

University of Maryland School of Medicine

Department of Medical and Research Technology



UNIVERSITY *of* MARYLAND
SCHOOL OF MEDICINE

Spring 2015 Clinical Rotation Placement Manual

**NATIONAL ACCREDITING AGENCY FOR CLINICAL LABORATORY SCIENCES
(NAACLS)**

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**UNIVERSITY OF MARYLAND BALTIMORE
SCHOOL OF MEDICINE**

DEPARTMENT OF MEDICAL AND RESEARCH TECHNOLOGY

	Page #
Operational Policies	4
DMRT Philosophy and Goals	4
Clinical Placement Expectations.....	7
Non-Academic Standards	8
Policies for Rotation Placement.....	9
Criteria for Rotation Placement	9
Background Checks	9
Evaluation of Students	9
Attendance/Tardiness.....	10
Student Grievance Report.....	11
Inclement Weather Policy.....	11
Service Work Performed by Students.....	12
Student Employment.....	13
HIPAA and Related Confidentiality Issues	13
Personal Appearance and Decorum	13
Professionalism and Academic Integrity	13
Dress Code at Laboratory Affiliates	14
Security and Order	15
Laboratory Protocols.....	15
Liability Insurance	16
Medical Treatment for DMRT Students.....	16
Exposure at Affiliates of DMRT.....	16
UMB email Accounts	18
Cell Phones and Electronic Devices	19
Acceptable Use of Computers at UMB and UMB Affiliates	19
Appendix A	
Clinical Objectives	
Appendix B	
Supplemental Forms	
Appendix C	
Faculty Contact List	
MLS Student Grievance Form	
Accident & Injury Report	

UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE DEPARTMENT OF MEDICAL & RESEARCH TECHNOLOGY

This manual contains the policies and procedure that are currently in effect for the undergraduate program at the Department of Medical and Research Technology. The Program reserves the right to change, update or modify policies as needed. ALL DMRT students must agree to abide by all policies and procedures established in this document.

OPERATIONAL POLICIES - University of Maryland Baltimore

The University authorities reserve the right to make changes in the curriculum, in the requirements for advancement and graduation, in fees, and in rules and regulations whenever appropriate.

The provisions of this publication are not to be regarded as an irrevocable contract between the student and the University of Maryland. The University reserves the right to change a provision or requirement at any time within the student's term of residence. The University further reserves the right, at any time, to ask a student to withdraw when it considers such action to be in the best interest of the University.

The University of Maryland, Baltimore is an equal opportunity institution with respect to both education and employment. The University's policies, programs and activities are in conformance with pertinent federal and state laws and regulations on nondiscrimination regarding race, color, religion, age, national origin, sex, and disability.

If you require special accommodations to attend or participate in the program or an activity, please provide information about your requirements to the DMRT Student Affairs Coordinator/Program Director at (410) 706-7664 (1-800-735-2258 TTY/Voice).

DMRT PHILOSOPHY AND GOALS

Mission Statement

To provide a program of instruction at the baccalaureate level which develops competence in ethical, principled laboratory scientists who possess the knowledge as well as the technical, interpersonal and attitudinal skills and attributes which create quality service.

In accordance with the philosophy and purposes of the University of Maryland School of Medicine, the Department of Medical and Research Technology (DMRT) is committed to the following goals:

- to encourage scientific and academic advancement, a commitment to life-long learning, and active participation in professional societies;

- to encourage the practice of moral and ethical values relating to patient care;
- to assist students in developing their level of competency and their analytical decision-making, thus preparing them to make appropriate judgments in their professional life;
- to assist students to develop enhanced skills in critical thinking, problem solving, and skills in oral and written expression;
- to provide the opportunity for student participation in a clinical/research setting designed to offer experiences required of an entry-level Clinical Laboratory Scientist or Biotechnology Research Scientist;
- to provide and foster student professional development, high standards of achievement, and interactions among other health care practitioners;
- to provide a level of instruction which maintains a progressive and positive educational environment;
- to support a graduate curriculum which serves as a natural extension of professional development for those who desire to serve in leadership roles in management, practice, education, and research in the field of clinical laboratory science/biotechnology science research.

Clinical Behavioral Norms

As part of our mission to develop competent medical laboratory scientists, faculty, staff, and clinical preceptors work collaboratively to cultivate adherence to the DMRT Clinical Behavioral Norms.

Behavioral Norms for MLS/MLT Student Clinical Rotation Placement

1. Punctual means:
 - At the **bench** at expected arrival time and ready to work.
 - Return from break/ lunch in the time allotted.
2. Be prepared means:
 - Take responsibility for your learning.
 - Review objectives/class notes prior to rotation.
 - Read the protocols thoroughly and follow them before asking questions.
 - Don't expect to be taught basics that the clinical site assumes you will come to rotation having learned in the didactic course.
3. Bring notebook to bench AND take notes!
4. No electronic devices - no cell phone; no texting; no games. Cell phones may be on silent mode.
5. If you don't know, ask before doing. Questions are always welcome and encouraged.
6. Take responsibility for your errors and seek help when needed:
 - Be patient with yourself, it is a learning process.
 - Making mistakes and learning from them are part of the process.
 - Provide and receive respectful feedback

7. Practice integrity and honesty throughout the entire testing process.
 - Follow procedures & protocols exactly.
 - Do not release patient results or use someone else's identification badge for any unauthorized purposes.
 - Do not falsify data or cover up mistakes.
8. Become part of the team, no one is done until everyone is done so:
 - Ask how you can help
 - Use resources wisely
 - Clean up when finished
 - Don't ask if you can leave early
 - Consider rotation time as an interview; a chance to network
9. Be mindful of patient-centered care especially patient confidentiality and safety.
 - Confidentiality goes beyond not talking about patients on elevators or in lunch rooms
 - Follow HIPPA regulations diligently such as not accessing patient results unrelated to the work performed.
 - Do not text details of your day
 - Do not post information on social network sites
10. Adhere to the daily rotation schedule, but be flexible and adaptable with the rotation schedule as well as the work. This includes being willing to help out beyond assigned work.
11. Adhere to the MLS/MLT program's dress code.
12. Maintain enthusiasm for the rotation experience and for the laboratory profession.
 - Seek out opportunities to learn.
 - Focus on your current career path (MLS/MLT), don't share your "alternatives" (professional school).
13. Be respectful in all communications with patients, laboratory personnel, physicians, staff and other members of the health care team. This includes:
 - Using proper grammar at all times; no jargon
 - Addressing clinical professionals by their proper names such as Dr., Ms. or Mr.
 - Not contacting clinical employees on social network sites (such as Face Book) until after graduation.
14. Document all of your work. If your work is not documented (written or electronic), it did not happen.
15. Always remember to thank your clinical preceptors.

CLINICAL PLACEMENT EXPECTATIONS

One of the goals of clinical rotation placement is to ensure that each student leaves the Department with an understanding of the behavioral standards of the profession, and that each student demonstrates a willingness to adhere to these standards. Following the completion of Department of Medical and Research Technology didactic coursework, the student will demonstrate the ability to:

- prepare for each rotation placement by reviewing notes, following objectives, and reading supplementary materials;
- present a clean and neat appearance in accordance with the Departmental dress code;
- report to the laboratory promptly and work until excused;
- comply with affiliate policies regarding:
 - a. work schedules and proper “in-time” attendance,
 - b. sample labeling,
 - c. confirmation of patient and sample identity,
 - d. patient confidentiality, issues of confidentiality,
 - e. appropriate management of discrepancies,
 - f. lunch break, eating, smoking, etc.,
 - g. safety regulations,
 - h. quality control protocols, and quality assurance protocols;
- perform procedures within the ethical policy of laboratory practice;
- perform according to his or her own individual strengths and limitations;
- accept constructive criticism in a mature fashion;
- maintain composure, work quality, and friendly relations with others, even under stressful conditions;
- actively participate in performing assigned tasks;
- complete assigned tasks on time, and be willing to adjust personal schedules to accommodate completion of tasks;
- give attention to instruction, listen well, and ask pertinent questions;
- take time to perfect skills, perform them well;
- analyze a procedure before attempting to undertake it; request assistance when necessary;
- state the pathological significance of test results;
- correlate facts, principles, and theories of work procedures in order to identify problems and to evaluate malfunctions;
- organize time, materials, and equipment to perform multiple assays with accuracy;
- identify sources of error and safety precautions;
- operate equipment carefully and skillfully; judiciously utilize reagents and supplies;
- report written results legibly and verbal results accurately and courteously; report results truthfully and objectively, maintaining patient confidentiality;
- volunteer for departmental activities;
- maintain a clean work area, leaving area clean and disinfected at the end of the work day;

- report out when leaving assigned area;
- arrive on time and limit unscheduled absences;
- communicate effectively, professionally and civilly at all times with faculty, staff, students and other health care professionals.

NON-ACADEMIC STANDARDS*

The following *non-academic standards* represent the essential requirements of the Department that the student must be able to carry out in a distraction-filled environment.

- Identify visually cellular components and microorganisms utilizing a microscope.
- Interpret visually and distinguish biochemical reactions on slides, plates, and test tubes.
- Demonstrate sufficient manual dexterity in order to process specimens; operate, maintain, and repair laboratory equipment; carry out all aspects of laboratory testing procedures.
- Ambulate adequately to collect blood specimens from patients and to perform basic laboratory functions in an established time-frame.
- Demonstrate written and oral proficiency in the English language including the ability to read, write, and speak English fluently.
- Exhibit effective communication skills when transmitting data and/or information to faculty, classmates, physicians and other health care personnel.

*** Please note: It is the student's responsibility to notify the department of any change in status in the above stated abilities.**

**THE UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE
DEPARTMENT OF MEDICAL AND RESEARCH TECHNOLOGY
POLICIES FOR PRACTICUM EXPERIENCES**

CLINICAL ROTATION PLACEMENTS

Each student who meets the academic and professional standards for advancement to clinical rotation placement will be placed at an affiliate site. Every effort is made to assign senior medical laboratory science students and post-baccalaureate students to clinical rotation placement sites according to geographic area, availability, and student interest. However, due to rotation commitments by the affiliates, special arrangements may be required for student placement in clinical affiliate laboratories. The final decision for all rotation placements is made by the program. **Once clinical rotation sites are assigned to the student no changes to the schedule will be made.**

The Program works closely with the clinical affiliates to assure that all rotation experiences provide comparable entry-level skills and training. A standardized set of Clinical (Behavioral) Objectives and rotation related policies have been developed with input from the clinical affiliates and are distributed annually at the Department of Medical and Research Technology's Clinical Orientation.

BACKGROUND CHECKS

DMRT's academic requirements involve placement at one or more off-campus training sites, such as hospitals and other institutional settings. These off-campus clinical sites routinely require students to undergo and pass a background check and, in some cases, drug testing.

More and more hospitals and other clinical training sites are requiring criminal background checks and drug tests to protect the safety of patients and other persons at these facilities, and to ensure the confidentiality of patient information.

Each training site sets its own standards for a background check and/or drug testing and typically conditions placement at the site on passing the check. You may also be asked by the training site to pay the cost of the background check and drug testing. You may have to complete more than one criminal background check and drug test during the course of your rotations, depending on the number of sites at which you are placed and the requirements of each site. Please note that students will be obligated to abide by this policy as well as other policies of the affiliate site.

If you fail a site's criminal background check or drug test, you may be unable to complete your course requirements. It is important for you to consider this before you enroll. The Department has no obligation to refund your tuition or fees, or to accommodate you in the event that you fail a background check or drug test and, as a result, are unable to complete your course requirements. You should also be aware of the possible consequences under the campus Substance Abuse Policy. (See: <http://cf.umaryland.edu/hrpolicies/section7/t70110Asa.html>.)

EVALUATION OF STUDENTS

1. Advancement from the didactic portion of the program to the laboratory portion in the senior year will be based on the student's overall academic record and professional behavior. Progression to clinical rotations is only permitted upon successful performance in both these areas. The Chair reserves the right to deny advancement to clinical rotation placement if any concerns in reference to professional behavior have been raised.
2. Twelve semester hours of Clinical Practice are taken on a **Pass/Fail** basis. A grade of "P" is not included in the calculation of the grade point average. Successful completion of each laboratory component is required before graduation.

The laboratory faculty makes a recommendation for the final grade based on written and/or oral examinations, and direct observations as well as the following evaluations:

- a. **The Interim Evaluation** is to be used by the clinical instructor to monitor the student's progress *during* the rotation. This evaluation is an indication of the student's progress and performance. It should reflect the student's potential to successfully complete the rotation/externship. It will be collected at the faculty site visit.
- b. **The Final Evaluation** must include a recommendation for a grade, formal evaluation, and documentation of specific observed behaviors with appropriate narrative comments. Successful demonstration of acceptable affective behavior and attendance in accordance with the Department's affective objectives is required of all students in order to pass laboratory courses.

It is the student's responsibility to return the original copy of the clinical final evaluation in a sealed envelope to the Program Director on the post rotation day. The clinical instructor can also mail final evaluations directly to the Department. These professional evaluation forms become a part of the student's permanent record. The evaluations are confidential and utilized by program officials when prospective employers, graduate schools, professional schools, etc request recommendations.

Copies of both the Interim and Final Evaluation can also be obtained on the Student Life page of the DMRT web site under Clinical Rotation: http://medschool.umaryland.edu/dmrt/docs/Interim_Clinical_Evaluation.pdf and http://medschool.umaryland.edu/dmrt/docs/Final_Clinical_Evaluation.pdf.

NOTE: Each student should have a form on file that authorizes the release of information for each recommendation requested for future employment. Forms were distributed at senior orientation in the beginning of the school year and can be obtained from the Office of Student Affairs.

- a. **The Self Evaluation** enables the students to rate themselves for comparison with the final evaluation filled out by the clinical supervisor. This evaluation may also be used to diagnose student strengths and weaknesses. This form is to be filled out by the student at the department on post rotation day.
- b. **The Laboratory Evaluation** allows the students to evaluate and give feedback on their experience at the affiliate laboratory. This information is reviewed by the Program Director, compiled in a report and shared with each clinical affiliate annually.

ATTENDANCE/TARDINESS

Attendance in all areas of the clinical rotation/externship is MANDATORY. Students are expected to treat attendance at clinical rotations as they would employment. Students are required to arrive on time and remain at the rotation site until the completion of the day's assigned duties or as determined by the clinical preceptor.

Absence from clinical rotation is not encouraged and any missed time due to absence, tardiness, or leaving early will be made up. Make-up time will be scheduled by the clinical preceptor at a time that does not interfere with the progress of the clinical rotation/externship. The policy for making up missed time will be determined by each clinical site. Please note that attendance, tardiness and leaving early reflect student professional attributes and are documented on the **Final Evaluation** form for clinical rotation experiences.

In the case of student illness, such as the flu, upper respiratory infection or other illness that could be transmitted to patients, the student is encouraged to remain at home.

Absence, tardiness, or leaving early during clinical rotation placement must be documented by either e-mail or phone call from the student with one communication to the respective laboratory preceptor and one to the Program Director. If the clinical preceptor has concerns about UMB student tardiness, absenteeism or leaving early, please contact a DMRT faculty liaison or the Program Director (410-706-7664).

Attendance at scheduled DMRT **Rotation Review Sessions is MANDATORY** for all medical technology students and post-baccalaureate categorical students enrolled in the related rotation experience.

Attendance at **Post Rotation/Externship Day is MANDATORY** for all medical technology students and post-baccalaureate categorical students enrolled in the related rotation or externship experience. Students with unexcused absences on Post Rotation/Externship day will NOT be permitted to advance to their next rotation.

STUDENT GRIEVANCE REPORT

Any DMRT student on clinical rotation may formally document a concern or grievance related to the clinical experience. The MT Student Grievance Report Form should be completed and submitted for review to the Program Director. Forms may be obtained from the Office of

Student Affairs at DMRT or from the Student Life page of the DMRT web site
http://medschool.umaryland.edu/dmrt/docs/Grievance_Form.pdf.

INCLEMENT WEATHER POLICY

Students on clinical rotation placement are to make every effort to attend their practicum. Time missed due to inclement weather must be made-up. Absences should be reported to the office of the Program Director and the department supervisor at the laboratory site.

As a result of varying conditions, students are urged to use their personal judgment on whether to travel to affiliate laboratories. Students are also to follow attendance protocol as previously described.

In the case of inclement weather and the campus is officially closed, the student is not obligated to report to the clinical site for rotation. In the case of the campus delaying opening until 10:00 a.m. the student should report to the affiliate site at 10:00 a.m.

Sources of information concerning inclement weather announcements include: the Campus Emergency Information Phone number of 410-706-8622, the Campus Alerts web page at <http://www.umaryland.edu/alerts>, the TV station WBAL TV, and the radio station WBAL FM 97.9.

Liberal Leave Due to Inclement Weather

The UMB Liberal Leave policy applies to faculty and staff in the event of severe inclement weather, or other unusual conditions affecting traffic conditions or the operation of public transit or campus facilities authorizes the President or his designee to declare Liberal Leave to be in effect under which non-essential employees may elect to work or to take accrued annual, holiday, personal, or compensatory leave, or leave without pay.

Students are not covered under the campus Liberal Leave policy and should always check with their school or program, in the event of severe inclement weather or other unusual conditions affecting traffic conditions or campus facilities, regarding class cancelations and/or other academic program requirements such as clinical placement participation.

For DMRT students during Liberal Leave, on-site classes will begin no earlier than 10:00 am. The Course Coordinator will work with the Program Director to evaluate the circumstances and make a decision. Students are responsible for monitoring University e-mail and Blackboard messages for the decision not to hold classes or proceed with a late start time. **Students on clinical rotation placement should communicate with the clinical site to determine the need to attend rotation.** Absence from class will not be counted against students who are not able to attend class when Liberal Leave is in effect.

SERVICE WORK PERFORMED BY STUDENTS

Students on clinical rotation placement are not expected to provide “service work” for the clinical sites during their clinical rotation placements. Students may not be substituted for clinical staff. After demonstrating competency, students may be permitted to perform procedures under qualified supervision; however, it is the responsibility of the supervising employee for final verification of the data and release to the LIS (laboratory information system).

Any service work by students in the clinical setting outside of the academic hours is non-compulsory. If a student chooses to be hired by a clinical site for a job that does not require a certified medical laboratory scientist (MLS), the work hours must be scheduled at a time other than class hours (e.g., evenings or weekends). In such cases, the student is a *bona fide* employee of the site and the work is not considered to satisfy any part of the student’s clinical rotation placement.

STUDENT EMPLOYMENT

To support academic success, it is the recommendation of the Department that students not maintain full-time employment and work no more than 16 hours per week. If additional funds are required, financial aid avenues should be pursued. Contact University of Maryland Baltimore Financial Aid at (410) 706-7347 or a DMRT representative for scholarship opportunities.

HIPAA AND RELATED CONFIDENTIALITY ISSUES

Students are required to complete the online HIPAA course offered at UMB. Prior to participating in the clinical practicum rotations, the student is required to sign a form whereby he/she agrees to abide by the rules and regulations of the clinical sites utilized by the program while on their premises during any assigned clinical or research rotations. Clinical sites may require the student to satisfy their specific HIPAA policies.

PROFESSIONALISM AND ACADEMIC INTEGRITY

Students are expected to demonstrate professional conduct in the clinical settings at all times. Such conduct shall include, but is not limited to, academic integrity, honesty and civility as well as honoring patient confidentiality.

PERSONAL APPEARANCE AND DECORUM

Since the environment of the UMB campus and the DMRT’s affiliate laboratories is professional rather than typically collegiate; students shall conduct themselves at all times, and in all places, in a manner which will bring credit to the University, School of Medicine, the Department of Medical and Research Technology and to themselves. Conduct of students in public, particularly within the affiliated hospitals and laboratories, should conform to the highest professional standards.

DRESS CODE AT LABORATORY AFFILIATES

As professional representatives of the Department and the University of Maryland, students on clinical rotation placement must adhere to the established dress code guidelines for the specific facility. Students will project a professional image. “Business Casual” is the way of expressing a mode of dress that conveys neat attire appropriate for the business of the facility. In addition to observing the guidelines of the practicum site, students must adhere to the following minimum guidelines of the Department of Medical and Research Technology:

- Appearance is to be neat and clean, and demonstrate the use of good body and oral hygiene at all times.
- Clothing should be clean, free from tears and not wrinkled or tattered. Skirt or pant hemlines should not touch the floor.
- Male students must wear long pants or scrubs with pockets. Dress pants, khakis, and corduroys are acceptable. Socks are required when wearing pants or scrubs to cover legs below the hemline.
- Female students must wear pants, scrubs with pockets or skirts resting below the knee. Dress pants, khakis, dressed crop pants and corduroys are acceptable. Dresses and skirts cannot be more than 3 inches above the knee. Socks are required when wearing pants or scrubs; stockings or hose are required when wearing a skirt to cover legs below the hemline.
- T-shirts, sweat shirts, hooded sweat shirts, strapless tops, mid-driff bearing, halter-tops, tube tops, spandex and tops with plunging necklines are not permitted. Shirts with a collar are recommended.
- Mini-skirts, shorts, blue jeans, sweatpants, stretch pants, overalls, spandex, capri pants and running pants are not permitted.
- Cloth, open-toed or perforated shoes (such as cros) are not permitted in the laboratories. Canvas tennis shoes, flip-flops and slippers are not acceptable.
- Hairstyles which extend below the shoulder must be tied back. Non-natural hair color is not permitted.
- Male student’s facial hair must be short, neatly trimmed, and maintained.
- Jewelry must be limited; long necklaces, dangling bracelets or earrings extending below the earlobes are not permitted.
- The use of strong scents and fragrances is highly discouraged.
- No more than two visible earrings are permitted in each ear. All other piercings (i.e., tongue, nose, eyebrow, lip rings, etc.) must be removed while on clinical rotation/externship or when visiting the Medical Center.
- Tattoos will be covered.
- Sunglasses will not be worn inside the school or clinical laboratory.

During clinical rotation placement, students must also adhere to the established dress code guidelines of the specific laboratory. Students should consult with the affiliate institution for site specific information. Instances when a student does not conform to the dress code will result in appropriate disciplinary action, including removal from rotation.

Policy on Fingernails

Natural fingernails must be kept clean, presentable and of professional length no longer than ¼ inch in length from the fingertip. Fingernails may not interfere with job duties or safety practices or protective glove requirements. Artificial nails, nail extenders, nail enhancements, gel wraps or attached decorations will not be allowed when working directly with patients such as during phlebotomy class and phlebotomy rotation as well as when participating in student laboratory activities at DMRT and clinical rotation sites.

SECURITY AND ORDER

Students are responsible for maintaining security, neatness and order in all areas.

- a. **Students must wear their University of Maryland Baltimore identification badge at all times, and observe all other security regulations.**
- b. Students are responsible for personal property and care of the affiliate institutional property.

LABORATORY PROTOCOLS

The following protocols are to be adhered to by all students in the laboratory setting since they comply with the Occupational Safety and Health Administration (OSHA) guidelines that are enforced to ensure the personal safety of students. Violations of these policies will result in immediate disciplinary action. Repeated violations will result in dismissal from the program. Students are responsible for cleaning the laboratory areas, and maintaining proper laboratory safety practices.

- Standard laboratory precautions will be practiced at all times.
- Personal protective equipment (PPE) such as lab coats will be worn in the laboratory at all times. Coats are not to be worn outside the laboratory or laundered by the student.
- Gloves must be worn when handling biological or hazardous materials.
- Splash shields are to be utilized when appropriate.
- Eating, smoking, chewing gum, drinking, and applying cosmetics are prohibited in the laboratory.
- Biological waste and sharps are to be disposed of in appropriate containers.
- Students are not permitted in affiliate laboratories unattended.
- Cell phones, MP3 players, electronic reading devices, etc. are not permitted in the laboratories.

LIABILITY INSURANCE

All students on rotations/externships are required to purchase medical professional liability coverage through the University of Maryland. The coverage is \$1,000,000 for each wrong act up to an aggregate of \$3,000,000.

MEDICAL TREATMENT FOR DMRT STUDENTS

Cost: All costs for medical treatment or post exposure evaluation and follow-up activities for students are the responsibility of the student. All full time DMRT students are required to have health insurance and the insurance can be billed for all medical services.

The DMRT must be notified immediately of any accident or injury involving a student during rotation placement by calling 410-706-7664. AN ACCIDENT AND INJURY form must be completed within 24 hours and should be faxed to the Program Director at 410-706-0073. This form is located in Appendix B and also available on-line at: <http://www.medschool.umaryland.edu/dmrt/rotations.asp>

POST-EXPOSURE EVALUATION AND FOLLOW-UP FOR STUDENTS

All exposure incidents that occur for students must be reported, investigated, and documented (see Accident & Injury report form in Appendix B).

EXPOSURE AT AFFILIATE LABORATORIES OF DMRT

If a DMRT student has an exposure incident at an affiliate laboratory, the student must inform that laboratory's Clinical Liaison or the immediate supervisor to begin the post exposure follow-up procedure. Some affiliate laboratories will perform the testing of both the student and the source individual's blood. However, other affiliates may send the student back to UMB for all testing. It is important that ALL students know the affiliates' policy concerning student exposure to blood borne pathogens PRIOR to an incident occurring.

The DMRT must be notified immediately of any exposure incident involving a student during rotation placement by calling 410-706-7664. AN ACCIDENT AND INJURY form must be completed within 24 hours and should be faxed to the Program Director at 410-706-0073. This form is located in Appendix B and also available on-line at: <http://www.medschool.umaryland.edu/dmrt/rotations.asp>

Following a report of an exposure incident, the exposed student must receive a confidential medical evaluation and follow-up, including at least the following elements:

1. Documentation of the route of exposure and the circumstances under which the exposure incident occurred.
2. Identification and documentation of the source individual, unless it can be established that identification is infeasible or prohibited by state or local law.
3. The source individual's blood will be tested as soon as feasible after consent is obtained to determine HBV and HIV infection. If consent is not obtained, the person responsible for the Hepatitis B vaccination program will establish that legally required consent cannot be obtained. When the source individual's consent is not required by law, the source individual's blood, if available, will be tested and the results documented.
4. When the source individual is known to be infected with HBV or HIV, testing for the source individual's HBV or HIV status need not be repeated.
5. Results of the source individual's testing must be made available to the exposed student along with information on applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual.

Collection and testing of blood for HBV and HIV serological status will comply with the following:

- The exposed student's blood will be collected as soon as feasible and tested after consent is obtained.
- The exposed student will be offered the option of having their blood collected for testing of HIV/HBV serological status. The exposed individual **MUST** have a blood test for HIV if the source patient consents for testing.

All DMRT students who experience an exposure incident will be offered post-exposure evaluation and follow-up in accordance with the OSHA standard. The health care professional responsible for the person's Hepatitis B vaccination and post-exposure evaluation will be provided with the following:

- A copy of 29 CFR 1910. 1030. <http://www.osha.gov>
- A written description of the exposed individual's duties as they relate to the exposure incident.
- Written documentation of the route of exposure and circumstances under which exposure occurred.

- Results of the source individual's blood testing, if available.
- All medical records relevant to the appropriate treatment of the person including vaccination status.

The exposed student will be provided a copy of the evaluating health care professional's written opinion within 15 days of the completion of the evaluation.

The health care professional's written opinion for HBV vaccination must be limited to whether HBV vaccination is indicated and if the student has received such vaccination. It will include a statement that the student has been informed of the results of the evaluation and of any medical conditions resulting from exposure to blood or other potentially infectious materials that require further evaluation or treatment. All other findings or diagnosis must remain confidential and will not be included in the written report.

Student Needle Stick Procedure

Monday thru Friday between the hours of 8:30 a.m. and 4:00 p.m. the following must be done in conjunction with the office of Student Health under the direction of Vivienne Rose, MD:

- For all exposures during these hours please call:
 1. Pager (410) 416-1329 and someone will respond within 10 minutes.
 2. If for some reason the pager is inoperative or unattended and you haven't received a return call in 10 minutes, page (410) 416-1854 and someone will respond within 10 minutes.
 3. In the unlikely event you do not receive a response from the second page, call the Department of Family and Community Medicine at (410) 328-8792; tell the operator you have a needle stick and/or body fluid exposure and you must speak to a Student Health staff member immediately.
- Any exposures outside of our normal business hours will be directed to the STIK Hotline (410) 328-2337, ID# 7845.
- It's imperative that the above procedure be followed during the hours indicated.

UMB e-mail ACCOUNTS

UMB e-mail accounts are assigned to students at the beginning of the academic school year. Since many DMRT courses are supported by Blackboard, such as the Final Comprehensive Exam, students are required to use their e-mail account provided by UMB. Periodically, throughout the student rotation/externship the Program Director must communicate with students; thus UMB e-mail accounts must remain current and active.

SMART/CELL PHONES AND ELECTRONIC DEVICES

Students will follow the policy of the clinical affiliate regarding the use of smart/cell phones. DMRT **strongly discourages** the use of cell phones including text messaging during rotation learning activities unless on an official break. **MP3 players, electronic games, and Kindle devices will not** be used at any time during the clinical rotation experience. The use of any and all other electronic devices such as personal lab tops, Blackberry devices, and PDAs is also strongly discouraged and may only be used in compliance with clinical affiliate policies.

ACCEPTABLE USE OF COMPUTERS AT UMB AND UMB AFFILIATES

Acceptable use of information technology (IT) resources is used in support of the research, education, service, and administrative activities of UMB or of an Affiliate. Authorized Users should always use IT resources in accordance with UMB, USM, and Affiliate policies, procedures, and guidelines, software licenses, and applicable laws. UMB depends upon a spirit of mutual respect and cooperation to create and maintain an open community of responsible users of UMB IT Resources. Use of UMB IT Resources must be responsible and professional

Authorized Users are responsible for safeguarding their own identification (ID) codes and passwords, and for using them for their intended purposes only. Authorized Users are solely responsible for all transactions made under the authorization of their ID, and for activity involving IT Resources.

Direct and indirect use of UMB IT Resources made available to an Authorized User is a privilege granted by UMB. The privilege is subject to compliance with this policy, other applicable UMB policies, Affiliate policies, and State and federal laws.

A P P E N D I X A

C L I N I C A L O B J E C T I V E S

PROFESSIONAL QUALITIES

1. Arrive at the laboratory on time and return from lunch/breaks on time.
2. Adhere to the established student uniform policy of the MLS program.
3. Notify the clinical supervisor of any unavoidable absences prior to the scheduled arrival time and make arrangements to make up the time on a mutually convenient date.
4. Demonstrate the ability to follow verbal and written instructions including written protocols and procedures and ask pertinent questions.
5. Communicate in a constructive, professional manner (i.e. polite, considerate, pleasant and unhurried) with members of the laboratory and hospital staff, peers and patients.
6. Organize work in a logical sequence.
7. Complete work and assignments within established deadlines.
8. With the approval of the clinical instructor, demonstrate the initiative to perform tasks without being reminded.
9. Demonstrate constructive utilization of all training time by examining available study materials during periods of time not devoted to instruction.
10. Demonstrate flexibility in changes to the scheduled daily learning activities due to laboratory staffing, emergencies, etc.
11. Demonstrate the ability to recognize and admit mistakes or discrepancies in laboratory protocols and/or results and, take appropriate corrective measures, including seeking help and notifying staff when needed.
12. Demonstrate the ability to accept professional constructive criticism regarding work.
13. Maintain the confidentiality of all patient information at all times in accordance with HIPPA regulations. This applies to patients or other unauthorized individuals and extends beyond the confines of the clinical setting.
14. Adhere to all published safety regulations in the laboratory.
15. Demonstrate professionalism in attitude, appearance and work ethic 100% of the time.

16. Adhere to standards and regulations regarding proper access and utilization of institutional computers.
17. Adhere to policies of the affiliate regarding the use of ALL electronic devices including, but not limited to, MP3 players and cell phones.

Clinical Performance Objectives in Clinical Chemistry
Department of Medical and Research Technology
University of Maryland School of Medicine

Upon completion of the **Clinical Chemistry** rotation the **MLS** student will be able to:

I. Laboratory Safety

1. Comply with the standard operating procedure (SOP) for specimen handling, distribution, and storage including correct triage of specimen for in house and send out laboratory testing.
2. Demonstrate safe work practices following departmental protocol by the following
 - a. Wearing personal protective equipment (PPE) as required.
 - b. Handling and disposing of contaminated materials according to standard precautions.
 - c. Handling chemicals according to safety procedures.
3. Dispose of waste according to laboratory protocol.

II. Specimen Handling

1. Check for correct identification/labeling of specimens according to the current National Patient Safety Standard from TJC.
2. Identify specimens that may be unsuitable for analysis due to incorrect anticoagulant used, sample volume and age, hemolysis, lipemia, icteric, clot, and/or air bubbles present.
3. Evaluate specimens for appropriate anticoagulant, collection time, and site of collection.
4. Explain corrective measures for unacceptable specimens.
5. Prepare a minimum of 20 specimens for analysis by centrifugation and separation of cells from serum/plasma.
6. Describe the process for archiving and retrieving patient specimens including the correct specimen storage requirement for each specimen type.

III. Quality Assurance

1. Explain the purpose of the quality control program.
2. Document results of calibration, performance, and maintenance checks, **malfunctions, and corrections without error.**
3. Observe basic LIS computer applications where relevant.
4. Comply with regulatory issues.
5. State the confidentiality policy of the facility during testing procedures and reporting according to HIPAA guidelines

IV. Performance of Procedures

A. Analytical Principle

1. Describe the sample path or flow in 2 instruments.
2. Discuss the theoretical principles for each analytical methodology.
3. Recognize common malfunctions of the instruments.
4. Recognize interfering substances for each procedure performed.
5. Describe the effect of interfering substances for each procedure performed.
6. Define the following methodologies:
 - End-point spectrophotometry
 - Kinetic spectrophotometry
 - Ion-selective electrodes
 - Osmometry
 - Electrophoresis
 - Chemiluminescence
 - Immunoassay
 - Fluorescent polarization
7. Classify the instruments at the site according to the approach to automation such as discrete or parallel analyzers.

B. Maintenance

1. Perform routine maintenance checks.
2. Describe the various periodic maintenance procedures for the different instruments and maintenance sheets.

C. Reagent Preparation

1. Prepare reagents, calibrators, and control material within the acceptable QC limits for 10 different assays.
2. Pipet reagents and samples accurately.

D. Quality Control and Calibration

1. Perform calibrations.
2. Evaluate the validity of the standardization/calibration of the instrument.
3. With 100% accuracy, identify all control results that are not within the accepted quality control limits.
4. State possible reasons, if QC results are not within the limits (e.g. outside instrument limitations)
5. Discuss appropriate actions for unacceptable control results.
6. Observe documentation of corrective actions for unacceptable control values.

E. Testing of Samples

1. Prepare dilutions with 100% accuracy.
2. Complete a minimum of 10 runs/assays with acceptable results and within the laboratory's timeframe specified for stat and/or routine turn-around time.
3. Operate at least one analyzer with minimal supervision in accordance with laboratory protocol.
4. Demonstrate the ability to organize workflow.
5. Describe or demonstrate basic trouble-shooting skills for the common malfunctions.

V. Interpretation and Reporting of Results

1. Recognize serum reference intervals and critical values for the following tests:

Glucose	Blood urea nitrogen
Total protein	Creatinine
Sodium	Total bilirubin
Potassium	Cholesterol
Chloride	Therapeutic drugs (peak and trough)
Blood gases	

2. Identify all patient values that are significantly different (e.g. risk values, critical values, analytical errors) and bring these to the attention of the technologist immediately.
3. According to the laboratory protocol document investigative and corrective action for discrepant results.
4. Determine need for repeat analysis on unacceptable reportable ranges.
5. Determine whether results fit the expected pattern with respect to previously obtained results on same test or other test results on same patient.
6. Evaluate a minimum of 50 patient results according to laboratory protocol including routine, STAT, critical value, and phone results.
7. Perform and interpret 10 routine calculations to include dilutions, anion gap, 24-hour urine, creatinine clearance, LDL, and thyroid index with 100% accuracy.
8. Correlate laboratory data with clinical implications with 70% accuracy. This includes:

• Cardiac enzymes	• Creatinine
• Liver enzymes	• Blood gases
• Bilirubin	• Iron
• Protein	• Lipids
• Glucose	• Endocrine function
• Electrolytes	• Blood urea nitrogen
• Tumor markers	• Therapeutic Drugs
• Drugs of Abuse	

9. State the difference between the analytical measurement range (AMR) and clinically reportable range (CRR).
10. Correlate abnormal test results to possible disease states with 90% accuracy.

VI. Professional Qualities

1. Arrive at the laboratory on time.
2. Adhere to the established student uniform policy.
3. Notify the clinical supervisor of any unavoidable absences prior to the scheduled arrival time and make arrangements to make up the time on a mutually convenient date.
4. Demonstrate the ability to follow verbal and written instructions.
5. Communicate in a constructive, professional manner (i.e. polite, considerate, pleasant and unhurried) with members of the laboratory and hospital staff, peers and patients.
6. Organize work in a logical sequence.
7. Complete work and assignments within established deadlines.
8. With the approval of the clinical instructor, demonstrate the initiative to perform tasks without being reminded.
9. Demonstrate constructive utilization of all training time by examining available study materials during periods of time not devoted to instruction.
10. Demonstrate flexibility in changes to the scheduled daily learning activities due to laboratory staffing, emergencies, etc.
11. Demonstrate the ability to recognize and admit mistakes or discrepancies and take appropriate corrective measures, including seeking help and notifying staff when needed.
12. Demonstrate the ability to accept professional constructive criticism regarding work and modified behavior appropriately.
13. Maintain the confidentiality of all patient information when questioned by patients or other unauthorized individuals.
14. Adhere to all published safety regulations in the laboratory.
15. Demonstrate professionalism in attitude, appearance and work ethic 100% of the time.

Clinical Performance Objectives in Clinical Hematology
Department of Medical and Research Technology
University of Maryland School of Medicine

Upon completion of the **Clinical Hematology** rotation, the **MLS** student will be able to:

I. SPECIMEN HANDLING AND PROCESSING/LABORATORY SAFETY

1. Comply with the standard operating procedure for specimen handling and distribution.
2. Follow departmental protocol, demonstrate safe work practices by:
 - Wearing personal protective equipment (PPE) as required.
 - Handling and disposing of contaminated materials according to standard precautions.
 - Handling chemicals according to safety procedures.
3. Accept only specimens that meet standard laboratory protocol.
4. Describe corrective measures for samples that are lipemic, icteric or contain paraproteins.
5. Describe corrective measures for samples that are rejected due to quantity not sufficient, wrong anticoagulant, cold agglutinin, clotted, hemolyzed, improper patient identification, or improper tube collected.
6. Handle body fluids with suboptimal sample.

II. QUALITY CONTROL, QUALITY ASSURANCE, REGULATORY ISSUES

1. Evaluate Quality Control results according to criteria established for each test.
2. Describe the various periodic (daily, weekly) maintenance routine for each piece of equipment used during clinical rotations.
3. Observe basic computer applications where relevant.
4. Document instrument maintenance and quality control.
5. Complete all work within established turn around time.
6. Report critical and discrepant results to clinical instructor/supervisor.
7. State the confidentiality policy of the facility during testing procedures and reporting according to HIPPA guidelines.
8. Describe the process used to implement a new lot number of control material.

III. Technical Procedures for Hematology

1. Operate automated hematology instrumentation with minimal supervision and within acceptable ranges.
2. Perform non-automated hematology testing with minimal supervision and within acceptable ranges.
3. Using the automated hematology analyzer, perform a minimum of 40 CBC's and differentials.
4. Recognize abnormal flags on automated instrumentation.
5. Recognize all critical values and/or discrepant results on CBC's and differentials.
6. Report all critical values and/or discrepant results on CBC's and differentials to the clinical instructor.
7. Identify the corrective actions necessary for abnormal automated results.
8. Differentiate between normal and abnormal scattergram (plot) patterns.
9. Identify normal (reference) values for the following routine assays:
 - WBC count
 - RBC count
 - Hemoglobin
 - Hematocrit
 - RBC indices
 - platelet count
 - Sedimentation rate
 - Reticulocyte count
10. Demonstrate proper technique in preparing peripheral smears for microscopic examination to the satisfaction of the clinical instructor.
11. Evaluate a minimum of 20-25 peripheral blood smears for acceptable cellular distribution and staining to the satisfaction of the clinical instructor.
12. Perform a minimum of 20-25 peripheral smears with a combination of normal and abnormal results with 95% proficiency.
13. Prepare (or discuss performance of) manual WBC and platelet counts according to standard operating procedure with 95% proficiency, where applicable.
14. Perform (or discuss performance of) manual WBC and platelet counts using the hemacytometer method and with 95% accuracy.

15. Identify abnormal red cell morphologies to include: microcytes, macrocytes, ovalocytes, spherocytes, target cells, sickle cells, schistocytes, burr cells, teardrops, acanthocytes, and rouleaux.
16. Grade abnormal red cell morphologies according to laboratory guidelines.
17. Identify qualitative white cell inclusions to include: toxic granulation, toxic vacuolization, Döhle bodies, Auer rods.
18. Identify red cell inclusions to include: Howell Jolly bodies, Pappenheimer bodies, basophilic stippling, siderotic granules, Heinz bodies.
19. Grade hypochromia and polychromasia according to laboratory guidelines.
20. Given a peripheral smear or electronic images slide, identify the stages of immature white cells.
21. Given a peripheral smear or electronic images slide, identify the stages of immature red blood cells.
22. Correct the WBC count for nucleated red blood cells according to laboratory guidelines.
23. Given a peripheral smear or electronic images slide, recognize, but not speciate, malarial forms.
24. Recognize abnormal platelet morphology.
25. Perform or discuss reticulocyte counts. If performed, the results should be within 20% of technologist-recorded result.
26. Explain the principle of the ESR and factors which might interfere with accurate results.
27. Perform the ESR with minimum supervision and within acceptable ranges.
28. Describe or perform a sickle cell screen (solubility test).
29. Discuss the interpretation a sickle cell screen according to laboratory guidelines.
30. Associate abnormal hematological results with possible pathology.
31. Given electrophoretic patterns, recognize the normal and abnormal hemoglobin patterns on electrophoresis at pH 8.6 (A, F, S, C, A₂, E, H, Barts, Lepore).
32. Assist in the proper preparation, staining, and review of bone marrow aspirate.
33. Discuss the use of cytochemistry for classification of acute leukemias.

34. Discuss the use of flow cytometry in the classification of acute leukemias.
35. Compare and contrast the chronic and acute leukemias in terms of onset and major cell type.
36. Discuss the myeloproliferative and myelodysplastic disorders with reference to FAB and WHO classification, and hematologic lab findings.
37. Perform (or discuss performance of) one (1) body fluid manual cell count and differential.
38. Recognize cells specific to each body fluid type to include:
 - Histiocytes,
 - Mesothelial cells
 - Malignant cells
 - Macrophages with inclusion
 - Crystals
 - Bacteria
 - Yeast

IV. TECHNICAL PROCEDURES FOR COAGULATION

1. Perform a minimum of 10 Prothrombin times and Partial thromboplastin times.
2. Discuss the principles of the following procedures and the reagents used:
 - PT
 - PTT
 - Thrombin time
 - Quantitative fibrinogen
 - FSP
 - D-dimer
3. Describe or perform:
 - quantitative fibrinogen
 - thrombin time
 - FSP
 - D-dimer matching technologist results.
 - describe the laboratory testing used to monitor anticoagulant therapy
4. Describe possible pathologic complications of anticoagulant therapy.
5. Describe the intrinsic and extrinsic coagulation pathways.

6. Propose appropriate laboratory test to identify factor deficiencies.
7. Describe the appropriate steps taken when the QC is out of range.
8. Identify common pre-analytic variables that may adversely impact patient results, including:
 - Sample selection
 - Storage (*PT vs APTT samples*)
 - ***Instrument check (pH , temperature)***
 - type of anticoagulant
 - short draw
 - clotted sample
 - Hematocrit >55
 - lipemia
 - hemolysis
 - type of tube(glass vs plastic)
9. Correlate common coagulation and platelet disorders with available patient history, information and coagulation test results.
10. Describe possible pathologic complications of anticoagulant therapy, ***including LMWH, heparin, coumadin, and other market available anticoagulants.***
11. When given patient history and coagulation test results, correlate thrombotic disorders with available patient history and coagulation test results.
12. In addition to the procedures listed above, discuss the principle, clinical significance, and reagents used for the following coagulation tests:
 - Factor assays
 - Mixing studies
 - Lupus anticoagulant (anticardiolipin assay)
 - Factor 5 Leiden
 - Protein S
 - Protein C (this should be included for MLT also)
 - Antithrombin assay

Clinical Performance Objectives in Blood Banking
Department of Medical and Research Technology
University of Maryland School of Medicine

Upon completion of the **Clinical Blood Banking** rotation the **MLS** student will be able to:

I. SPECIMEN HANDLING AND PROCESSING/LABORATORY SAFETY

1. Follow departmental protocol and demonstrate safe work practices by:
 - Wearing personal protective equipment (PPE) as required.
 - Handling and disposing of contaminated materials according to standard precautions.
 - Handling chemicals/reagents according to safety procedures.
2. Identify the types of blood samples and collection tubes appropriate for routine testing in the blood bank.
3. Determine the acceptability of a sample for compatibility testing based on sample age, sample appearance and institutional policy.
4. List the minimum information required for labeling samples for blood bank testing.

II. QUALITY ASSURANCE/QUALITY CONTROL AND REGULATORY ISSUES

1. Perform daily quality control for routine testing according to the operating procedures of the laboratory with 100% accuracy.
2. Recognize discrepant results in routine ABO, Rh and antibody screen testing with 100% accuracy.
3. Report all discrepant results to the clinical instructor.
4. List the quality control activities that are performed monthly, quarterly, bi-annually and annually.
5. Perform or observe basic laboratory computer applications where relevant.
6. State the patient confidentiality policy of the facility that complies with HIPPA guidelines for testing and reporting procedures.
7. List the accrediting and inspection agencies that monitor blood banks and transfusion services.

III. ROUTINE TECHNICAL PROCEDURES – ABO/RH, AB SCREEN AND DAT

1. Using a “0 to 4+” scale, grade macroscopic agglutination reactions within ± 1 agglutination grade of the instructor.
2. Prepare a 3-5% red cell suspension as needed for tube testing.
3. Label test tubes for routine testing according to laboratory procedure without error.
4. Perform ABO and Rh testing on a minimum of 25 samples with 100% accuracy.
5. Interpret the results of ABO and Rh testing without error.
6. Perform weak D testing on designated patient samples when available. (optional)*
7. Perform ABO confirmatory testing on a minimum of 20 donor segments with 100% accuracy.
8. Suggest a plan of action for the preliminary investigation of the following ABO discrepancies:
 - Hypogammaglobulinemia/ Immunosuppression
 - Cold reacting alloantibody
 - Cold reacting autoantibody
 - Subgroup of A with anti-A1
 - Mixed field agglutination
9. Identify mixed field agglutination in 2 samples to the satisfaction of the clinical instructor.
10. Perform antibody screening on a minimum of 20 samples to the satisfaction of the clinical instructor.
11. Explain the next step/s to be taken to investigate a positive antibody screen.
12. Compare and contrast direct and indirect antiglobulin testing with regard to principle, procedure and application.
13. Identify sources of false negative and false positive error in antiglobulin testing.
14. Perform DAT and DAT Battery on a minimum 2 samples to the satisfaction of the clinical instructor.
15. Discuss alternatives in routine testing such as gel or solid phase.

IV. ROUTINE TECHNICAL PROCEDURES – CROSS-MATCHING AND TRANSFUSION MANAGEMENT

1. Label test tubes for routine compatibility testing according to laboratory protocol without error.
2. Perform the appropriate crossmatch procedure, immediate spin (IS) or Full (IAT), on a minimum of 10 samples when given the relevant patient information and the policy of the laboratory. Electronic crossmatches if performed at the site may also be included.
3. Select the most appropriate donor units to crossmatch with a patient when ABO specific red cells are available and when not available.
4. Select the most appropriate donor units when the patient presents with:
 - a. single alloantibody
 - b. basic multiple alloantibodies
5. Interpret the results of crossmatching with 100% accuracy.
6. Explain possible causes of an incompatible crossmatch.
7. Discuss the policies for emergency release and massive transfusion.
8. Distinguish ABO and Rh-related HDN according to clinical and serologic presentation.
9. If available, perform or discuss the prenatal (mother) and postnatal (mother and newborn) serologic workups for managing cases of HDN.
10. Observe or discuss the procedures for RhIg administration including candidate selection, FMH screening, and dosage determination.
11. Compare and contrast the following adverse reactions to transfusion with regard to cause, classic signs & symptoms, and serologic investigation (if applicable):

Immediate Hemolytic	Urticarial
Delayed Hemolytic	Anaphylactic
Febrile Non-hemolytic	Bacterial sepsis
TRALI(optional)	TACO
12. Recommend approaches for future transfusion in patients who have experienced the transfusion reactions listed above.

13. Perform or describe a minimum of 1 transfusion reaction work-up, according to laboratory protocol.

14. Compare and contrast warm and cold reacting autoantibodies with regard to serologic presentation, related testing and transfusion approaches.

V. REFERENCE PROCEDURES

1. Perform routine antibody identification panels on a minimum of 5 samples according to the acceptable precision of the laboratory.
2. Interpret the results of routine and selected cell panels to determine the specificity of single and multiple antibodies (simple).
3. Perform or discuss the following reference techniques to assist in antibody identification:

- Selected cell panel
- Red cell (antigen) phenotyping
- Enhancement media (PeG & LISS)
- Acid Elution
- Pre-warmed technique
- Enzyme treatment
- Neutralization
- Adsorption
- Saline replacement
- ReST
- Cold panel (optional)

4. Compare and contrast the serologic characteristics of antibodies to the following blood group systems:

Rh	Kell
Kidd	Duffy
MNSs	Lewis
Lutheran	I
P ₁	

5. List 5 antigens of low incidence and 5 antigens of high incidence.

VI. DONOR /COMPONENTS/PRODUCT DISPOSITION

1. Discuss the physical and medical criteria used in the selection of the following blood donors:
 - Allogeneic
 - Autologous
 - Directed
 - Therapeutic (optional)

2. Describe, and, if available, perform the processing of a donor to include:
 - Donor history
 - Physical exam
 - Donor acceptability
 - Proper unit collection and handling

3. Identify the blood bank serologies and viral marker testing required on all allogeneic, autologous and directed units.

4. Explain the preparation and handling of the following components:
 - Packed red blood cells
 - Fresh frozen plasma
 - Apheresis platelets (single donor)
 - Cryoprecipitate

5. Discuss the following forms of blood product handling and manipulation:
 - Pooling
 - Aliquoting
 - Washing
 - Irradiating

6. Identify the shelf life, storage requirements and therapeutic use of:

Packed red blood cells	Fresh frozen plasma
Apheresis platelets (single donor)	Cryoprecipitate (single unit & pooled)
Frozen red blood cells	Leukoreduced red blood cells
Irradiated red blood cells	Washed red blood cells
Factor FVII, VIII & IX concentrates	Rh Immune globulin

7. Review the daily inventory and inspection of blood products.
 - Observe routine paperwork for receiving or shipping blood products

8. Issue or observe the issue (release) of a minimum of 5 blood products for administration.

9. Describe the rationale for the use of bacterial detection methods on platelet products.

10. Describe the special transfusion protocol or handling procedure indicated for the following patient populations or scenarios:
 - ABO discrepancy Oncology patient
 - Subgroup of A with anti-A1 Sickle cell anemia
 - Neonates Autoimmune hemolytic anemia
 - Intrauterine transfusion Massive transfusion & emergency release
 - IgA deficiency

Clinical Performance Objectives in Immunology
Department of Medical and Research Technology
University of Maryland School of Medicine

Upon completion of the **Clinical Immunology** rotation, the MLS student will be able to:

I. SPECIMEN HANDLING AND PROCESSING/LABORATORY SAFETY

1. Following departmental protocol, demonstrate safe work practices by:
 - a. Wearing personal protective equipment (PPE) as required.
 - b. Handling and disposing of contaminated materials according to standard precautions.
 - c. Handling chemicals according to safety procedures.
2. State the specimen collection and handling requirements for each immunologic test.
3. Evaluate patient specimens for acceptability, using laboratory policy.
4. If patient specimens are determined to be unacceptable, state the resolution.

II. QUALITY CONTROL AND QUALITY ASSURANCE

1. Prepare controls and reagents within acceptable QA limits.
2. Using established criteria, determine whether or not available controls and reagents are acceptable for use according to lab protocol.
3. Recognize all critical values obtained during patient testing as abnormal.
4. Report critical values immediately to clinical instructor.
5. State the confidentiality policy of the facility during testing procedure and reporting in accordance with HIPAA guidelines.
6. Observe basic laboratory computer applications where relevant.
7. Review quality control data for a minimum of three (3) different immunology assays performed in the laboratory.
8. Evaluate quality control data according to established laboratory guidelines.
9. Discuss appropriate actions for unacceptable control results.

III. CORE KNOWLEDGE AND SKILLS

1. Demonstrate pipetting technique in accordance with manufacturers' instructions using all available types of pipettes.
2. Pipette reagents and samples accurately.
3. Calculate all specimen dilution concentrations with 100% accuracy.
4. To the satisfaction of the clinical instructor:
 - a. Explain how to correctly calculate both serial and non-serial dilutions.
 - b. Explain the concept of lattice theory in antigen/antibody reactions: prozone, equivalence, postzone (and how that might impact patient test results).
 - c. Determine corrective action that is needed upon recognizing when prozone has occurred.
 - d. Discuss the five classes of human immunoglobulins in terms of physical structure, biological activity and location(s).
 - e. Compare and contrast primary and secondary immune responses
 - f. Define the functions of the following cell types in regard to their role(s) in the humoral or cellular immune systems: neutrophil, monocyte, macrophage, eosinophil, basophil, B lymphocyte, T_H lymphocyte, T_C lymphocytes and NK cells.
 - g. Compare and contrast the terms sensitivity and specificity.

IV. IMMUNOLOGY ASSAY METHODOLOGIES/INSTRUMENTS

1. Discuss the theories/principles of operation of the following assays:
 - Latex agglutination
 - Hemagglutination
 - immunodiffusion
 - Direct immunofluorescence
 - Indirect immunofluorescence
 - ELISA (EIA) sandwich technique
 - Western blot
 - FPIA
 - RIA
 - Flow cytometry
2. Identify the common immunological application of the: fluorometer, chemiluminometer, photometer and fluorescence microscope.
3. Perform if available, the following assays to the satisfaction of the clinical instructor: Latex agglutination, Hemagglutination, EIA.

4. Observe, if available on site, the following assays: Immunodiffusion, Direct and indirect immunofluorescence, FPIA, RIA, Flow cytometry.

V. BACTERIAL SEROLOGY: NON TREPONEMAL (VDRL, RPR) TREPONEMAL (FTA-ABS), STREPTOZYME, LYME DISEASE

1. To the satisfaction of the clinical instructor:
 - a. Discuss the theory/principle of each test.
 - b. Correlate the disease manifestations with expected test results for each assay.
 - c. Explain the significance of reactive, weakly reactive and non-reactive results in the RPR test.
 - d. Discuss instances where false positive and false negative RPR and FTA-ABS reactions might be expected to occur.
 - e. Perform RPR assay QC/calibration techniques (temperature, needle, rotator) according to lab protocol.
 - f. Interpret with 100% accuracy a minimum of 10 RPR screening tests.
 - g. Perform a minimum of 2 RPR titers on previously reactive specimens, matching the technologist's results within +/- one dilution factor.
 - h. Compare & contrast the RPR and FTA-ABS assays for syphilis in terms of sensitivity, specificity, use in diagnosis, and use in monitoring therapy.
 - i. Discuss or perform the Streptozyme assay on a minimum of 2 specimens.
 - j. Discuss or perform the screening and/or confirmatory western blot for Lyme Disease on a minimum of two (2) specimens.

VI. VIRAL SEROLOGY - HEPATITIS A-C, EBV, HIV, RUBELLA, CMV, HERPES

1. Correlate viral markers with clinical disease for the following: Hepatitis A, B, C; EBV; HIV; Rubella; CMV.
2. List the viral markers used to screen blood donor units.
3. Discuss or perform a hepatitis assay.
4. Explain the theory/principle of screening tests for infectious mononucleosis.
5. Perform a minimum of five (5) screening tests for infectious mononucleosis, matching the technologist's results with 100% accuracy.
6. Observe or discuss an HIV antibody screen.
7. Discuss how ELISA and Western blot tests are used to diagnose HIV infection.
8. Discuss the TORCH panel with regard to its use and clinical significance.

VII. AUTOIMMUNITY ASSAYS– ANA, CRP, C3, C4, RF, THYROID ANTIBODIES

1. Observe, perform or discuss the following:
 - ANA assay (both fluorescence and enzyme methods)
 - CRP
 - C3
 - C4
 - RF
 - Thyroid antibodies
2. When given electronic images or slides, visually identify the following ANA patterns: homogeneous, peripheral (rim) speckled, nucleolar, and centromere.
3. When given electronic images or slides, correlate the ANA patterns seen with the following disease states: SLE, Sjögrens Syndrome, Mixed Connective Tissue Disease (MCTD), Progressive Systemic Sclerosis (Scleroderma) and CREST Syndrome.
4. If available on site, resolve technical, instrument, and/or physiologic causes of problems or unexpected test results for each assay performed to the satisfaction of the clinical instructor.

Clinical Performance Objectives in Microbiology
Department of Medical and Research Technology
University of Maryland School of Medicine

Upon completion of the **Clinical Microbiology** rotation the **MLS** student will be able to:

I. SPECIMEN HANDLING AND PROCESSING

Follow departmental protocol and demonstrate safe work practices by:

- a. Wearing personal protective equipment (PPE) as required.
 - b. Handling and disposing of contaminated materials according to standard precautions.
 - c. Handling chemicals according to safety procedures.
 - d. Properly used biologic safety cabinet when needed.
1. List criteria for evaluating specimens and requisitions for acceptability using laboratory defined criteria.
 2. Apply proper specimen handling to microbiological specimens in regard to timeliness, appropriateness of specimen submitted for analysis requested, safety and security of collection system, and completeness of essential patient information, to the satisfaction of the clinical instructor.
 3. Document rejected specimens according to laboratory's procedures for specimen rejection.
 4. Given any routine specimen for culture:
 - a. State the collection system, storage conditions, and acceptable length of storage
 - b. Explain the selection and use of appropriate primary culture media for initial plating
 - c. State the proper incubation temperature and atmosphere conditions for each medium
 5. Given plating instructions and media selection criteria:
 - a. Process a minimum of 20 bacterial specimens of different types and prepare smears for Gram stain (if appropriate), to the satisfaction of the clinical instructor.
 - b. Demonstrate proper aseptic technique and streaking method, obtaining isolated colonies.

II. QUALITY CONTROL and QUALITY ASSURANCE

1. State the purpose of quality control in the microbiology laboratory.
2. Perform or state the daily or weekly maintenance checks on equipment (i.e. refrigerators, incubators, water baths, instruments) with 100% accuracy.

3. Perform quality control procedures (i.e. stains, media, biochemical tests, antisera, and susceptibility tests) with 100% accuracy.
4. Record all Q C results with 100% accuracy.
5. Report divergent results to instructor and suggest corrective actions
6. Observe basic laboratory computer operations where relevant.
7. State the patient confidentiality policy of the facility during testing procedures and reporting, according to HIPAA guidelines.

III. BACTERIOLOGY

1. Perform Gram stains on a minimum of 15 samples, including both direct smears and cultured colonies, following established laboratory procedures..
2. Evaluate stained smears for stain quality, according to established criteria.
3. Read a minimum of 15 direct Gram stained smears, matching the interpretation of the technologist 80% of the time.
 - a. Describe Gram reaction and morphology
 - b. Quantitate bacteria and polymorphonuclear cells
4. Demonstrate the ability to select isolated colonies from a culture plate, streak for isolation, and obtain isolated colonies.
5. Correlate Gram stain results with isolates on culture plates to the satisfaction of the clinical instructor.
6. List the criteria for an acceptable sputum specimen.
7. Screen sputum smears for the quality of the specimen to the satisfaction of the clinical instructor.
8. Recognize alpha (α), beta (β) and gamma (γ) hemolysis with 100% accuracy.
9. Distinguish between gram-positive and gram-negative organisms using their Gram stain characteristics and/or their growth on selective media with 100% accuracy.
10. Determine the required biochemical tests for a cost-effective identification of the unknown pathogens.
11. Inoculate all biochemical media and identification systems used in the laboratory, within a reasonable time limit, as determined by the clinical instructor.

12. Determine a positive or negative reaction for each test to include (but not limited to, or exclusive of) the following, matching the technologist's results:

- | | |
|------------------------------|--|
| a. Catalase | g. Hippurate hydrolysis/CAMP |
| b. Slide & tube coagulase | h. Optochin/bile solubility |
| c. Novobiocin susceptibility | i. Commercial bacterial ID system(s) |
| d. Bile esculin/6.5% NaCl | j. Haemophilus ID & Neisseria ID systems |
| e. PYR/bacitracin/SXT | k. Oxidase |
| f. Spot indole | l. <i>Streptococci</i> identification |

13. Using the information obtained from Gram stain, isolation on select media, and biochemical testing, demonstrate the ability to utilize flow charts and coded systems to identify the following organisms with a 90% rate of success in identification.

<i>E. coli</i>	<i>Neisseria gonorrhoeae</i>
<i>Klebsiella / Enterobacter / Serratia</i>	<i>N. meningitidis</i>
<i>Citrobacter spp.</i>	<i>Moraxella catarrhalis</i>
<i>Salmonella spp.</i>	<i>Haemophilus influenzae</i>
<i>Shigella spp.</i>	<i>Haemophilus parainfluenzae</i>
<i>Proteus / Providencia / Morganella</i>	<i>Campylobacter jejuni</i>
<i>Staphylococcus aureus</i>	<i>Clostridium perfringens</i>
<i>Staphylococcus – coagulase-negative</i>	<i>Bacteroides fragilis / fragilis group</i>
Group D <i>Streptococcus</i>	<i>Fusobacterium nucleatum</i>
<i>Enterococcus faecalis / faecium</i>	<i>Prevotella spp.</i>
Viridans streptococci	<i>Stenotrophomonas maltophilia</i>
<i>Streptococcus pneumoniae</i>	<i>Acinetobacter baumannii</i>
Beta (β) streptococci Gp A /Gp B / others	<i>Pseudomonas aeruginosa</i>
<i>Vibrio ssp.</i>	<i>Listeria monocytogenes</i>
<i>Yersinia enterocolitica</i>	<i>Peptostreptococcus/Peptoniphilus</i>
<i>Abiotrophia spp. (NV Streptococci)</i>	<i>Eikenella/P. multocida</i>

14. Discuss the isolation and identification of the following organisms:

- Mycoplasma/ Ureaplasma*
- Nocardia asteroides*
- Aeromonas ssp.*
- Burkholderia cepacia* and other NFB
- Pasteurella multocida*
- Legionella ssp.*
- Propionibacterium*

15. Urine cultures:

- a. List common uropathogens.
- b. Recognize urethral contaminants vs. potential pathogens.
- c. Differentiate between lactose vs. non-lactose-fermenters with 100% accuracy.
- d. Quantitate colony counts according to laboratory protocol, matching the instructor's counts.
- e. Using laboratory criteria, determine which colony counts/isolates require identification and susceptibility testing, according to the criteria of the laboratory.
- f. Perform appropriate identification and susceptibility tests on significant isolates with 90% accuracy.

16. Respiratory cultures:

- a. Recognize normal respiratory flora on a minimum of 10 samples to the satisfaction of the clinical instructor.
- b. List the primary pathogens detected in throat vs. sputum cultures.
- c. Using laboratory criteria, determine which isolates are considered significant for identification and susceptibility tests with 90% accuracy.
- d. Rule out group A streptococci in throat cultures with 100% accuracy.
- e. Perform or discuss the test procedure for rapid group A streptococcal (GAS) antigen test.

17. Genital cultures (vaginal, cervical, urethral, etc.):

- a. Recognize normal vaginal flora, i.e. lactobacilli.
- b. Evaluate specimens for the presence of potential pathogens, i.e. *Neisseria gonorrhoeae*, *Gardnerella vaginalis* and group B *Streptococci*.
- c. Perform presumptive identification procedures, confirmatory tests and susceptibility tests on suspected pathogens.

18. Stool cultures:

- a. List the possible bacterial pathogens for which stool cultures are routinely examined.
- b. Describe the appearance of each enteric pathogen on selective/differential media used in the laboratory.
- c. Recognize and isolate any suspicious organism to the satisfaction of the clinical instructor.
- e. Perform or discuss appropriate identification tests including serological confirmatory tests.
- f. State the selective media to isolate the following and describe their appearance on this medium:
 - *E. coli* O:157 H:7
 - *Yersinia enterocolitica*
 - *Campylobacter jejuni*
 - *Salmonella enterica* subsp.

<i>Vibrio</i> spp.
<i>Aeromonas</i> spp.
<i>Pleisiomonas</i> spp.
<i>Shigella</i> spp.

- g. State the optimum temperature and atmosphere requirements for *C. jejuni* and *Y. enterocolitica*

19. Blood cultures:

- a. Describe the media used for blood cultures and the principle of the blood culture detection system.
- b. After performing staining of suspicious or positive cultures, detect the presence/absence of organisms in the smears with 100% accuracy.
- c. Using proper sterile techniques, subculture positive cultures to appropriate media, obtaining isolated colonies.
- d. Perform or observe rapid testing methods when indicated.

20. Wound/body fluid cultures:

- a. List normal flora and possible pathogens isolated from the site.
- b. Perform appropriate identification and susceptibility tests of isolated pathogens with 90% accuracy.
- c. Using laboratory criteria, determine which isolates are considered significant for identification and susceptibility tests.

21. Anaerobic cultures:

- a. Compare and contrast the Gas PakTM and anaerobic chamber systems.
- b. List the types of clinical specimens that are acceptable/ unacceptable for anaerobic culture.
- c. List the media used for primary isolation of anaerobes and the purpose of each.
- d. Observe or isolate suspected anaerobic colonies.
- e. Perform appropriate identification and susceptibility tests of isolated pathogens using laboratory criteria.

22. Susceptibility testing:

- a. Explain the choice of antibiotics in relation to the test organism and clinical source.
- b. Perform the Kirby-Bauer disk diffusion procedure according to the procedure manual.
- c. Measure zone sizes accurately, within 1-2 mm of technologist's results.
- d. Using CLSI chart, interpret and record results without error.
- e. Explain potential sources of error in the Kirby-Bauer procedure and appropriate corrective actions.
- f. Explain the principles of the MIC microdilution procedure and the E-test.
- g. Perform MICs or E-tests to the satisfaction of the clinical instructor.
- h. Interpret results of MICs, matching the technologist's results.
- i. Perform a test for beta-lactamase with 100% accuracy.
- j. Describe the procedures to identify VRE, MRSA, clindamycin-resistant *S. aureus* (D-test), penicillin resistant *S. pneumonia*, ESBL, and CRE.
- k. Recognize "typical" susceptibility patterns of commonly isolated organisms.

1. Discuss the significance of susceptibility patterns (results) in VRE, MRSA, VISA, VRSA, ESBL, penicillin-resistant *S. pneumoniae*, and CRE.

IV. MYCOBACTERIOLOGY

1. Describe or demonstrate the safety precautions to be taken when working with mycobacteria.
2. List the specimens most likely to be received for culture of mycobacteria and identify which specimens need digestion/decontamination.
3. List the media that are used in the isolation and cultivation of mycobacteria.
4. Explain why the genus *Mycobacterium* is often referred to as "acid-fast bacilli" (AFB).
4. Observe, perform or discuss the Ziehl-Neelsen, Kinyoun, or fluorochrome acid-fast stain, where applicable.
6. Recognize AFB in clinical or QC stained slides, where applicable.
7. State the criteria and proper report format for numbers of acid-fast bacilli observed in stained smears.
8. Outline the method used to digest, decontaminate, concentrate, and culture specimens for mycobacteriae.
9. Observe the digestion and concentration procedure on culture specimens for mycobacteriae (if performed in lab).
10. State the optimal growth requirements (temperature and atmosphere) for *M. tuberculosis*.

V. PARASITOLOGY

1. State the purpose of each of these techniques used for O&P specimens:
 - a. Saline direct smear
 - b. Iodine direct smear
 - c. Trichrome stain
 - d. Concentration (formalin ethyl-acetate)
 - e. Cellophane tape prep
 - f. Modified acid-fast stain
2. Perform the following techniques to the satisfaction of the clinical instructor (if available):

- a. Trichrome stain
 - b. Concentration (*e.g.*, formalin ethyl-acetate)
3. Using reference slides, electronic images, CD-ROM or preserved specimens, identify these parasites:
 - *Ascaris lumbricoides*
 - *Strongyloides stercoralis*
 - Hookworm
 - *Enterobius vermicularis*
 - *Hymenolepis nana*
 - *Taenia spp.*
 - *Entamoeba histolytica*
 - *Giardia lamblia*
 - *Entamoeba coli*
 - *Trichuris trichiura*
 - *Plasmodium spp.*, if applicable
 4. Identify *Cryptosporidium* on acid-fast smears or DFA.
 5. In addition to the parasites listed in objective #3, identify the following parasites, using reference slides and/or preserved specimens (where available):
 - *Dientamoeba fragilis*
 - *Diphyllobothrium latum*
 - *Clonorchis sinensis*
 - *Schistosoma spp.*
 - *Toxoplasma gondii*

VI. MYCOLOGY

1. Describe or demonstrate the safety precautions to be taken when working with fungal isolates.
2. Explain the purpose of each medium used for the isolation of fungi from clinical specimens and the optimum temperature for incubation
3. Recognize yeast vs. filamentous fungi on culture media
4. Identify the presence of *Candida albicans* in a germ tube test (or cornmeal agar or equivalent rapid yeast test) with 100% accuracy.
5. Perform the yeast identification system used in the laboratory with 100% accuracy
6. Describe the preparation **OR** set-up a slide culture for fungal identification

7. Perform latex agglutination test for detection of cryptococcal antigen with 100% accuracy, where applicable.
8. Prepare a LPCB and calcofluor/ KOH preps, to the satisfaction of the clinical instructor.
9. Using prepared slides, colony morphology on fungal media, CD-ROM, and/or electronic images, identify the following molds with 90% accuracy
 - *Rhizopus* spp.
 - *Mucor* spp.
 - *Penicillium* spp.
 - *Aspergillus fumigatus*
 - *Microsporum* spp.
 - *Trichophyton* spp.
 - *Epidermophyton floccosum*
 - *Pneumocystis Jiroveci*
10. Describe the microscopic and macroscopic identifying features of the dimorphic fungi.

VII. VIROLOGY

1. Perform or discuss an RSV antigen detection assay to the satisfaction of the clinical instructor.
2. Perform or discuss at least one additional immunoassay viral detection test to the satisfaction of the clinical instructor.

VIII. MOLECULAR AND RAPID DIAGNOSTICS

1. Discuss the principles and procedures of molecular testing (including GC, *Chlamydia*, *Mycobacterium*)
2. Discuss or perform EIA/molecular methods for *C. difficile* toxin detection.

Clinical Performance Objectives in Urinalysis
Department of Medical and Research Technology
University of Maryland School of Medicine

Upon completion of the **Urinalysis** experience the MLS student will be able to:

I. LABORATORY SAFETY

1. Comply with the standard operating procedure (SOP) for specimen handling, distribution, and storage including correct triage of specimen for in house and send out laboratory testing. Following departmental protocol, demonstrate safe work practices by:
 - a. Wearing personal protective equipment (PPE) as required.
 - b. Handling and disposing of contaminated materials according to standard precautions.
 - c. Handling chemicals according to safety procedures.
2. Dispose of waste according to laboratory protocol.

II. SPECIMEN HANDLING

1. Check for correct identification/labeling of specimens according to the current National Patient Safety Standard from TJC.
2. Explain the importance of proper collection and transport of specimens.
3. List criteria for evaluating specimen quality and corrective actions to resolve problems.

III. QUALITY ASSURANCE

1. List substances that will cause false negative and false positive results in a routine urinalysis.
2. Summarize the advantages and disadvantages of commonly used urine preservatives.
3. State the confidentiality policy of the facility during testing procedure and reporting in accordance with HIPAA guidelines.
4. Observe basic computer applications where relevant.

IV. PERFORMANCE OF PROCEDURES

A. Analytical Principles

1. Explain the physiological role of the components of the urinary system.
2. Explain the principle and methodology limitations of refractometry for urine specific gravity.
3. Correlate the origin and significance of the chemical constituents usually found in urine by the multitest reagent strip methodology to include:
 - pH
 - Protein
 - Glucose
 - Ketone
 - Bilirubin
 - Blood
 - Nitrite
 - Urobilinogen
 - Specific gravity
4. Explain the principle and methodology limitations of each test on the multi-test reagent strip.
5. Discuss the significance of the confirmatory tests used in the chemical analysis of urine, i.e., icotest, sulfosalicylic acid, clinitest, acetest.
6. Explain the principle and methodology limitations of each of the following confirmatory tests: icotest, sulfosalicylic acid, clinitest, acetest.
7. Explain the principles of bright field, phase contrast, and polarized microscopy.

B. Maintenance

1. Perform routine maintenance checks.
2. Describe the various periodic maintenance procedures for the different instruments and maintenance sheets.

C. Quality Control and Calibration

1. Perform quality control analysis in the urinalysis laboratory.

2. Evaluate, with 100% accuracy, quality control results from a minimum of 10 days of testing.
3. Perform or discuss corrective action needed to be taken if quality control values are not within established limits.
4. Report or record quality control results according to the standard operating procedures of the laboratory with 100% accuracy.

D. Testing of Samples

1. For a minimum of 25 urine specimens with 95% accuracy:
 - a. Describe the physical appearance.
 - b. Perform specific gravity analysis using the refractometer and/or dipstick methods.
 - c. Perform chemical analysis of the urine specimens.
 - d. Interpret results obtained from chemical analysis.
 - e. Where applicable, confirm abnormal results with appropriate confirmatory tests for a minimum of 5 different abnormal urine specimens.
 - f. Interpret the confirmatory test results.
 - g. Perform microscopic analysis on urine specimens according to the standard operating procedure of the laboratory.
 - h. Given a specimen or electronic images, identify normal and abnormal constituents in a microscopic analysis of urine specimens with 95% accuracy. These constituents include:
 - Erythrocytes
 - Leukocytes
 - Epithelial cells: squamous, transitional, renal
 - Bacteria
 - Yeast
 - Casts: hyaline, fine and coarse granular, rbc, wbc, waxy
 - Crystals: uric acid, calcium oxalate, triple phosphate, tyrosine, cystine, ammonium biurate

- Oval fat bodies
 - Contaminants: fibers, talc, glass, etc.
2. Operate automated dipstick readers with 100% accuracy.
 3. For the following procedures, it is essential that the student receive hands-on experience and perform with 95% accuracy in whichever department the procedure is performed:
 - a. Cerebrospinal fluid analysis to include cell count, differential, chemistry
 - b. Fecal occult blood
 - c. Urine/serum pregnancy test
 4. Recognize cells specific to each body fluid type to include histiocytes, mesothelial cells, malignant cells, macrophage with inclusions, crystals, yeast, bacteria and others.
 5. Discuss or perform body fluid analysis on synovial, serous, and other fluids.

V. Interpretation and Reporting of Results

1. State the reference (normal) values for all routine assays performed in the urinalysis laboratory.
2. With 95% accuracy, correlate quantitative data with microscopic data.
3. Correlate abnormal results with associated common disease states.
4. Interpret the results obtained from performing body fluid analysis on synovial, serous, and other fluids.
5. Report all divergent or discordant results between quantitative and microscopic data to the clinical instructor.
6. Recognize all critical values and report these findings to the clinical instructor.

A P P E N D I X B

S U P P L E M E N T A L F O R M S



UNIVERSITY of MARYLAND
SCHOOL OF MEDICINE

**DEPARTMENT OF MEDICAL & RESEARCH TECHNOLOGY
UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE**

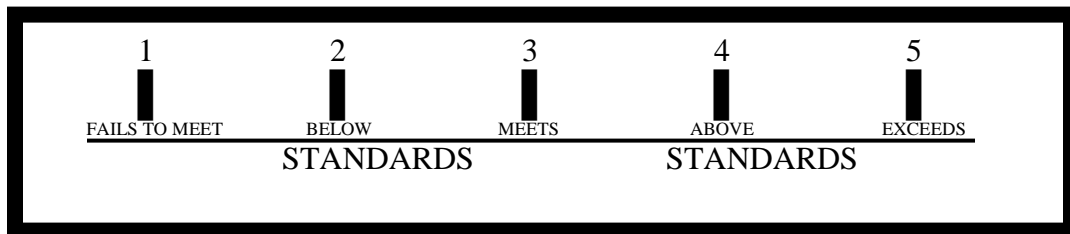
INTERIM CLINICAL EVALUATION

Student: _____ Evaluation Date: _____

Rotation Number: _____ Affiliate: _____

Discipline _____

This assessment is an abbreviated version of the final clinical evaluation. Please refer to that form for detailed descriptions of behavior in the categories below. Circle the number, which corresponds to the student's performance in each category using the following rating scale as a guide:



1. ***Fails to Meet Standards*** – Performance is below entry-level expectations. Student does not meet minimum standards. Performance is unacceptable.
2. ***Below Standards*** – Performance is marginally below entry-level expectations. Student needs to improve to meet minimum standards.
3. ***Meets Standards*** – Meets entry-level expectations and minimum standards.
4. ***Above Standards*** – Consistently meets entry-level expectations and minimum standards. Excels in certain areas. Student has demonstrated a high level of initiative and independent functioning.
5. ***Exceeds Standards*** – Clearly outstanding. Consistently exceeds entry-level expectations and minimum standards. Student has demonstrated a high level of initiative and independent functioning.

❖ Initiative and Interest

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
----------	----------	----------	----------	----------

❖ Responsibility

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
----------	----------	----------	----------	----------

❖ Adaptability

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
----------	----------	----------	----------	----------

❖ Knowledge

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
----------	----------	----------	----------	----------

❖ Technique

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
----------	----------	----------	----------	----------

❖ Professional Standards

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
----------	----------	----------	----------	----------

GENERAL COMMENTS:

Days Absent _____	Days Made-up _____	Days Tardy _____
-------------------	--------------------	------------------

Evaluated by: _____
Affiliate Signature Title Date

I have reviewed this evaluation and agree with its content:

Student Signature Date

Reviewed by

DMRT Program Director Date

<http://medschool.umaryland.edu/dmrt/clinical.asp>



UNIVERSITY of MARYLAND SCHOOL OF MEDICINE

DEPARTMENT OF MEDICAL & RESEARCH TECHNOLOGY UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE

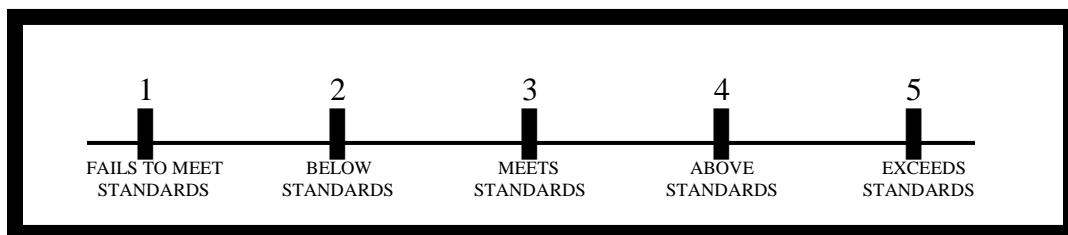
FINAL CLINICAL EVALUATION

Student: _____ Evaluation Date: _____

Rotation Number: _____ Affiliate: _____

Discipline: _____

The primary objective of this assessment is to ensure that each student enters the clinical laboratory science profession with an understanding of its behavioral and skill standards by demonstrating a willingness to adhere to those standards. Circle the number, which corresponds to the student's performance in each category using the following rating scale as a guide.



1. ***Fails to Meet Standards*** – Performance is below entry-level expectations. Student does not meet minimum standards. Performance is unacceptable.
2. ***Below Standards*** – Performance is marginally below entry-level expectations. Student needs to improve to meet minimum standards.
3. ***Meets Standards*** – Meets entry-level expectations and minimum standards.
4. ***Above Standards*** – Consistently meets entry-level expectations and minimum standards. Excels in certain areas. Student has demonstrated a high level of initiative and independent functioning.
5. ***Exceeds Standards*** – Clearly outstanding. Consistently exceeds entry-level expectations and minimum standards. Student has demonstrated a high level of initiative and independent functioning.

STANDARDS OF CLINICAL PRACTICE

- **KNOWLEDGE**

- ❖ Demonstrates understanding of basic theoretical concepts.

1	2	3	4	5
<hr/>				

- ❖ Demonstrates knowledge of general quality assurance principles and practices.

1	2	3	4	5
<hr/>				

- ❖ Correlates pathological significance of test results with laboratory data.

1	2	3	4	5
<hr/>				

- ❖ Recognizes patient abnormal results and takes appropriate action.

1	2	3	4	5
<hr/>				

- ❖ Identifies problems, errors, or malfunctions appropriately at an entry level.

1	2	3	4	5
<hr/>				

- **TECHNIQUE**

- ❖ Applies theoretical principles to current tasks.

1	2	3	4	5
<hr/>				

- ❖ Completes assigned tasks within an acceptable time frame.

1	2	3	4	5
<hr/>				

- ❖ Accomplishes tasks with minimal supervision.

1	2	3	4	5
<hr/>				

- ❖ Reports accurately and efficiently.

1	2	3	4	5
<hr/>				

- ❖ Demonstrates appropriate entry-level troubleshooting skills.

1	2	3	4	5
<hr/>				

PROFESSIONAL STANDARDS

• INITIATIVE AND INTEREST

- ❖ Attentive to instructions; listens well and asks pertinent questions.

1 2 3 4 5

- ❖ Actively participates in performing assigned tasks.

1 2 3 4 5

- ❖ Prepares adequately for the days laboratory experience.

1 2 3 4 5

- ❖ Functions as a self-starter in appropriate situations.

1 2 3 4 5

• RESPONSIBILITY

- ❖ Accountable for work assigned including willingness to take extra time to complete a task when necessary and seeking help when appropriate.

1 2 3 4 5

- ❖ Acknowledges errors and takes appropriate action such as notifying the teaching technologist.

1 2 3 4 5

• INTERPERSONAL/PROFESSIONAL SKILLS

- ❖ Communicates effectively and professionally.

1 2 3 4 5

- ❖ Promotes a cooperative working environment with other professionals.

1 2 3 4 5

• **ADAPTABILITY**

- ❖ Accepts constructive criticism and modifies behavior accordingly.

1	2	3	4	5
---	---	---	---	---

- ❖ Flexible when schedule of daily learning activities is modified.

1	2	3	4	5
---	---	---	---	---

• **ADHERENCE TO POLICIES**

- ❖ Adheres to institutional policies.

N/A No Yes

- ❖ Adheres to established scheduling policies of the institution.

N/A No Yes

- ❖ Complies with institution's laboratory safety policies and procedures.

N/A No Yes

- ❖ Maintains patient and institutional confidentiality.

N/A No Yes

- ❖ Appearance is professional and/or follows dress code.

N/A No Yes

- ❖ Adheres to UMB affiliate policies on the use of IT resources (computers, Internet, etc.)

N/A No Yes

OVERALL SUMMARY

Please rank student's overall performance:

1	2	3	4	5
FAILS TO MEET STANDARDS	BELOW STANDARDS	MEETS STANDARDS	ABOVE STANDARDS	EXCEEDS STANDARDS

COMMENTS:

I recommend that the student receive a final evaluation of:

___ Passing with Excellence

___ Passing

___ Failing

Days Absent ___ Days Tardy ___ Days Left Early ___ Time Made-up

Evaluated by: _____
Affiliate Signature Title Date

Affiliate Signature Title Date

- I have reviewed this evaluation and agree with it's content:

Student Signature Date

- Student has returned affiliate's badge (if applicable) Yes No NA

Affiliate Signature Title Date

STUDENT COMMENTS:

Final Evaluation By DMRT:

___ Passing with Excellence

___ Passing

___ Failing

Program Director Date



Department of Medical & Research Technology
University of Maryland School of Medicine

STUDENT SELF EVALUATION

Self-evaluation is a process that contributes to effective learning experiences. The systematic use of a self-evaluation should yield objective information and form the basis of positive future activities. Your participation and constructive use of this evaluation is greatly appreciated.

Date: _____

Section I

- A. Student Name: _____
- B. Rotation Number (circle one): I II III IV Summer I Summer II
- C. Name of Affiliate: _____
- D. Discipline (check one): Chemistry Hematology Microbiology
 Blood Bank Immunology/serology

Section II

Directions: Briefly answer the following questions.

1. Did your academic training adequately prepare you for this rotation? If not, what specific improvements could be made?

2. Did you read and follow the course objectives as you progressed through this rotation? Did the objectives enhance the learning process? Were they reasonable and attainable?

3. Did you demonstrate active participation in performing assigned tasks? Please provide an example.

4. How did you prepare for daily activities and assignments at the clinical affiliate?

Section II - continued

5. How much time did you spend supplementing your practical experiences gained in the laboratory rotation with review of theory presented during your didactic training?

6. In which of the following areas(s) do you believe you improved the most while in the rotation?

- | | | |
|--|--|--|
| <input type="checkbox"/> technical dexterity | <input type="checkbox"/> new or alternative techniques | <input type="checkbox"/> speed |
| <input type="checkbox"/> confidence | <input type="checkbox"/> interpersonal skills | <input type="checkbox"/> other (specify) |

7. Did you take initiative in asking questions, requesting assistance or clarification when necessary? If not, why not?

8. Describe your general response to feedback from clinical faculty.

9. Do you believe this rotation prepared you adequately for future employment in the clinical laboratory science profession? If not, why not?

10. What can you do to improve future experiences in the clinical laboratory?

11. What person at this clinical site impacted your rotation experience the most?



**DEPARTMENT OF MEDICAL AND RESEARCH TECHNOLOGY
UNIVERSITY OF MARYLAND SCHOOL OF MEDICINE
CLINICAL COURSE EVALUATION**

Evaluation is a continuous process that underlies all successful and effective teaching and learning experiences. The systematic use of planned evaluation procedures yields objective information and the more accurately we judge, the more effective we will be in directing learning. The information provided by this evaluation will be used to make decisions regarding program improvement and curriculum modification. Your participation and constructive use of this evaluation is greatly appreciated.

SECTION I

- A. Student Name: _____
- B. Rotation Number (circle one) I II III IV Summer I Summer II
- C. Name of Affiliate: _____
- D. Discipline (check one) Chemistry Hematology Blood
Bank
- Microbiology Immunology/Serology

SECTION II

Directions: Please check the appropriate response to the following questions pertaining to your clinical experience.

- | | | | |
|----|---|-----|----|
| 1. | Did you receive an orientation at your clinical affiliate use? | Yes | No |
| 2. | DMRT clinical objectives were distributed to you and the affiliate.
Were the objectives: | | |
| | a. clearly stated? | Yes | No |
| | b. Helpful? | Yes | No |
| | c. Realistic? | Yes | No |
| | d. Utilized? | Yes | No |
| 3. | Were you given a learning checklist by the affiliate? | Yes | No |
| 4. | Were you given separate objectives by the affiliate? | Yes | No |
| 5. | Were you notified of the evaluation procedures in advance? | Yes | No |
| 6. | Was your daily schedule organized and task assignments | | |

- | | | | |
|----|---|-----|----|
| | clearly specified? to student schedule the majority of the time? | Yes | No |
| 7. | Were laboratory procedure manuals available for you at the bench? | Yes | No |
| 8. | In your opinion, were your experiences: | | |
| | a. Adequate in number and variety | Yes | No |
| | b. Well organized | Yes | No |
| | c. Adequately supervised | Yes | No |

SECTION II – continued

- | | | | |
|-----|---|-----|----|
| 9. | In general, did the teaching technologist(s): | | |
| | a. Show genuine interest in your education | Yes | No |
| | b. Incorporate theoretical information with practical training | Yes | No |
| | c. Encourage active participation in workstation activities | Yes | No |
| | d. Clearly explain expectations for daily work | Yes | No |
| | e. Suggest complementary and/or reference readings reviews | Yes | No |
| 10. | In general, did the laboratory personnel promote an environment that was: | | |
| | a. Conducive to learning | Yes | No |
| | b. Open to questions | Yes | No |
| 11. | In your opinion, was the amount of time devoted to work stations: | | |
| | Too Long | | |
| | Too Short | | |
| | Just Right | | |

SECTION III

Directions: Briefly answer the following questions:

12. Did your interest increase following rotation in this area?
13. Would you seek employment with this clinical affiliate institution? In the laboratory?
14. What positive factors in this facility make it desirable for training Medical Technology students?

Additional Comments:

A P P E N D I X C

***F A C U L T Y C O N T A C T
L I S T***

M L S G R I E V A N C E F O R M

***A C C I D E N T & I N J U R Y
R E P O R T***

Department of Medical and Research Technology
Faculty Contact List - Spring 2015 Clinical Rotation Placements

Faculty Contact	Faculty Contact Information	Affiliate
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Dr. Lilia Mijares	410-706-3771 lmijares@som.umaryland.edu	NIH - Micro UMMC – Micro VA Medical Center – Micro
Deirdre Parsons	410-706-1829 dparsons@som.umaryland.edu	Anne Arundel Medical Center Johns Hopkins Hospital JH BayView Medical Center National Institutes of Health - BB
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Harry Wandell	410-706-7535 hwandell@som.umaryland.edu	Harbor Hospital Center National Institutes of Health-Chem St. Agnes Hospital UMMC – Chem & BB VA Medical Center – Chem, Heme & BB

R: student affairs/clin rot mat//faculty contact list 14-15

**DEPARTMENT OF MEDICAL AND RESEARCH TECHNOLOGY
MLS STUDENT GRIEVANCE REPORT FOR CLINICAL ROTATION PLACEMENT**

CLINICAL AFFILIATE: _____
ROTATION: _____
DISCIPLINE AREA: _____
FACULTY LIAISON: _____
DATE: _____

Describe the issue or concern related to your clinical rotation experience. You may attach typed comments to this form.

STUDENT REPORT:

STUDENT NAME (please print)

DATE

Student Signature

REVIEWED BY: _____
PROGRAM DIRECTOR

DATE

ACTION PLAN: _____

(Attach additional information as needed)

*Department of Medical and Research Technology
University of Maryland, School of Medicine*

Accident and Injury Report Form JT-1

Name of Individual:
Date of Incident:
Name of person first contacted about the incident (<i>Instructor</i>)
Description of Injury:
How did the accident occur? (<i>describe fully</i>)
Name of object or item involved in the accident:
Was safety equipment provided (<i>circle</i>) <div style="text-align: center; margin-top: 10px;">YES NO</div>
Was safety equipment in use at the time of injury? <div style="text-align: center; margin-top: 10px;">YES NO</div>
Was accident caused by injured's failure to use or observe safety regulations? <div style="text-align: center; margin-top: 10px;">YES NO</div>
Was the injury treated at the scene or by a doctor at a treatment facility?
If treated at the scene of the accident, describe treatment:
Did the injured person return to school or work, if so, time and date:
Follow up:
Signature of person filing report:
Date of report: