



Ontario Society of  
Medical Technologists

*Certified Medical  
Laboratory  
Assistant / Technician  
(MLA/T)*

MLA/T COMPETENCY GUIDELINES

Competencies expected of an entry-level  
Medical Laboratory Assistant/Technician (MLA/T)

JULY 2008

## TABLE OF CONTENTS

Forward	
A. Standards of Practice	Page 1
B. Definitions	Page 8
C. Medical Terminology	Page 9
D. Basic Biology, Anatomy & Physiology	Page 9
E. Laboratory Mathematics, Statistics & Quality Control	Page 10
F. Specimen Procurement, Processing, & Data Collection	Page 11
G. Laboratory Safety	Page 13
H. Laboratory Equipment & Supplies	Page 15
I. Anatomical Pathology & Cytology	Page 18
J. Clinical Microbiology	Page 19
K. Clinical Chemistry	Page 21
L. Clinical Hematology	Page 22
M. Immunohematology	Page 23
N. Electrocardiograms (ECG)/Holter Monitors	Page 23
O. Reference Sources	Page 24

## **FOREWORD**

In 1988 the Ontario Society of Medical Technologists (OSMT) recognized the need for the establishment of provincial standards for entry to practice for Medical Laboratory Assistants/Technicians (MLA/Ts). After careful consideration, time and effort a certification exam was developed and is held in June and November each year. Since that first exam in 1988, thousands of MLA/T candidates have successfully challenged the exam, earning them the distinction of being a certified Medical Laboratory Assistant/Technician with the OSMT.

It is the goal of the society that MLA/T certification provide the public with assurance of competent health care providers, employers with assurance of competent MLA/Ts who meet provincial standards and newly certified MLA/Ts with increased employment opportunities and portability.

It should be recognized that these MLA/T Competency Guidelines are meant as a minimum standard of competency, which must be met for certification. It is further recognized that a MLA/T is required by legislation to work under the supervision of a Medical Laboratory Technologist (MLT). It must therefore be understood that the emphasis of these guidelines is on practical performance rather than on the theoretical background. MLA/Ts will be required to recognize problems and errors but will not be expected to provide solutions. Problems and errors are to be referred to the MLT supervising them. Where theoretical requirements, prefaced by such terms as “demonstrate, understand, have basic knowledge of” are written in these guidelines, these terms shall imply the minimum level of knowledge required for the correct practical performance of the method to which the theoretical requirement is related.

**A. STANDARDS OF PRACTICE**

**1. GENERAL**

A standard of practice is defined as the measure by which the accuracy or quality of performance of an individual is judged.

The Medical Laboratory Assistant/Technician must be knowledgeable in the theory, technique and clinical application of the various procedures performed and must be skilled in the performance of those procedures. The Medical Laboratory Assistant/Technician must conduct himself/herself in a professional manner.

The intent of the **Standards of Practice** is to provide an overview of the expectations placed on the Medical Laboratory Assistant/Technician.

Medical Laboratory Assistants/Technicians shall:

- 1.1 Cooperate with other members of the health care team to provide effective patient care
- 1.2 Ensure and protect confidentiality of all patient information
- 1.3 Take responsibility for their work
- 1.4 Know the laws and regulations governing Medical Laboratory Technology and apply these to the practice of their profession
- 1.5 Understand the difference between direct supervision and general supervision and relate the need for these to their work
- 1.6 Ensure knowledge and application of the following:
  - a) Health Care Consent Act, 1996
  - b) The Regulated Health Professions Act (RHPA), 1991, with special attention to section 11 Ontario Regulation 107/96 Controlled Act and exemptions
  - c) Laboratory and Specimen Collection Centre Licensing Act, Regulations 682 & 683
  - d) Personal Health Information Protection and Electronic Documents Act (PIPEDA), (a Canadian Act for commercial laboratories)
  - e) Personal Health Information Protection Act (PHIPA), (an Ontario Act)
  - f) Chain of Custody documentation
  - g) Workplace Hazardous Materials Information System (WHMIS) Regulation
  - h) Transportation of Dangerous Goods (TDGS) Act
  - i) Canada's Health Care System
  - j) Canada Health Act
  - k) Occupational Health and Safety Act.
- 1.7 Practise within the scope of their competence and seek help when a task is beyond their competence

## **STANDARDS OF PRACTICE (Cont'd)**

### **2. KNOWLEDGE**

Medical Laboratory Assistants/Technicians shall take the necessary measures to maintain their skills and remain current with scientific advances.

Medical Laboratory Assistants/Technicians shall:

- 2.1 Demonstrate knowledge of the pertinent theoretical and practical items in the OSMT common core competency guidelines
- 2.2 Share their knowledge with colleagues in the interests of optimal patient care
- 2.3 Know and understand the ethical and legislative framework that influences the practice of Medical Laboratory Technology
- 2.4 Know and apply institutional policies and procedures

### **3. SAFETY**

Medical Laboratory Assistants/Technicians shall conduct their professional practice in accordance with current safety guidelines and legislation.

Medical Laboratory Assistants/Technicians shall:

- 3.1 Apply health and safety measures at all times to ensure the safety of patients, co-workers and themselves, and for the protection of the environment
- 3.2 Know and promote the proper use of appropriate safety equipment
- 3.3 Cooperate with other members of the health care team with regard to safety issues
- 3.4 Follow the procedures for preservation and safe shipment of biological specimens in accordance with current government legislation
- 3.5 Dispose of biological specimens and other hazardous waste safely, in accordance with institutional policies and government regulations
- 3.6 Understand and review all emergency response plans

## **STANDARDS OF PRACTICE (Cont'd)**

### **4. SPECIMEN PROCUREMENT AND HANDLING**

Medical Laboratory Assistants/Technicians shall know, understand and follow standard procedures for the collection and handling of specimens and/or provide all necessary information to those responsible for collection.

Medical Laboratory Assistants/Technicians shall:

- 4.1 Show an understanding of specimen collection requests (e.g. which health professionals can order tests and the specimen requirements of specific test requests)
- 4.2 Provide the information necessary for patients to understand the specimen collection procedure
- 4.3 Show courtesy, consideration, and professionalism when dealing with patients
- 4.4 Follow institutional protocol for the collection of specimens, ensuring proper identification of patients and specimens
- 4.5 Follow institutional protocol for specimen accessioning and handling, ensuring appropriate identification of specimens and documentation that is readily retrievable

### **5. TESTING**

Medical Laboratory Assistants/Technicians shall know and understand the various steps of the techniques they perform and ensure the accuracy of their work by adhering to appropriate quality control protocols.

Medical Laboratory Assistants/Technicians shall:

- 5.1 Have basic knowledge of the principles of the techniques they carry out
- 5.2 Know and follow the various steps involved in the techniques they perform
- 5.3 Be proficient with the use, operation and maintenance of the equipment they use
- 5.4 Know the reference ranges, critical values and detection limits of the techniques they use
- 5.5 Know about possible interferences and refer problems to a MLT
- 5.6 Ensure that control protocols are followed for each test

## **STANDARDS OF PRACTICE (Cont'd)**

### 6. **QUALITY MANAGEMENT**

Medical Laboratory Assistants/Technicians shall work under the supervision of a MLT in a timely, accurate, and effective manner.

### 7. **ETHICS**

Ethics are defined as principles of conduct governing an individual or a group.

Medical Laboratory Assistants/Technicians shall:

- 7.1 Hold in confidence and protect all the information relating to patients
- 7.2 Work with other health care professionals to provide quality effective patient care
- 7.3 Promote the image and status of their contribution to the practice of laboratory medicine by maintaining high standards in their work habits and through active support of the OSMT
- 7.4 Work within their legislated scope of practice and seek direction where required
- 7.5 Endeavor to maintain and improve their skills and knowledge
- 7.6 Use safe work practices at all times

**LABORATORY AND SPECIMEN COLLECTION CENTRE LICENSING ACT**

**REGULATION 682**

**LABORATORIES**

(sections applicable to laboratory technicians)

1. In this Regulation:

“laboratory director” means a person who is responsible for the administration of the scientific and technical operation of a laboratory including the supervision of tests and the reporting of the results of the tests

“laboratory supervisor” means a person who under the general supervision of a laboratory director supervises laboratory personnel and who may perform tests requiring special scientific skills

“laboratory technician” means a person who under direct supervision performs laboratory tests which require limited technical skill and responsibilities

“laboratory technologist” means a person who under general supervision performs tests which require the exercise of independent judgment

The owner and the operator of a laboratory shall ensure that the staff of the laboratory,

- (a) examine specimens from humans only
  - (i) at the request of a legally qualified medical practitioner or a dentist,
  - (ii) at the request of a midwife, in respect of a test specified in Appendix B,
  - (iii) at the request of a person who lawfully practises a health profession in a jurisdiction outside Ontario, if in that jurisdiction a laboratory may lawfully examine specimens at the request of that person,
  - (iii) at the request of an insurer or an agent within the meaning of the *Insurance Act*, in respect of HIV Antibody testing, or
  - (iv) at the request of a registered nurse who holds an extended certificate of registration under the *Nursing Act, 1991*, in respect of a test specified in Appendix C,
- (b) report the results of a test directly to the person who requested it and include in the report the name of the laboratory that received the specimen and the name and address of the laboratory in which the test was performed

**LABORATORY AND SPECIMEN COLLECTION CENTRE LICENSING ACT (Cont'd)**

*The duties listed below are taken directly from a guidance document prepared by the Ministry of Health and Long-Term Care Laboratories Branch regarding laboratory technician duties (June 1996) and were not developed by the OSMT.*

**LABORATORY TECHNICIANS**

Section 1 of Ontario Regulation 682 defines a “laboratory technician” as a person who under direct supervision performs laboratory tests which require limited technical skill and responsibilities.

In accordance with this, a laboratory technician may, under the direct supervision of an appropriately qualified Medical Laboratory Technologist (MLT), respiratory therapist (RT), medical radiation technologist (MRT), laboratory supervisor or laboratory director, perform laboratory tests which require limited technical skill and responsibilities and which do not require interpretation, assessment or the exercise of independent judgment. Specific work assignments should only be undertaken subsequent to thorough training and instruction by qualified supervisory personnel. A technician functions in accordance with predetermined criteria, which are used to recognize unexpected results, errors and problems. Any such difficulties or problems encountered during the performance of the day’s work must be brought to the immediate attention of the personnel providing supervision.

A technician’s duties may include the following:

- blood sample procurement
- sample preparation for analysis, e.g., separation, numbering (including referral specimens)
- reagent preparation
- media preparation, smear preparation, i.e. blood films
- staining of smears
- cover slipping of slide preparation
- concentration of stool samples for parasitology examinations
- planting and streaking of microbiology specimens and controls, including set up of anaerobic and CO<sub>2</sub> jars, for reading by a MLT

**LABORATORY AND SPECIMEN COLLECTION CENTRE LICENSING ACT (Cont'd)**

- subculturing of stock cultures in bacteriology
- titrations using a pH meter
- urinalysis (excluding microscopic)
- recording quality control results for interpretation and approval by qualified staff as listed above
- operation of automated instruments after proper functioning has been established by qualified staff as listed above
- set up of erythrocyte sedimentation rates
- set up of micro hematocrits
- set up of serology tests, e.g., occult blood, pregnancy test (to be read and interpreted immediately by a MLT)
- routine equipment maintenance
- temperature monitoring of thermally controlled equipment
- transcription of results from worksheets to reports
- filing of records and retrieval of files
- glassware washing, housekeeping
- preparation of kits

The above-noted list is not intended to be all-inclusive. It is recognized that there may be other laboratory activities that do not require interpretation, assessment or the exercise of independent judgment, which may be carried out by a laboratory technician.

**B.**

**DEFINITIONS**

(The definitions given below are for use with the OSMT MLA/T Competency Guidelines)

**MLT - MEDICAL LABORATORY TECHNOLOGIST**

Means a person who is registered with the College of Medical Laboratory Technologists of Ontario (CMLTO) and who, under general supervision, performs tests which require the exercise of independent judgment

**MLA/T - MEDICAL LABORATORY ASSISTANT/TECHNICIAN**

Means a person who, under the direct supervision of a MLT, performs laboratory tests which require basic technical skill and knowledge

**DEMONSTRATE**

Clearly show and express knowledge through words or actions

**UNDERSTAND**

See the meaning and importance of words or actions

**BASIC KNOWLEDGE**

Entry-level comprehension of theoretical basis

**PRACTICAL**

Demonstrate ability to perform a technique, distinct from theory

**THEORETICAL**

Based on theory only

C.

**MEDICAL TERMINOLOGY**

The Medical Laboratory Assistant/Technician shall have a fundamental vocabulary of medical terms.

D.

**BASIC BIOLOGY, ANATOMY & PHYSIOLOGY**

The Medical Laboratory Assistant/Technician should know, understand, and be prepared to explain:

- The human body
- The human cell and its major constituents; Hydrogen, Oxygen, Carbon and Nitrogen. The result of combining any of these elements: water, proteins, carbohydrates, and fats
- Tissue's structural and functional characteristics. The four basic types: Epithelium, Connective, Muscular, and Nervous
- The organs and their functions
- The body cavities, skull, thorax, abdomen, and pelvis
- The Body Systems:
  1. Skeletal
  2. Muscular and Articular
  3. Circulatory
  4. Hematopoietic
  5. Lymphatic
  6. Reticuloendothelial
  7. Digestive
  8. Respiratory
  9. Urinary
  10. Nervous
  11. Reproductive
  12. Endocrine
  13. Skin and Special Senses

## **E. LABORATORY MATHEMATICS, STATISTICS & QUALITY CONTROL**

The Medical Laboratory Assistant/Technician shall know, understand, and be able to perform the procedures related to the following:

Statistics:

- Use of specific units in the International System (S.I.) (volume, weight and linearity)
- Define mean, median, mode, standard deviation, coefficient of variation, accuracy, precision
- Calculation of mean, standard deviation, and coefficient of variation

Quality Control:

- Differentiation between standards and controls as to characteristics and use
- Differentiation between commercial controls, in-house pools, and blind duplicate patient samples
- Evaluation of equipment and methods with regard to accuracy and precision
- Effects of potential sources of error
- Use of external quality control methods

Laboratory Mathematics:

- Ratio, proportion, dilution
- Exponents
- Metric system
- Convert temperature reading from Celsius to Fahrenheit or Fahrenheit to Celsius
- Significant digits
- Rounding off

Solution Preparation:

- Preparation, standardization, and storage of molar, isotonic, and percentage (w/w, v/v, w/v) solutions
- Calculation and preparation of dilutions using concentrated and diluted reagents
- Relate the following terms for grades of chemicals and their practical use: analytical, technical, commercial, C.P., USP, B.P. certified ACS
- Use of deionized water vs distilled water

## **F. SPECIMEN PROCUREMENT, PROCESSING, AND DATA COLLECTION**

The Medical Laboratory Assistant/Technician must be able to:

1. Recognize the importance of specimen collection (i.e. all subsequent procedures rely on the quality of the specimen)
2. Correctly identify appropriate sites for venous and capillary sample collection for adults, infants and timed specimens
3. Select appropriate equipment for blood collection (including vacutainer system, syringes, and variation of needle gauges, butterfly needles, lancets, anticoagulant, microtubes)
4. Correctly perform venous and capillary specimen procurement using proper aseptic technique in various situations (e.g. alcohol and iodine skin decontamination)
5. Recognize the terms and uses of anticoagulants and preservatives
6. Describe the potential hazards to the patient and to the Medical Laboratory Assistant/Technician during phlebotomy and subsequent specimen handling
7. Explain the necessity for proper patient and sample identification in all stages of the specimen handling, from collection to final disposition
8. Describe the methods for preservation and safe shipment of biological specimens in accordance with applicable regulations
9. Describe the differences between “isolation” and “reverse isolation” and recognize the significance of each
10. Describe the proper collection of a 24-hour urine specimen
11. Describe the protocol for collection of mid-stream urine specimen (MSU)
12. Provide kits and instructions for collecting skin scrapings
13. Describe the procedure to be followed if a specimen cannot be processed immediately
14. Recognize if a collected sample is suitable for the requested testing and understand the proper follow-up procedures. This is in reference to method of collection, sample identification and specified collection time, specimen volume, storage, stability, hemolysis and type of anticoagulant.

## **SPECIMEN PROCUREMENT, PROCESSING, AND DATA COLLECTION (Cont'd)**

15. Perform serum/plasma separation and storage
16. Understand proper storage of whole blood samples
17. Meet requirements for filing, storage and retrieval of pathology/cytology specimens, blocks and slides
18. Be familiar with a system of reporting laboratory results including the following:
  - a) initiation of the request for a particular test
  - b) use of patient requisition forms
  - c) specimen collection and labelling
  - d) forwarding and receiving a laboratory specimen and requisition
  - e) the importance and reason for “stat” orders
19. Recognize abnormal results which must be verified by a MLT
20. Understand the regulatory requirements involved in patient confidentiality including requests for telephone reports by unauthorized persons
21. Recognize the legal and clinical consequences of reporting
22. Know additives for various blood collection systems, e.g. (vacutainer), uses for various tests, order of draw, and implications of incorrect collection
23. Know the technique for blood culture collections
24. Know the proper technique for collection of blood alcohol levels
25. Know the technique for collection of fecal specimens: Ova and Parasites (O&P), Fecal Occult Blood (FOB), Culture and Sensitivity (C&S), Fecal Fat and Viral Studies
26. Know the technique and sample requirements of sputum samples for C&S and cytology studies
27. Know specimen requirements for seminal fluid for fertility or post vasectomy studies
28. Know the techniques for the preservation of fine needle aspirate biopsy smears and specimens

**G.**

**LABORATORY SAFETY**

The Medical Laboratory Assistant/Technician shall demonstrate an understanding of the need for and the effective use of (or response to) the following:

- Laboratory Safety Symbols
- WHMIS
- Standard Precautions
- Transportation of Dangerous Goods
- Basic CPR
- Decontamination of Laboratory Equipment
- Procedures for Incident Reporting

Physical and Chemical Hazards:

- 1) Response to fire and use of fire extinguishers
- 2) Safe storage and use of chemicals (including spill clean up)

Biological Hazards:

1. Standard precautions
2. Leaking specimens and contaminated requisitions
3. Biological spills
4. Isolation techniques (strict, enteric, wound and skin, respiratory, reverse)
5. Biomedical waste disposal regulations (institutional, federal and provincial):
  - a. Packaging
  - b. Containers - reusable - single use - sharps
  - c. Colour - coding and labelling
  - d. In-house movement of waste
  - e. Storage
  - f. Treatment options- Steam autoclaving- Chemical decontamination
  - g. Containment, Decontamination and Disposal of Sharps
  - h. Use of Level II Containment

Radiation Hazards:

1. Monitoring
2. Spills and contamination
3. Accidents

## **LABORATORY SAFETY (Cont'd)**

### Safety Equipment:

1. Safety gloves, gowns and lab coats
2. Eye shields
3. Face shields and regulation masks
4. Pipettes; safety bulbs for pipettes
5. Acid bottle carriers
6. Fume hood
7. Biological safety cabinets
8. Safety cans
9. Safety shower
10. Eye wash
11. Fire blankets and extinguishers
12. Latex and vinyl gloves
13. Chemical and biological spill kits
14. Flammable storage cabinets
15. Gas cylinder carts
16. Self-contained breathing apparatus
17. Safety Shields

### First Aid:

1. Chemical injury
2. Heat injury
3. Trauma
4. Electric shock
5. Radioisotope contamination
6. Needle stick injury
7. Body Fluid exposure

**H.**

**LABORATORY EQUIPMENT & SUPPLIES**

The Medical Laboratory Assistant/Technician shall demonstrate the understanding of the theory and application (handling, storage, safety precautions, care, and cleaning) of the following equipment:

<b>Mandatory Equipment &amp; Supplies in Schools</b>	<b>Additional Mandatory Equipment at Clinical Placement</b>	<b>Optional Equipment (usually at clinical placement)</b>
<b>General Equipment:</b>		
Balances (Mechanical and Analytical)		
Centrifuge		
Hot Plate		
Autoclave		
Compound Microscope		
Mixing devices (i.e. vortex)		
Water baths		
Refrigerator	Alarm systems for performance verification	
Freezer	Alarm system for performance verification	
Thermometers (including chart recording)		
<b>Hematology:</b>		
Manual cell counter		Automated cell counter
Hemacytometer		Automated slide stainer
Microhematocrit centrifuge		Automated coagulation analyzer
Sedimentation tubes		Cytospin
Unopette system		
<b>Microbiology:</b>		
Incubators		Hot air ovens
Loop incinerator		Class II & III Biosafety cabinet
Class I Biosafety cabinet		Automated media processor
Culture media (plates, tubes)		Automated blood culture system
<b>Histotechnology:</b>		
		Tissue processor (open and closed system)
		Microtome
		Automatic cover slip applicator

**LABORATORY EQUIPMENT & SUPPLIES (Cont'd)**

<b>Mandatory Equipment &amp; Supplies in Schools</b>	<b>Additional Mandatory Equipment at Clinical Placement</b>	<b>Optional Equipment (usually at clinical placement)</b>
<b>Urinalysis:</b>		
Reagent strips		Refractometer
		Automated strip reader
<b>Biochemistry:</b>		
pH meter		Water distiller
Automated and semi-automated pipettes	Automatic dispensers	Ion exchange resins
		Automated chemistry analyzer
		ABG analyzer
		Desiccator
<b>Immunoematology:</b>		
		Cell washer
		Serofuge
		Heating block
<b>Electrocardiograph (ECG):</b>		
ECG machine		
Holter Monitor		
<b>Other supplies/reagents:</b>		
Sufficient laboratory glass and plastic ware		Automated glassware washer
Sufficient phlebotomy supplies, e.g. needles, tubes, biohazard containers, etc.		
Sufficient reagents for staining and laboratory procedures		

## **LABORATORY EQUIPMENT & SUPPLIES (Cont'd)**

### Laboratory Glass and Plastic Ware:

- Properties of common types of laboratory glass and plastics with reference to effects of temperature extremes, solvents and corrosive chemicals.
- Use of beakers, centrifuge tubes, funnels, graduated cylinders, syringes, test tubes, flasks (volumetric, erlenmeyer, florence).
- Use of pipettes and pipette washers:
  - a. Serological  
Volumetric  
Mohr  
Capillary tubes  
Multipipette
  - b. Understand and use of:
    - I. T.D. pipette
    - II. T.C. pipette
    - III. Frosted ring

### Microscope / Compound microscope:

- a. Function and use of objective
- b. Oculars
- c. Condenser
- d. Iris diaphragm
- e. Stage
- f. Light source
- g. Filters
- h. Vernier scale
- i. Mechanical stage
- j. Use of immersion oil
- k. Refractive index
- l. Calculation of magnification
- m. Kohler illumination

## I.

### ANATOMICAL PATHOLOGY AND CYTOLOGY

The Medical Laboratory Assistant/Technician shall be able to demonstrate understanding of the following theories and procedures related to the safe reception, processing, staining and cover slipping of both Cytology and Histology specimens in the department of Anatomical Pathology.

Specimen receiving:

- Accessioning
- Common specimen rejection

Specimen Processing:

- Fixation
- Centrifugation
- Decalcification
- Cell block preparation (Application in Cytology only)
- Cytospin Technique
- Direct smear preparation
- Filtration-nucleopore and millipore

Specimen Staining:

- Romanowsky, Papanicolaou and routine H&E stains
- Stain and reagent preparation
- Staining sequence
- Manual and automated staining
- Understand cross contamination risks and the proper procedures required during specimen processing and staining.

Cover Slipping:

- Mounting media
- Manual and automated techniques

## **J.**

## **CLINICAL MICROBIOLOGY**

The Medical Laboratory Assistant/Technician shall know, understand, and be able to perform the procedures related to the following:

- The specimen collection requirements for microbiology specimens
- Common specimen rejection criteria

### **Classification of Microorganisms**

Have basic knowledge of the classification of microorganisms:

- bacteria
- viruses
- parasites
- protozoa
- fungi, molds and yeasts
- chlamydia
- rickettsia

### **Bacteriology**

Inoculation using:

- agar media (four quadrant streak method)
- agar slant tubes
- culture broth tubes
- automated plating machines

Distinguish between non-selective, selective, differential, and enriched media

Know the use of common media:

- Blood Agar, MacConkey Agar, Chocolate Agar, Thayer Martin (Transgrow) Agar, Phenylethyl Alcohol (PEA) Agar, Salmonella-Shigella (SS) Agar, Thioglycolate Broth

Incubation of specimens:

- correct time and temperature requirements
- anaerobic conditions: anaerobic jar including gas-pak method, anaerobic, glove box
- increased CO<sub>2</sub> tension: CO<sub>2</sub> incubator, candle jar
- microaerophilic conditions

Know the use of and be able to load an automated streaking machine, i.e. Iso-Plater

## CLINICAL MICROBIOLOGY (Cont'd)

Preparation of Media:

Given a lab procedure for the preparation of media, be able to:

- select the correct size and type of container
- measure or weigh out the proper ingredients
- measure and adjust pH
- filter heat sensitive ingredients
- sterilize by autoclave or inspissations
- dispense into appropriate containers using aseptic technique
- prepare complex media additive: laked blood, peptic digest of blood, eggs

Storage of Dehydrated and Prepared Media:

- stock dating/inventory procedures
- temperature requirements

Staining:

Have a basic knowledge of the principles and correct procedure for

- Gram Stain
- ZN Stain

Understand fundamental differences between Gram positive and Gram negative bacteria:

- Cocci and bacilli

Outline the use of the steam autoclave to sterilize media/equipment and to decontaminate biohazardous waste in the lab.

**K.****CLINICAL CHEMISTRY**

The Medical Laboratory Assistant/Technician shall know the specimen requirements, including common rejection criteria, for all routine clinical chemistry tests and be able to set-up/load both automated and manual instrumentation including QC samples for initial analysis. The Medical Laboratory Assistant/Technician shall know the reportable ranges for all routine clinical chemistry tests, recognize variant results and report them to their MLT supervisor.

The MLA/T shall have basic knowledge and be able to perform the procedures for the following:

Urinalysis:

- collection instructions for routine and microscopic (R&M)
- criteria for rejection of unacceptable specimens for routine and microscopic
- preparation of urine for microscopic examination
- preservation of urine for R&M if necessary
- collection instructions for 24 hour urine
- knowledge of 24 hour urine preservation, preservatives and their proper use
- measuring total volume of 24 hour urine and know the significance to the test requested

Tolerance and Stimulation Testing:

- types of routine tolerance testing and glucose loads
- administration of glucose solutions
- patient reactions to glucose load
- timed specimen collection

The Medical Laboratory Assistant/Technician should be aware of the following tests and their normal ranges, why they are ordered, and why some are grouped together:

- Liver function
- Renal function
- Lipid profile
- Cardiac enzymes
- Endocrine
- Tumour markers
- Drug levels
- Hepatitis testing
- Electrolytes
- Glucose testing

L.

## CLINICAL HEMATOLOGY

The Medical Laboratory Assistant/Technician shall know, understand, and be able to perform the procedures relating to the following:

- Specimen requirements related to hematology testing
- Common specimen rejection criteria
- Know the meaning and normal ranges of the different components which make up a CBC and Differential:
  - I. Haemoglobin
  - II. Haematocrit
  - III. RBC and Indices
  - IV. WBC
  - V. Platelets

Be able to load samples and reagents onto automated counter:

- Recognize and take appropriate action with samples which are:
  - I. Lipemic
  - II. Hemolysed
  - III. Icteric
  - IV. Clotted
  - V. Agglutinated

Automatic Coagulation:

- Specimen requirements related to coagulation testing
- Have a basic knowledge of instrument's operation
- Be able to prepare samples and load on machine
- Daily, weekly, and monthly maintenance

Manual Techniques:

- Reticulocytes sites
- Preparation of blood film

Counting chambers:

- care
- dilution of sample
- flooding chamber

## **CLINICAL HEMATOLOGY (Cont'd)**

Sedimentation Rate:

- correctly set up ESR
- be aware of sources of error
- know the difference between Westergren and Wintrobe methods

Routine and Special Staining

### **M. IMMUNOHEMATOLOGY**

The Medical Laboratory Assistant/Technician shall be able to demonstrate a basic knowledge of blood groups, blood products, storage requirements, effects of storage and the tests routinely performed in transfusion medicine, and be able to understand the procedures for the following, including implications of errors.

- ABO grouping
- Rh typing
- Antibody screening and testing
  
- Blood donations:  
Main criteria established by the Canadian Blood Services for acceptance or deferral of blood donors.
  
- Collection of whole blood:
  - a. anticoagulant in current use
  - b. additives
  - c. preparation of components
  
- Common specimen rejection criteria
- Tests routinely performed on all blood donations.

### **N. ELECTROCARDIOGRAMS (ECG)/ HOLTER MONITORS**

The Medical Laboratory Assistant/Technician should know the theory and practice of ECGs/Holter Monitors.

- Patient preparation
- Placement of leads
- Conduct test
- Baseline determination, artifact recognition and correction
- Recognize abnormal values and know appropriate action for each

**O.****REFERENCE SOURCES**

<u>ISBN</u>	<u>TITLE</u>	<u>AUTHORS</u>
	Histology and Cytology Notes for MLA/Ts	OSMT
	Reference Guide of Acts & Regulations for MLA/Ts	OSMT
0-323-03412-8	Clinical Laboratory Science: The Basics and Routine Techniques - 5 <sup>th</sup> Edition	Linné/Ringsrud
0-7216-0268-X	Clinical Procedures for the Medical Assistant – 6 <sup>th</sup> Edition	Kathy Bonewit-West
0-7216-0308-4	Student Mastery Manual for Clinical Procedures for Medical Assistants – 6 <sup>th</sup> Edition	Kathy Bonewit-West
0-8053-5386-0	Essentials of Human Anatomy & Physiology Textbook – 7 <sup>th</sup> Edition	Elaine N. Marieb
0-8053-5903-6	The Anatomy and Physiology Coloring Workbook A Complete Study Guide – 7 <sup>th</sup> Edition	Elaine N. Marieb
0-921479-10-7	Laboratory Safety – CSMLS Guidelines Fifth Edition 2001	Shematek/Wood
0-07-235118-7	Hole’s Essentials of Human Anatomy and Physiology – 9 <sup>th</sup> Edition	Shier/Butler/Lewis
0-7216-5275-1	Laboratory Procedures for Medical Office Personnel	Elsevier Science
0-8926-2434-5	Clinical Laboratory Assistant/Phlebotomist	Thomson/Nelson
0-8926-2435-3	Electrocardiography Essentials	Thomson/Nelson
0-323-01338-4	Human Body in Health and Disease – 3 <sup>rd</sup> Edition	Elsevier Science
0-553-58189-9	The Bantam Medical Dictionary 3 <sup>rd</sup> Revised Edition	Bantam Books
1416001018.00	Dorland’s Medical Dictionary	Elsevier Science
0-323-01430-5	Mosby’s Medical & Nursing Dictionary – 5 <sup>th</sup> Edition	
0805339701	An Introduction to Chemistry for Biology Students - 8 <sup>th</sup> Edition, Addison Wesley, 2005	G. Sackheim

### REFERENCE SOURCES (Cont'd)

0-7668-1206-5	Basic Medical Laboratory Techniques 4 <sup>th</sup> Edition, Thomson Learning, 2000	B. Estridge
0-8036-1265-6	Lab Notes: Guide to Lab and Diagnostic Tests F.A. Davis, 2005	Tracey Hopkins
0-7668-3826-9	Essential Laboratory Mathematics by Johnson 2 <sup>nd</sup> Edition	Timmons & Hall, ed.
	Body Structures & Functions – 10 <sup>th</sup> Edition 2004, Toronto: Delmar Publishers	A.S. Scott / Elizabeth Fong
	Boundaries of Practice Guidebook, Toronto	CMLTO
	Collaboration Practice Guidelines and Guidebook, Toronto	CMLTO
	Color Atlas & Textbook of Diagnostic Microbiology, 5 <sup>th</sup> Edition; Login Brothers Publisher	Koneman
	Tietz Fund of Clinical Chemistry 5 <sup>th</sup> Edition; Elsevier Publishing	Burtis
1-56238-515-1	NCCLS. Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture; Approved Standard – Fifth Edition NCCLS Document H3-A5, December 2003	CLSI (formerly NCCLS)
	Laboratory and Specimen Collection Centre Licensing Act - R.R.O. 1990, Reg. 682	
	Statutes & associated regulations, Government of Ontario <a href="http://www.e-laws.gov.on.ca">www.e-laws.gov.on.ca</a>	

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