience gained is extremely valuable.

Assignment of Duties

The medical laboratory scientist in charge of the students in a department normally assigns duties with, regard to departmental routine and the directives of the pathologist and the supervisor. Bench objectives and daily and/or weekly assignments are to be given to the student on the first day of his/her rotation in that department.

Personal Electronic Devices

Students must read the Personal Electronic Device SOP HS-HR0753 during Orientation. Excessive personal calls during school hours, regardless of the phone used can interfere with the student's daily schedule and be distracting to others. The Hospital SOP is to limit personal calls, including text messages, during school hours to no more than one per day as needed. Students are therefore, asked to make any other personal calls on non-school time. Checking and sending of text messages is considered the same as making a personal call. Additionally, the use of Bluetooth hands-free devices is prohibited. To ensure the privacy of our patients, no personal cell phones calls will be conducted within their presence or within patient care areas. All students must be aware that taking photographs with their cell phones within UPMC Altoona facilities that contain either patients or families is a prohibited practice. Students who do not adhere to the Hospital SOP on Cell Phones, be it a personal cell phone or a UPMC Altoona provided desk phone, will be subject to discipline up to and including termination from the program.

Library

Library resources for the School of Medical Laboratory Science include the library of the Department of Laboratory Services and the Glover Memorial Library.

The Laboratory's library contains numerous volumes on clinical laboratory methodologies and interpretations, clinical and anatomical pathology, various technical and professional journals, audiovisual material, and seminar material.

In addition, each department in the Laboratory maintains a current library of volumes related to their specialized fields.

Glover Memorial Library is located on the fifth floor. Internet access will be available to reference all search engines. Special reference requests may be obtained through the Education Department at Ext. 2731

Library Rules and Regulations

Hours (Subject to Change)

1. Library Hours: Monday through Friday (7:30 a.m. to 3:30 p.m.).

2. Closed Saturday and Sunday.

Audiovisual Materials

1. Check out by writing the subject, volume, number and date taken on a white card, along with the name (cassette tapes have special cards) or via computer checkout.

2. Audiovisual materials circulate for one week.

3. Library staff will check out audiovisual equipment by logging in the Equipment Directory.

4. Time due for various pieces of equipment will vary and be directly up to the Library Staff. However, cassette tape players will not be allowed out more than one month and not renewable after one month for five (5) weeks.

Housing

The procurement of suitable housing is the responsibility of the student. The school will utilize the resources of the Laboratory and its staff to the best of its ability to aid the student in his/her quest but ultimately, finding accommodation is up to the student. The Program Director has apartment listings on file.

Grievance Procedure

If a student believes that he or she has been treated in an unfair or discriminatory manner, his first recourse is to discuss with the Medical Laboratory Science Program Director the nature of his complaint. This procedure will be followed for **academic** and **nonacademic grievances**.

If the student disagrees with the Program Director's resolution of his problem, he may then request a general meeting of the school faculty to present his grievance. The faculty will then vote on the matter and hand down a decision to the student. If the grievance involves or is directed toward the Program Director, this individual is exempt from voting on all items relating to this issue.

If the student still wants to pursue the grievance, he/she may go before the School of Medical Laboratory Science Advisory Board. This body is composed of three individuals within the hospital **not connected with the Laboratory**. Generally, these members include the Hospital Attorney, the Director of Education and the Vice-President of Human Resources. The Medical Laboratory Science Advisory Board is the final authority to which there is no appeal.

Academic Dishonesty

Any student or students willfully engaging in an act of academic dishonesty **during an examination** will upon the first offense be asked to leave the testing site immediately and receive a zero for the examination. The decision whether willful academic dishonesty has occurred is at the discretion of the proctor of the examination. All offenses will be referred to the Program Director for appropriate disciplinary action.

Any of the following shall constitute an act of academic dishonesty:

1. Talking for any reason to any student during a test.
2. Looking at any other student's paper during a test.
3. Permitting any other student to observe test answers.
4. Engaging in systematic non-verbal communications with the intent to divulge test information to other students during the test.
5. Utilization of unauthorized papers or cards or other printed materials that reveal test information.
6. Any other behavior(s) that may be interpreted as suspicious by the proctors.
7. Use of old examinations that are the property of the school.

Any student or students who willfully engage in an act of academic dishonesty **in a non-testing situation** (i.e., plagiarizing another student's paper, etc.) will be given a zero for the assignment. The decision whether willful academic dishonesty has occurred is at the discretion of the Instructor and/or the Program Director. For a second offense, the student will be referred to the Program Director for further disciplinary action.

Grading

Grades are assigned according to the following scale:

93 - 100 = A
85 - 92 = B
75 - 84 = C
74= D (unsatisfactory)

If the **FINAL** grade in any subject area of a lecture series, rotation exam, or rotation grade falls below 75% a re-examination may be necessary. This re-examination will be at the discretion of the Program Director and/or Section Supervisor. This exam will be taken on a date decided upon by the instructor and Program Director. The incomplete will be removed upon successful completion of the second examination. A grade of 75% will be entered on the student's record. If the re-examination is not satisfactory (75% or above), the course will terminate with a failure. If the final grade in any subject area of the lecture series is below a 75%, this may result in academic dismissal.

Course grades are determined by evaluating all organized subject matter and related activities that are planned to achieve course objectives. Course grades are composed of theory grades, clinical rotation grades and the comprehensive examination. **Students must pass (75% or higher) theory, clinical rotation and the comprehensive examination in order to graduate.**

Theory grade is determined by examinations, quizzes, papers, projects, assignments or other related activities. The student must maintain at least a 75% average in each subject area. The school will make every attempt to assist the student in their problem area(s). If a student fails one subject area, they may have the opportunity to repeat the lecture course during the next academic year. Should the student fail to raise their grades to the 75% minimum level, he/she may be terminated from the program.

If a student fails an exam, they will be required to meet with the Program Director and/or Instructor for academic counseling. If a student's average in **any** of the lecture series falls below 75%, they will be placed on academic probation. The academic probation will be for 30 days. The probationary status will be re-evaluated after a thirty-day period.

The Clinical Rotation Grade is determined by the clinical rotation evaluation, rotation examinations, quizzes, projects and assignments. Failure (minimum of 75%) of **any** aspect of the clinical rotation may lead to academic probation or dismissal. Re-examination will be at the discretion of the Program Director and/or the Section Supervisor. The length of time in a

section may be extended by a few days or up to one week to complete assignments or examination. No section in the rotation may be shortened by working nights, weekends or holidays.

Comprehensive examination is given at the end of the school year covering all the material outlined in the course objectives. Students must achieve a passing grade of 75% in order to graduate from the program. If the student fails the comprehensive examination, a re-examination must be taken on a date decided upon by the Medical Director, Program Director, faculty and the student.

The final grade in each subject is determined according to the following percentage:

60% = Lecture examinations and quizzes
30% = Clinical rotation final grade
10% = Comprehensive examination

Grade Release Policy:

Public Law 93-280 (The Family Education's Rights and Privacy Act of 1974) prohibits the release of educational records, other than in certain defined exceptions, without the student's consent. One such exception is Section 438 (b)(1)(H) which allows release of educational records to "Parents of a dependent student of such parents, as defined in Section 152 of the Internal Revenue Code of 1954".

Under the provisions of Section 438, the Program Director can send grades to parents. Students, who are not dependents, meaning they are not so claimed by parents for income tax purposes, may have their grades withheld from their parents by filing a request with the Program Director.

Requirements for Graduation

1. Submit a **most** recent transcript from college/university.

2. Obtain from your College or University an approved transcript evaluation of entrance credits (if applicable).

3. Attend one full academic year of clinical laboratory training completing each course, both practicum and didactic with a minimum number of absent days (five).

4. Complete all requirements for the practical laboratory assignments.

5. All department examinations, both written and practical, must be satisfactorily passed per specified grading scale.

6. Completion of courses with a minimum grade of 75%.

7. All assignments given by the Program Director must be completed before the graduation date.

8. Satisfactory passing of the comprehensive examination with a score of 75% or more. If this examination is not satisfactory (75% or above), a reexamination must be taken on a date decided upon by the Medical Director, Program Director, faculty and the student. This test must be given no later than 30 days after graduation. If the student passes the second comprehensive exam, a grade of 75% will be entered on the student's record. The school diploma will be issued only when the student has successfully passed this final examination. Final grades will not be forwarded to the College/University until satisfactory passing of the comprehensive examination.

9. All bills must be paid in full before graduation can be approved.

10. Only those students who have completed **ALL** of the school requirements will receive a diploma.

Graduation

Students who successfully complete the requirements of the School of Medical Laboratory Science are eligible for graduation and are awarded a diploma.

If the graduate was enrolled in a 3 + 1 program at his/her college or university, the credits earned at the hospital are transferred to the college or university, listed on the graduate's final transcript according to the college's policies, and are credited toward the graduation requirements of that college/university. The diplomate graduate is then granted a baccalaureate degree by his/her college or university.

With the baccalaureate degree on the college/university transcript, the graduate is then eligible to take the national certification examination and become certified as a Medical Laboratory Scientist.

Granting of the degree or diploma shall not be contingent upon successful completion of an external certification or licensure examination.

Technical Performance Standards

These Technical Performance Standards/Essential Functions represent the non-academic requirements that students must possess, with or without a reasonable accommodation to successfully participate in the UPMC Altoona hospital-based program. Applicants **MUST** be able to affirm their ability to comply with the following:

Manual Dexterity:

Possess the gross/fine motor skills and eye-hand coordination to safely manipulate, maneuver, adjust, control and/or use:

- Chemicals
- Specimens
- Phlebotomy/culture equipment
- Laboratory equipment/instruments
- Computers, including keyboard and mouse
- Collect valid laboratory specimens from patients

Vision:

a. Characterize the color, clarity and viscosity of biological specimens, reagents, or chemical reaction products.
b. Discriminate color, shading and fine structural differences of microscopic specimens using a clinical grade binocular microscope.
c. Read text, numbers and graphs displayed in print and using laboratory technology.
d. Judge distance and depth accurately.

Health:

a. Possess the physical, mental and emotional health to function effectively during an 8-hour day under the stressful conditions of technical malfunctions, time constraints and a distracting environment.
b. Move freely and safely around the laboratory and hospital facilities.
c. Possess normal, corrected or aid-able hearing.
d. Possess the ability to:

    - bend, stoop, stand and lift 20 pounds
    - grasp with one or both hands
    - reach laboratory bench tops, shelves and patients lying in beds or seated in a specimen collection chair

- perform moderately taxing and repetitive tasks, often requiring prolonged standing/sitting over several hours

Behavior

a. Possess the ability to be independent, flexible, creative and adaptable to change.
b. Possess the willingness to work with sharp objects, hazardous chemicals and infectious/biohazardous materials.
c. Recognize potentially hazardous materials, equipment and situations.
   - Able to proceed safely in order to minimize risk of injury to patients, self and co-workers.
d. Demonstrate honest, compassionate, ethical and responsible conduct in all actions.
   - Straightforward about error or uncertainty.
e. Promote a team approach to learning, task completion, problem solving and patient care.
   - Support and advance the activities of fellow students and health care professionals.

Intellectual

a. Apply complex thought processes to problem solving, troubleshooting and exercising sound judgment.
b. Use reasonable judgment in stressful conditions to recognize and correct performance deviations.
c. Prioritize and perform tasks productively, accurately and within a realistic time allowance with and without direct supervision as required.

Communication (All verbal/written communications are in English as the primary language.)

a. Follow verbal and written instructions.
b. Read and comprehend text, numbers and graphs in professional and technical materials, e.g., textbooks, journals, instructional technology, Internet and procedure manuals.
c. Independently prepare papers, reports or posters.
d. Deliver oral presentations to fellow students and health care professionals.
e. Take paper, oral, computer and laboratory practical examinations at the post-secondary level.
f. Interact and communicate effectively and confidentially with all patients, hospital staff, administrators and co-workers.
g. Effectively use computer software, instructional technology and the Internet for communication, education and professional purposes.

Policy for Termination of Students

The students are subject to the Hospital's Substance Abuse Policy.

1. The use of alcohol or unlawful manufacture, distribution, possession or use of a controlled substance is prohibited on hospital property. Violations of this policy will result in immediate disciplinary action up to and including dismissal and may have legal consequences.

2. There is a two-month probationary period for assessing:

   A. Responsible attitude to patients
   B. Motivation
   C. Mental discipline
   D. Adaptability
   E. Ethics
   F. Technical proficiency
   G. Discrimination of colors
   H. Use of keyboards
   I. Ability to adapt to physical surrounding
   J. Flexibility

   Failure to successfully complete probationary period may result in termination.

3. The students are expected to maintain an average of "C" (75%) or above throughout the year. Failure of one or more lecture courses may result in dismissal.

4. Unsatisfactory performance in the laboratory rotation will be brought to the student's attention and he/she may be asked to repeat the entire department or just a specific area of the department. Continued performance below specified guidelines may result in dismissal. (as outlined in the rotation handouts).

5. Dismissal is taken under advisement with the Medical Director of the Program, the Program Director, Department Supervisor and the entire teaching staff.

6. Any student found cheating on an exam (including talking during an exam) will receive an "F" for that exam and may be subject to academic probation or dismissal. Old examinations are considered the property of the school and are not to be used by the student. Use of old examinations could lead to academic probation or dismissal.

7. Readmission may be gained by writing an application to the Medical Director or the Program Director for remedial studies to be readmitted to the program. Approval is granted through the Medical Director, Program Director and Faculty.

Certification Examination

Upon completion of the clinical and educational period, the graduate is eligible to apply for certification. Usually, the educational institution responsible for the student's preparation is required to attest that the graduate has completed all the requirements for certification and to indicate an expected date of graduation. With few exceptions, certification is obtained by passing an examination, administered on the national level. The most common agency is:

The American Society of Clinical Pathologist Board of Certification for Medical Laboratory Scientist @ www.ascp.org

State License Agencies for Clinical Laboratory Personnel

- State of California-Department of Health Services
- State of Florida-Board of Clinical Laboratory Personnel
- State of Georgia-Office of Regulatory Services
- State of Hawaii-State Laboratory Division
- State of Louisiana-Licensure Divisions
- State of Montana-Science Practitioners
- State of Nevada-Nevada State Health Division
- State of New York-Office of the Professions
- State of North Dakota-Division of Laboratory Services
- Puerto Rico-Department of Public Health
- State of Rhode Island-Board of Clinical Laboratory Sciences
- State of Tennessee-Medical Laboratory Board
- State of West Virginia-Department of Health and Human Services

Some of these agencies also administer specialty examinations for the various sections of the Laboratory, such as Chemistry, Hematology, Blood Banking and Microbiology, for the individual who wishes to concentrate in one subject.

Students in Need of Health Service

For minor illness or injury an Employee Health nurse is available.

1. Authorization form must be obtained prior to visit.
    A. Notify the Program Director and Section Supervisor.
    B. In the absence of the Program Director, notify the Administrative Director.
2. Monday through Friday from 6:30a.m. to 5:00 p.m. (except holidays)- please report to Employee Health, Extension 7677.
3. All other times--page the nursing supervisor.
4. All sudden and severe medical emergencies will report directly to the Emergency Department

Fire and Safety

The Program Director is responsible for formulating, implementing, and promulgating a Fire and Safety Plan for students in cooperation with the Safety and Security Department of the Hospital. In order for the plan to be effective and ensure the safety of everyone, the cooperation of each individual is necessary.

An annual safety in-service program is provided to students during orientation. It is the responsibility of each instructor to orient students to the Fire Plans and equipment in each of the Laboratory Departments.

Fire Plan in The Hospital

RACE:

RESCUE	Remove the occupant(s) from the room.
ALARM	Pull the nearest fire alarm box.
CONTAIN	Close all windows and doors and contain the fire to a specific area.
EXTINGUISH	Fight the fire until help arrives.

If you discover a fire:

1. Remove the patients from immediate danger (during Phlebotomy training).
2. Pull the nearest fire alarm box. NEVER assume that someone else has or is going to do it.
3. Contain the fire to the immediate area by closing windows, doors, vents, and laundry chutes. Turn off fans, air conditioners and oxygen not needed to sustain life. Keep lights on.
4. Attempt to extinguish the fire while awaiting the arrival of the fire brigade and fire department.
5. When relieved by members of the fire brigade or the fire department, report back to your Laboratory Supervisor.

WHEN THE FIRE ALARM SOUNDS AND THE FIRE IS NOT

IN YOUR IMMEDIATE AREA

1. Close all windows, doors, vents and laundry chutes. Turn off fans, air conditioners and oxygen not needed to sustain life. Keep lights on.
2. Reassure patients and visitors. Have them remain in their rooms.

3. Report to your Laboratory Supervisor and follow instructions outlined in your department fire plan.

Student Safety in the Laboratory

INTRODUCTION

Laboratory safety defines a broad program of preventive medicine designed to protect the health of students who encounter potential safety hazards in the Laboratory. Safety **MUST** be an intrinsic part of each laboratory operation; work must be planned so that exposure to hazards will not occur. Students will be **REQUIRED** to review the Laboratory Safety Manual during orientation.

HEPATITIS B IMMUNIZATION

The Hepatitis B vaccination series is not mandatory, but it is strongly recommended the series be started prior to clinical experiences. The vaccination is voluntary. The safety and efficacy of the vaccine has been extensively studied. After the series of Hepatitis B vaccine, 96% of healthy adults develop protection. If you decide not to be vaccinated, you will need to sign a declaimer. Currently, Infection Control is strongly recommending the vaccination of anyone with a contaminated needle stick injury.

AIDS OR HIV EXPOSURE

It is the responsibility of the exposed student to report the exposure to his/her clinical instructor and Program Director. An MJLX, anecdotal and top and middle sections of the Authorization for Injury/Illness Treatment form (#1439) will need completed. The Program Director will send the student to the Employee Health Nurse. The Employee Health Nurse will implement the required protocols of UPMC Altoona and, first aid treatment for the exposure. The Occupational Health Department will provide counseling, lab testing, antibiotic therapy and follow-up as per the SOP: *Blood and Body Fluid Protocol (A-3).*

UNIVERSAL PRECAUTIONS

Medical technology students as stated in the SOP: *Standard Universal Precautions* must regard each specimen as a potential health hazard. Because the potential for infectivity of any patient's blood and body fluid cannot be known, blood and body fluids must be adhered to for all patients and for all specimens submitted to the Laboratory. All blood, body fluids, tissue, stool and urine specimens must be handled as infectious specimens. For additional information on Universal Precautions, please refer to the Laboratory Safety Manual.

GLOVES

Gloves **MUST** be worn while performing phlebotomies and when handling blood and body fluids in the clinical setting. Handwashing must be done before donning gloves and immediately after removing gloves. Gloves must be changed between patient contacts.

OSHA STANDARD ON OCCUPATIONAL EXPOSURE

TO BLOODBORNE PATHOGENS

The Occupational Safety and Health Administration ("OSHA") has issued a final standard protecting workers from occupational exposure to blood borne pathogens, including the human immunodeficiency virus ("HIV") which causes AIDS and the hepatitis B virus ("HBV"). The standard, effective March 6, 1992, will affect over 6 million workers in hospitals, nursing homes, and home health care.

Universal precautions, treating all body fluids as infectious, are mandated by the standard. The employer and employee are not allowed to decide, using their own professional discretion, whether to use universal precautions.

Appropriate personal protective equipment, which is defined as not permitting blood or other potentially infectious material to reach the employee's skin or work clothing, must be provided, cleaned and replaced by the employer at no cost to the employee. Such equipment includes gloves, gowns, masks, eye protection and face shields, but does not include "general work clothes" such as uniforms and laboratory jackets. The employer must ensure that employees use appropriate personal protective equipment unless under "rare and extraordinary" circumstances the employee, not the employer, decides the equipment would interfere with the delivery of health care or pose an increased risk to the worker.

For additional information on this OSHA Standard, please refer to the Laboratory Safety Manual.

In-services conducted by the Infection Control Officer will be provided. Topics include, but are not limited to: Isolation, New OSHA Standards, Handling of Specimens and Handwashing.

Drug-Free Environment

Federal law requires all recipients of federal grants to take specified actions aimed at establishing and/or maintaining a drug-free environment. UPMC Altoona School of Medical Technology believes that it has the responsibility to offer a positive and constructive program of student services.

Students are required to sign a drug-free statement prior to receiving federal financial aid. In addition, all students attend an in-service on the drug-free environment given by UPMC Altoona Safety and Security. The intent of the School is to maintain a drug-free, healthful, safe and secure environment.

During the orientation period at UPMC Altoona, a physical assessment is completed which includes drug screening.

The unlawful manufacture, distribution, dispensation, possession, or use of a controlled substance is prohibited. Violations of this policy will result in immediate disciplinary action up to and including dismissal and may have legal consequences.