CSMLS ● SCSLM

Canadian Society for Medical Laboratory Science
Société canadienne de science de laboratoire médical

Competency Profile

General Medical Laboratory Technologist

Competencies Expected of an Entry-Level General Medical Laboratory Technologist

MAY 2005
Effective with the June 2010 Examination

Code of Professional Conduct

- Medical laboratory professionals are dedicated to serving the health care needs of the public. The welfare of the patient and respect for the dignity of the individual shall be paramount at all times.

- Medical laboratory professionals work with other health care professionals, to provide effective patient care.

- Medical laboratory professionals shall promote the image and status of their profession by maintaining high standards in their professional practice and through active support of their professional bodies.

- Medical laboratory professionals shall protect the confidentiality of all patient information.

- Medical laboratory professionals shall take responsibility for their professional acts.

- Medical laboratory professionals shall practise within the scope of their professional competence.

- Medical laboratory professionals shall endeavour to maintain and improve their skills and knowledge and keep current with scientific advances. They will uphold academic integrity in all matters of professional certification and continuing education.

- Medical laboratory professionals shall share their knowledge with colleagues and promote learning.

- Medical laboratory professionals shall be aware of the laws and regulations governing medical laboratory technology and shall apply them in the practice of their profession.

- Medical laboratory professionals shall practise safe work procedures at all times to ensure the safety of patients and co-workers and the protection of the environment.

Revised November 2011 © CSMLS

Foreword

In the past, the most marketable skill of an entry-level medical laboratory technologist was considered to be the application of principles learned in the educational program, which were then used in a broad spectrum of laboratory testing in the work environment. The competencies proposed here for the entry-level medical laboratory technologist build on these application skills: they create a vision of a laboratory professional who can not only apply learned principles, but also communicate, evaluate and extend these principles through research, critical thinking and continuous learning in their interactions with patients, clients, and other health care professionals.

This competency profile for entry-level medical laboratory technologists continues the CSMLS focus on outcomes rather than on content to meet the needs of our changing profession. Most of the competencies outlined here formed the original entry-level profile, last revised in November 2000. They resulted from extensive analysis, clarification and validation procedures to ensure that they represented entry-level activities. The profile was accompanied by a commitment to continue the validation process by seeking and implementing input from practitioners, managers, educators, employers, members of the Canadian Association of Medical Laboratory Educators (CAMLE), and CSMLS exam panel members. The original profile has been modified, mainly through the addition of relevant competencies, to reflect the additional knowledge, skills and attitudes necessary for an entry-level medical laboratory technologist to perform successfully in the laboratory and to thrive in the health care system. This new profile will continue to benefit from the ongoing evaluation process already established for previous competency profiles.

In using the profile please note that the term "common" is used in reference to blood group antigens, microorganisms, etc., and should be interpreted as those which occur frequently in the population and are encountered on a regular basis in clinical practice. The competencies should be interpreted in their broadest sense and not limited by the concept of five laboratory disciplines.

For the purposes of this draft document, text that has been added to the original profile is highlighted, as are notes about omissions of text. With the exception of the paragraph above and a few phrases here and there, this Foreword has been completely revised.

Examination Blueprint

~ CSMLS general medical laboratory technology examinations are based on this plan ~

	Competencies	Mark %
1. Safe Work Practices	1.01, 1.02, 1.03, 1.04, 1.05, 1.06, 1.07, 1.08, 1.09, 1.10, 1.11, 1.12, 1.13, 1.14, 11.05	3-5%
2. Specimen Collection and Handling	2.01, 2.02, 2.03, 2.03.01, 2.03.02, 2.03.03, 2.03.04, 2.04, 2.05, 2.06, 2.07, 2.08, 2.09, 2.10, 10.01, 10.05, 10.05.01, 10.05.02, 10.05.03, 11.01, 11.04	3-5%
Performance of Tests		
3a. Prepare Specimens for Analysis	3.01, 3.02, 3.03, 3.06, 3.11, 3.12	1-2%
3b. Analytical Principles and Instrumentation	4.01, 4.01.01, 4.01.02, 4.02, 4.02.01, 4.03, 4.03.01, 4.03.02, 4.04, 4.04.01, 4.04.02, 4.05, 4.05.01, 4.05.02, 4.06, 4.06.01, 4.06.02, 4.07, 4.07.01, 4.07.02, 4.08, 4.08.01, 4.08.02, 4.08.03, 4.08.04, 4.19, 4.19.01, 4.19.02, 4.19.03, 4.22, 6.08	8-10%
3c. Analytical Techniques 1	4.09, 4.09.01, 4.10, 4.10.01, 4.11, 4.12, 4.12.01, 4.12.02	10-12%
Analytical Techniques 2	4.13, 4.14, 4.14.01, 4.14.04, 4.15, 4.15.01, 4.15.02, 4.15.03, 4.15.04, 4.16	4-6%
Analytical Techniques 3	4.17, 4.17.01, 4.17.03, 4.17.04	4-6%
Analytical Techniques 4	4.20, 4.20.01, 4.21, 4.21.01	4-6%
3d. Report Results	5.02, 5.05, 5.06, 5.07, 5.08, 10.02, 10.02.01, 10.02.02, 10.02.03, 10.02.04, 10.02.05, 10.02.06, 10.02.07	3-5%
Assessment of Results		
4a. Assessment and Interpretation	3.10, 4.14.02, 4.14.03, 4.14.05, 4.17.02, 4.20.02, 5.03, 5.04, 5.09	16-20%
4b. Quality Control	3.05, 3.07, 3.08, 3.09, 4.18, 4.18.01, 4.21.02, 6.02, 6.03, 6.04, 8.01, 8.01.01, 8.01.02	12-15%
4c. Quality Assurance	5.01, 6.07, 6.09, 7.01, 7.02, 7.03, 7.04, 7.05, 11.02, 11.06, 11.07, 11.08	5-7%
4d. Quality Management /Professionalism	3.04, 6.01, 6.05, 6.06, 6.10, 8.02, 8.03, 8.03.01, 8.03.02. 8.03.03, 9.01, 9.01.01, 9.01.02, 9.01.03, 9.02, 9.02.01, 9.02.02, 9.03, 9.04, 9.04.01, 9.04.02 10.03, 10.04, 11.03, 11.09, 11.10, 11.11	6-8%

Assumptions about Medical Laboratory Science

The Medical Laboratory Technologist
Upon completion of an accredited program, has developed a broad knowledge base that is assessed prior to the certification examination.
Practises to ensure the safety of patients, colleagues, self, and the environment.
Contributes to the health care of the public, educates the public, promotes the welfare of the patient, respects the patient's dignity, and protects patient confidentiality.
Is an integral member of the health care team who shares knowledge that is essential to the diagnosis and treatment of disease, promotes learning, and collaborates with other professionals in providing effective patient care.
Is responsible and accountable for professional acts and practices according to standards of practice as well as laws and regulations governing the profession.
The Client/Patient
The client is any individual who interacts with the medical laboratory technologist (e.g., patient, patient representative, other health care professionals, other laboratory professionals).
The patient is any individual requiring medical laboratory services.
The medical laboratory technologist works with clients to procure and analyze specimens and evaluate these analyses.
The medical laboratory technologist maintains effective verbal and written communication skills to optimize interaction with clients in the provision of a high quality professional service.
The Environment
The medical laboratory technologist is prepared to work in a variety of settings including, but not limited to, hospitals, private medical laboratories, community health departments, educational institutions, the home and bedside of the patient, and private industry.
The medical laboratory technologist works in an environment that is dynamic and evolving, and uses technological equipment to provide accurate information in a timely manner.

Competency Categories

1.	**Safe Work Practices**	Conducts professional practice according to established protocols, safety guidelines, and existing legislation.
2.	**Data Collection and Specimen Procurement/Receipt**	Verifies relevant data and ensures that appropriate specimens are procured according to established protocols.
3.	**Analysis of Specimens and Validation of Results**	Analyzes specimens and validates results using established protocols.
4.	**Analytical Techniques**	Understands the principles and performs analytical techniques on specimens that originate from a variety of sources.
5.	**Interpretation and Reporting of Results**	Using scientific knowledge as the basis, interprets, communicates, and documents confidential data.
6.	**Quality Management**	Practises and promotes the principles of quality management and the efficient utilization of resources.
7.	**Critical Thinking**	Applies critical thinking skills to constructively solve problems.
8.	**Applied Investigation**	Demonstrates research skills to investigate, evaluate or problem-solve.
9.	**Resource Management**	Addresses workplace challenges by applying skills involving human resources, as well as skills in change management, materials management, financial management and information management.
10.	**Communication and Interaction**	Interacts with clients/patients in a professional and competent manner, using effective listening, verbal and written communication in dealings with laboratory colleagues, patients, clients and other health professionals. The medical laboratory professional projects a professional image and follows generally accepted practices regarding interactions with clients, patients and colleagues.
11.	**Professionalism**	Meets the legal and ethical requirements of practice and protects the patient's right to a reasonable standard of care. Professional responsibility encompasses scope of practice, accountability, and professional development.

Category 1

Safe Work Practices

The medical laboratory technologist conducts professional practice according to established protocols, safety guidelines, and existing legislation.

Number	Competency
1.01	Applies the principles of standard precautions
1.02	Uses personal protective equipment, e.g., gloves, gowns, mask, face shields, aprons
1.03	Applies appropriate laboratory hygiene and infection control practices
1.04	Minimizes possible dangers from biological specimens, laboratory supplies, radioactive material, and equipment
1.05	Utilizes laboratory safety devices in a correct manner, e.g., biological safety cabinets, fume hoods, laminar flow cabinets, safety pipetting devices, safety containers and carriers, safety showers, eye washes
1.06	Labels, dates, handles, stores, and disposes of chemicals, dyes, reagents, and solutions according to WHMIS and existing legislation
1.07	Handles and disposes of "sharps" according to institutional policy
1.08	Stores, handles, transports and disposes of biological, toxic, and radioactive material according to existing legislation
1.09	Selects and utilizes the appropriate method for items to be disinfected/sterilized
1.10	Minimizes the potential hazards related to disinfection/sterilization methods
1.11	Applies first-aid measures in response to incidents, e.g., chemical injury, traumatic injury, electrical shock, burns, radioisotope contamination
1.12	Applies spill containment and clean up procedures for infectious materials and dangerous chemicals according to institutional policy
1.13	Responds appropriately to fire emergencies
1.14	Reports incidents related to safety and personal injury (e.g., needle stick injuries), in a timely manner

Category 2

Data Collection and Specimen Procurement/Receipt

The medical laboratory technologist verifies relevant data and ensures that appropriate specimens are procured according to established protocols.

Number	Competency
2.01	Ensures relevant information is on the requisition received with the test request
2.02	Procures and labels blood and other specimens according to specific requirements, in a variety of conditions
2.03	Performs venipuncture and capillary blood collection to obtain appropriate samples for laboratory analysis
2.03.01	Confirms the identity of the patient
2.03.02	Establishes a professional relationship with the patient
2.03.03	Provides the necessary information for the patient to understand the specimen collection procedure
2.03.04	Obtains agreement from the patient to proceed with specimen collection
2.04	Observes established protocol for procurement of specimens with legal implications, e.g., blood alcohol
2.05	Collects, labels and delivers specimens in a safe and timely manner taking into account priority and specimen stability
2.06	Verifies specimen suitability including adequate amount/volume and integrity
2.07	Validates documentation to ensure that it corresponds with the specimen
2.08	Registers specimens into laboratory information system, e.g., logbook, computers
2.09	Complies with existing guidelines for specimen retention, storage and disposal
2.10	Takes corrective action when errors in specimen procurement are identified

Category 3

Analysis of Specimens and Validation of Results

The medical laboratory technologist analyzes specimens and validates results using established protocols.

Number	Competency
3.01	Prepares specimens for analysis, e.g., centrifuging, aliquoting, preserving
3.02	Ensures appropriate storage of specimens
3.03	Prioritizes analyses, e.g., stat, urgent, routine, sample stability
3.04	Maximizes efficient use of resources, e.g., time, equipment, personnel
3.05	Prepares and uses calibrators, standards, quality control materials
3.06	Organizes specimens from worklists, log books and computerized work documents
3.07	Performs analyses within acceptable limits of error
3.08	Verifies test results using calibration and quality control data
3.09	Recognizes possible specimen/analytical deficiencies and takes appropriate action
3.10	Identifies implausible results and takes appropriate action
3.11	Verifies that specimen identification is traceable throughout the analysis
3.12	Verifies that all ordered analyses have been completed

Category 4

Analytical Techniques

The medical laboratory technologist understands the principles and performs analytical techniques on specimens that originate from a variety of sources.

Number	Competency
4.01	Applies the principles of microscopy to laboratory analyses
4.01.01	Uses and maintains the compound light microscope
4.01.02	Selects the appropriate application of the following modifications of the light microscope: • phase contrast • fluorescence • dark field • polarizing • inverted
4.02	Applies the physical and chemical principles of staining to laboratory analyses:
4.02.01	Identifies staining problems and initiates corrective action
4.03	Applies principles of light measuring systems to laboratory analyses:
4.03.01	Operates and maintains common instruments using: • absorption spectrophotometry • emission spectrophotometry • reflectometry • turbidimetry
4.03.02	Identifies sources of interference and initiates corrective action as applicable
4.04	Applies principles of electrochemical systems to laboratory analyses
4.04.01	Operates and maintains common instruments using: • ion selective electrodes • conductance electrodes
4.04.02	Identifies sources of interference and initiates corrective action as applicable
4.05	Applies principles of electrophoresis and chromatography to laboratory analyses
4.05.01	Operates and maintains common instruments
4.05.02	Identifies sources of interference and initiates corrective action as applicable
4.06	Applies principles of osmometry to laboratory analyses
4.06.01	Operates and maintains common instruments
4.06.02	Identifies sources of interference and initiates corrective action as applicable
4.07	Applies principles of immunoassays to laboratory analyses
4.07.01	Operates and maintains common instruments
4.07.02	Identifies sources of interference and initiates corrective action as applicable

Number	Competency
4.08	Applies principles of particle counting systems to laboratory analyses
4.08.01	Operates and maintains common instruments used to evaluate blood cells
4.08.02	Identifies sources of interference and initiates corrective action as applicable
4.08.03	Assesses results to initiate follow-up testing
4.08.04	Performs manual counting procedures as appropriate
4.09	Performs analyses to assess and monitor hemostasis
4.09.01	Identifies the need for follow-up action
4.10	Performs qualitative and quantitative biochemical analyses
4.10.01	Assesses results to initiate follow-up testing
4.11	Prepares blood, body fluids and other clinical specimens for microscopic examination
4.12	Identifies and evaluates the morphology of cellular and non-cellular elements in microscopic preparations
4.12.01	Differentiates between clinically significant and insignificant findings
4.12.02	Initiates follow-up action as applicable
4.13	Applies principles of immunology to the detection of antigens and antibodies
4.14	Identifies common red blood cell antigens and antibodies
4.14.01	Operates and maintains common instruments/ equipment
4.14.02	Interprets results to determine phenotype/genotype
4.14.03	Differentiates between clinically significant and insignificant antibodies
4.14.04	Performs compatibility analyses
4.14.05	Assesses results and initiates follow-up action as necessary
4.15	Prepares and issues blood products
4.15.01	Assesses suitability of donor/product
4.15.02	Ensures proper storage of blood products
4.15.03	Evaluates the quality of blood products
4.15.04	Evaluates the appropriateness of the blood product for the patient's clinical situation
4.16	Recognizes and investigates the adverse effects of transfusion according to established protocol and initiates follow-up action as required

Number	Competency
4.17	Performs analyses to detect and identify bacteria and clinically significant yeast-like fungi
4.17.01	Selects appropriate media and environment for the isolation of common clinically significant organisms from all body sites
4.17.02	Recognizes common clinically significant organisms according to body site
4.17.03	Confirms identification using staining techniques, biochemical and/or serological tests
4.17.04	Applies the principles of instrumentation to the detection and identification of organisms
4.18	Performs appropriate antimicrobial susceptibility analyses according to CLSI (NCCLS) guidelines
4.18.01	Identifies sources of error and initiates corrective action
4.19	Applies molecular diagnostic principles to identify nucleic acid sequences
4.19.01	Operates and maintains common instruments/equipment
4.19.02	Identifies sources of interference and initiates corrective action as applicable
4.19.03	Assesses results and initiates follow-up action as necessary
4.20	Performs tissue preparation techniques to produce paraffin and frozen sections for microscopic examination
4.20.01	Operates and maintains common instruments/ equipment
4.20.02	Assesses the quality of the preparation and initiates corrective action as required
4.21	Performs techniques to demonstrate cellular and non-cellular components in tissue and body fluids
4.21.01	Operates and maintains common instruments/equipment
4.21.02	Assesses quality of staining and initiates corrective action as required
4.22	Operates and maintains standard laboratory equipment/instruments

Category 5

Interpretation and Reporting of Results

The medical laboratory technologist, using scientific knowledge as the basis, interprets, communicates and documents confidential data.

Number	Competency
5.01	Recognizes the relationship between analyses, diagnoses, clinical information and treatment by assessing results on the basis of: • reference values • critical values • method limitations, e.g. dynamic ranges, interferences, specificity, sensitivity • patient delta checks • recognition of implausible results • relationship to clinical conditions • relationship to other laboratory findings
5.02	Releases results of laboratory analyses that meet internal quality control criteria to the appropriate client in a timely and efficient manner
5.03	Recognizes when results of patient analyses are outside expected findings and responds appropriately
5.04	Investigates unusual findings prior to reporting
5.05	Recognizes critical values and responds appropriately
5.06	Communicates information regarding laboratory analyses to clients in an appropriate manner
5.07	Ensures that laboratory results are accurately documented and retained in accordance with existing legislation
5.08	Uses a computer for data entry, storage and retrieval
5.09	Recognizes the implications of laboratory findings and identifies further testing

Category 6

Quality Management

The medical laboratory technologist practices and promotes the principles of quality management and the efficient utilization of resources.

Number	Competency
6.01	Follows established protocols as defined in policy and procedure manuals
6.02	Determines the need for calibration of instruments and manual methods
6.03	Performs and assesses quality control (internal and external)
6.04	Utilizes statistics and indicators to monitor the acceptability of results based on established quality control ranges
6.05	Maintains appropriate documentation, e.g., document laboratory reporting errors and corrective measures taken
6.06	Utilizes responsible practices which contribute to the cost-effective use of health care resources
6.07	Follows established preventive maintenance programs and maintains instrument logs
6.08	Recognizes malfunctions in equipment/instruments and initiates appropriate corrective action.
6.09	Addresses equipment/instrument malfunction according to established protocol
6.10	Applies continuous quality improvement techniques and risk management processes to ensure quality clinical laboratory services, including point-of-care testing

Category 7

Critical Thinking

The medical laboratory technologist applies critical thinking skills to constructively solve problems.

Number	Competency
7.01	Demonstrates an open inquiring mind and self-directed learning processes in resolving analytical, workplace and career challenges
7.02	Demonstrates the ability to adapt to rapidly changing situations, e.g.: responds appropriately to critical situations; retains composure in stressful situations; applies existing skills to new situations
7.03	Demonstrates knowledge of the health care system and professional laboratory organizations and responsibilities
7.04	Demonstrates knowledge of the determinants of health and their implications for the laboratory system
7.05	Recognizes that change initiated in one area will impact on other areas of health care services

Category 8

Applied Investigation

The medical laboratory technologist demonstrates research skills to investigate, evaluate or problem-solve in the health care setting.

Number	Competency
8.01	Demonstrates analysis and synthesis skills to resolve workplace challenges
8.01.1	Effectively analyzes and interprets data to arrive at a conclusion or solve a problem.
8.01.2	Develops recommendations based on conclusions
8.02	Develops implementation strategies that integrate timelines, resource management and communication
8.03	Demonstrates research skills that further inquiry in laboratory and health care settings
8.03.1	Develops protocols to investigate problems or evaluate procedures
8.03.2	Seeks out sources of information necessary for problem solving.
8.03.3	Effectively communicates research findings

Category 9

Resource Management

The medical laboratory technologist addresses workplace challenges by applying skills involving human resources as well as skills in change management, materials management, financial management and information management.

Number	Competency
9.01	Applies human resources skills to interactions with laboratory colleagues and other health professionals
9.01.1	Recognizes signs of individual and group stress
9.01.2	Demonstrates empathy in assisting colleagues to deal with stress
9.01.3	Identifies the potential for conflict and uses negotiation skills to manage conflicts
9.02	Applies change management strategies
9.02.1	Demonstrates acceptance of the need for change
9.02.2	Anticipates, contributes to, responds to, and effectively works in a changing environment
9.03	Demonstrates effective time management
9.04	Demonstrates information management skills
9.04.1	Uses information to make informed decisions
9.04.2	Uses computers, laboratory information systems and related technology in specimen tracking and data management

While the following competencies were proposed in the 2004 draft competency profile, there were considerable comments as to whether they were expected entry level competencies in all jurisdictions. They **will not be included in certification exams** as part of this edition of the competency profile, but will be re-examined as part of the next General Medical Laboratory Technology Competency profile review.

A	Demonstrates a knowledge of capital asset inventory maintenance, inventory control and purchase of supplies
B	Demonstrates knowledge of financial management to include operating and capital budget preparation and interpretation and cost-benefit interpretation
C	Demonstrates knowledge of laboratory productivity indicators, e.g.: workload measurement systems
D	Demonstrates knowledge of staff scheduling requirements

Category 10

Communication and Interaction

The medical laboratory technologist interacts in a professional and competent manner, using effective listening, verbal and written communication in dealings with laboratory colleagues, patients, students, clients, and other health professionals. The medical laboratory professional projects a professional image and follows generally accepted practices regarding interactions with clients, patients and colleagues.

Number	Competency
10.01	Practices effective communication with colleagues, patients, students, clients, and other health professionals while maintaining a professional attitude
10.02	Demonstrates effective communication skills
10.02.1	Seeks out and listens to colleagues, patients, students, clients and other health professionals
10.02.2	Uses effective verbal communication strategies
10.02.3	Uses technology appropriately to facilitate communication
10.02.4	Writes clearly and concisely
10.02.5	Uses effective written communication strategies
10.02.6	Identifies barriers to effective communication
10.02.7	Recognizes forms of non-verbal communication
10.03	Implements interdisciplinary learning in personal practices to develop teamwork skills in dealings with colleagues, patients, students, clients and other health professionals
10.04	Promotes interdisciplinary collaboration in dealings with other health professionals
10.05	Demonstrates basic patient care skills relevant to the laboratory professional
10.05.1	Recognizes common indicators of patient stress
10.05.2	Initiates follow-up procedures where necessary for patient well-being
10.05.3	Demonstrates adaptive skills in dealing with patients with varying levels of acuity

Category 11

Professionalism

The medical laboratory technologist meets the legal and ethical requirements of practice and protects the patient's right to a reasonable standard of care. Professional responsibility encompasses scope of practice, accountability, and professional development.

Number	Competency
11.01	Provides for the health care needs of the public, keeping the welfare and confidentiality of the patient paramount at all times, and respecting the dignity, values, privacy and beliefs of the individual
11.02	Complies with legislation governing medical laboratory technology and applies these to the practice of the profession
11.03	Seeks help and guidance when asked to perform beyond competence
11.04	Discusses procedure in order to facilitate informed consent and respects a patient's right to refuse treatment
11.05	Exercises a judicious approach to the right to refuse to participate in potentially dangerous situations
11.06	Takes responsibility and is accountable for professional actions
11.07	Identifies learning needs and participates in continuing education and training
11.08	Keeps abreast of laboratory techniques and research and shares new knowledge with colleagues
11.09	Promotes the image and status of the profession of medical laboratory science as members of the health care team by maintaining high standards in practice
11.10	Promotes an awareness and understanding of the contribution the medical laboratory technologist provides to the consumer and public
11.11	Recognizes how ethical issues in the health care environment affect the medical laboratory technologist