Creating Sustainability for Laboratory Human Resources

A Proposed Education/Career Path Model for Ontario Medical Laboratory Professionals

White Paper

Clinical Laboratory Management Association, Trillium Chapter

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Executive Summary

The Clinical Laboratory Management Association (CLMA) Trillium Chapter’s Laboratory Medicine: Education/Career Path Model Discussion Paper is a proposed Education/Career Path Model that aims to improve sustainability in laboratory medicine human resource and solicit feedback and support from stakeholders. The model offers clearly delineated education/career pathways in a common framework for educating holistically across laboratory professions; building on previous knowledge, skill and experience; and seeking to build capacity and responsiveness within the workforce.

Background

The Discussion Paper was released nationally in 2009 to CLMA members, laboratory leaders and subsequent focus groups. The resulting feedback supported a new approach to training and career pathways in laboratory medicine.

Overview of Laboratory Medicine

Clinical laboratories provide analyses and investigations on blood, body fluids, tissue samples and other biological specimens to assist clinicians with the diagnosis, treatment, monitoring and prevention of disease. Up to 85% of decisions about diagnosis and treatments are based on laboratory test results.

Drivers for Change - Issues Impacting Sustainability in Laboratory Medicine

Issues that threaten sustainability of laboratory services and drive the need to change the status quo in order to improve service delivery; operational efficiency; and professional development opportunities include the:

- Acute overall shortage of laboratory human resources
- Shortage of laboratory professionals with advanced skills and knowledge
- Greater demand for laboratory services
- Increasing cost of laboratory services.

Barriers to Human Resource Sustainability in the Current Laboratory Medicine System in Ontario

The current education, certification and regulatory systems in Ontario are inadequate in sustaining human resource needs due to an inability to attract and sustain motivated individuals in a career in Laboratory Medicine. In reality, these systems are fraught with barriers that make it difficult or impossible for motivated individuals to enter and advance within the profession through a process of growth and development. These barriers include:

- Protracted time and effort spent in educational endeavors due to the lack of synergy between different laboratory programs
- Difficulty for internationally educated medical laboratory technologists (IEMLT) to enter workforce
- Clinical placement shortages
- Certification and professional regulation limitations for specialized skills (relevant BSc/MSc degreeed individuals).

Proposed Education/Career Path Model

The proposed Education/Career Path model is simplified from the existing model by defining different levels of practice built constructively to allow an individual to progress, as desired, through various clinical laboratory professions. The model aims to improve long-term sustainability of human resources in laboratory medicine by taking a holistic approach to educating across laboratory professions and building on previous knowledge, skills and experience.
Some of the changes proposed are:

- Reprofile laboratory tasks and establish clear roles and responsibilities to ensure that the right person is doing the right job. Reprofiling has shown substantial cost savings and enhancement of service delivery in other jurisdictions.

- Redefine the medical laboratory technician role with an expanded scope of practice for the performance of more complex specimen processing, limited laboratory testing, and instrument maintenance under appropriate supervision. The Technician role would require certification and regulation.

- Develop a constructive curriculum across the laboratory professions to remove the need to “back track” in order to progress forward in a laboratory career and to create a seamless continuum of post secondary education. After each level of education has been reached, an individual can exit into the workforce, applying for certification and registration as applicable.

- Change from general Medical Laboratory Technologist (MLT) to MLTs with Core Specializations. After completing an initial multidisciplinary curriculum, students would focus on a Core Specialization for the final portion of the MLT program. Proposed specializations include Blood Sciences, Infectious Sciences, Tissue and Cellular Sciences and Genetic Sciences.

- Develop new competency profiles, certification exams and associated regulations for MLA, MLA/T, and MLT Core Specializations in collaboration with stakeholders.

- Build capacity by providing multiple entry points and alternative certification routes for clinical laboratory professionals. Internationally educated candidates would only have to challenge the applicable core specialization MLT certification exam instead of an examination for all disciplines. Develop a Laboratory Bridging Program to prepare BSc/MSc, non-MLT candidates for work in a clinical laboratory by covering applicable laboratory basics.

**Proposed Levels**

Each level provides defined entry and exit points, didactic and clinical portions, certification and professional registration points as well as proposed curriculum.

**Level I - Medical Laboratory Assistant (MLA)**

Scope of Practice - With a limited scope, a MLA undertakes a range of clearly defined task and procedural based roles under the supervision of a MLT. Roles may include specimen procurement, receiving, order entry, processing, specimen query and customer service. Direct entry as high school graduate or mature student.

**Level II - Medical Laboratory Technician (MLA/T)**

Scope of Practice - With a proposed expanded scope beyond the MLA role, a Technician (MLA/T) will perform more complex specimen processing, limited laboratory testing and instrumental maintenance under appropriate supervision (MLT, Clinical Scientist).

**Level III - Medical Laboratory Technologist (MLT)**

Scope of Practice - Performance of laboratory investigations on the human body or on specimens taken from the human body and the evaluation of the technical sufficiency of the investigations and their results (CMLTO, 2010). Multiple points of entry and exit.

**Level III – Alternate Routes to MLT Certification**

Scope of Practice similar to Level III with more specialization. Provides opportunity to become an MLT for IEMLT and BSc/MSc, non-MLT.

**Level IV – Bachelor of Science (Medical Laboratory Science)**

Scope of Practice: Would be similar to that of the diploma MLT however at an advanced level combined with a university-based program at the Bachelor of Science degree level. Curriculum would include a research emphasis to advance medical laboratory profession through scholarly work and publication.
Level V – Clinical Scientist (MSc/MD)
Scope of Practice: Clinical Scientists assess test outcomes, evaluate feasibility and efficacy of lab testing, develop new techniques/procedures and assume a consultative role in the health care team. At this level, there are a variety of academic pathways available building on previous knowledge and skills. Master’s level programs can include MSc, Pathologist Assistant, Education, Management, Research and Quality or alternatively the pathway can lead to the Medical Doctor program.

Level VI and VII – Clinical PhD, Residency, Post Doctorate and Fellowship
Scope of Practice: Would be similar to that of a Clinical Scientist however at an advanced level. Medical staff obtain their medical licensure through an accredited medical program and obtain certification through the Royal College of Physicians and Surgeons of Canada. Clinical Scientists obtain a Clinical PhD, MD or equivalent degree and postdoctoral training and certification through applicable professional associations (i.e. Canadian Academy of Clinical Chemistry).

Benefits of the Proposed Education/Career Path Model
Potential benefits and impact of the proposed model span laboratory, government, and public spectrums. Stakeholder benefits include:

- **Healthcare**: reduced costs and continued availability of quality laboratory services.
- **Human resources sustainability**: increased numbers of laboratory professionals entering the workforce with career direction, commitment to career and longevity.
- **Employers**: reduction in compensation costs through reprofiling of laboratory roles; enhanced recruitment and retention opportunities; ability to staff specialized laboratory positions with appropriately educated and skilled individuals; and reduced orientation times for new employees.
- **Education Institutions**: development of standard curriculum delivered across programs; revenue potential through program expansion and increases in student intake; and alleviation of clinical placement shortages.
- **Students and IEMLTs**: decreased time and financial burden through a faster integration into the workforce; increased bridging program seats available; and increased access to Canadian work experience.
- **Support of Stakeholder Initiatives**: creates a seamless continuum of post-secondary education; increases Bridging Programs for IEMLTs; and integrates new immigrants to the workforce.
- **Patients/Public**: contributes to continuing patient/public safety.

Challenges and Opportunities (Issues and Potential Solutions)
Each challenge/issue has a potential solution that presents an opportunity to strengthen the laboratory medicine community through collaboration and issue resolution. Identified challenges include:

- Securing stakeholder collaboration
- Confusing nomenclature
- Transforming laboratory programs
- Changing certification
- Integrating current Medical Laboratory Assistants into an expanded MLA/T role
- Integrating changes with existing collective bargaining agreements
- Lack of synergy between BSc/MSc and laboratory medicine technical programs.

Next Steps
Moving forward, some next steps include:

- Disseminating the model broadly to laboratory professionals and appropriate stakeholder groups
- Soliciting support and collaboration in implementing strategies to sustain laboratory medicine
- Developing strategies for reprofiling clinical laboratory tasks
- Investigating alternative sources for competency profiles and certification exams
- Developing a standard curriculum for laboratory programs
Creating Sustainability for Laboratory Human Resources -
A Proposed Education/Career Path Model for Ontario Medical Laboratory Professionals

Developed by the Clinical Laboratory Management Association Trillium Chapter

Presented in this paper is a proposed Education/Career Path Model that aims to improve sustainability in laboratory medicine human resources and solicit feedback and support from stakeholders. The model offers clearly delineated education/career pathways in a common framework for educating holistically across laboratory professions; building on previous knowledge, skill and experience; and seeking to build capacity and responsiveness within the workforce.

1.0 Background

In August 2009, the CLMA Trillium Chapter released Laboratory Medicine: Education/Career Path Model Discussion Paper nationally to laboratory leaders. The purpose was to stimulate discussion and solicit feedback to address growing concerns over laboratory workforce sustainability. Over 300 participants provided feedback through focus groups and informal discussions. Participants included a wide range of laboratory stakeholders such as pathologists, managers/leaders, administrators, educators, academic program chairs, technologists and laboratory assistants,

The discussion paper was well received and support was shown for a new approach to training and career pathways in laboratory medicine. Concerns were also brought forward for consideration. Many respondents and focus group participants expressed interest in being involved as this initiative moved forward.

Support for the Model was in the following areas:
- A new approach to training and career pathways in laboratory medicine as the current system is rigid
- Benefits of clearly delineated career pathways to aid in workforce sustainability
- Integration of internationally educated medical laboratory technologists into the workforce
- The concept of laboratory specialists
- Appropriate certification and professional regulation requirements in the interest of patient safety and quality of care.

Concerns to be addressed with the model were expressed in the following areas:
- The career pathway for lab assistants entering into lab technologist programs
- Potential contradiction of government initiatives to broaden scopes of practices of regulated professions reducing workforce flexibility
- The operationalization of the concept of laboratory specialists
- Potential conflict or disconnect between availability of specialties based on market need versus particular disciplines of interest to students
- Establishment of funding formulas for training and bridge programs
- The need to tie higher learning to professional recognition.

Feedback received was utilized to modify and clarify the model proposed initially. After careful analysis, a decision was made to narrow the scope of the Proposed Education/Career Path Model initiative to the province of Ontario to better partner with relevant stakeholder groups in the further development of the model. Future plans include expanding the model to other provinces/territories across Canada.
2.0 Overview of Laboratory Medicine

Clinical laboratories provide analyses and investigations on blood, body fluids, tissue samples and other biological specimens to assist clinicians with the diagnosis, treatment, monitoring and prevention of disease. Up to 85% of decisions about diagnosis and treatment are based on laboratory test results.

Laboratory services vary across the province in what is offered and what methodologies are utilized. Laboratory services are commonly provided in the areas of hematology, clinical biochemistry, transfusion medicine, microbiology, anatomical pathology, diagnostic cytology, and clinical genetics. However, some laboratories provide services in further subspecialities including virology, electron microscopy and immunohistochemistry. Additionally, the degree of specialization varies from laboratory to laboratory. Further, a wide range of testing methodologies can be found in clinical laboratories, from manual to highly automated procedures using sophisticated instrumentation.

Many types of laboratory professionals exist. These include Medical Laboratory Assistants (MLA), Medical Laboratory Technologists (MLT), Pathology Assistants (PA), Clinical Scientists (MSc and PhD), Medical Staff/Pathologists (MD), Educators and Managers/Leaders. Laboratory professionals are part of the interprofessional health care team providing analytical results, technical advice, and interpretive consultation.

Health care today is under pressure to deliver more using less. In laboratory services this pressure is translated into a need to change the status quo to improve service delivery, operational efficiency and maintain and improve the long-term supply of quality laboratory medicine professionals.

3.0 Drivers for Change - Issues Impacting Sustainability in Laboratory Medicine Services

Acute Shortage of Laboratory Human Resources

Laboratory services are threatened by current and predicted shortages of skilled laboratory professionals. These shortages are affected by an aging workforce and insufficient numbers entering the workforce. With respect to the aging workforce, currently approximately 65% of MLTs working in Ontario are 45 years and older. With many eligible for retirement at age 55, this translates into almost two-thirds of the current workforce potentially retiring in the next 10 years (CIHI, 2010).

Insufficient numbers of new laboratory graduates are entering the workforce. This is partly due to the limited capacity of the educational institutions to increase enrolment, declining clinical placement sites, a lack of bridging programs for the internationally educated, and competition with other science-based industries for young adults interested in a career in science. Although potential candidates exist in the form of internationally educated medical laboratory technologists (IEMLT), these individuals are hampered from gaining entry to the workforce. A lack of bridging program seats needed to upgrade knowledge to meet Canadian standards and low numbers of clinical placement sites limit the number of IEMLTs able to gain certification to work. Additionally, the lack of a clear education/career pathway limits the attractiveness of laboratory medicine as a career choice.

Based on potential attrition and current MLT supply data (new graduates and IEMLTs), it is predicted that there will be a shortfall of approximately 2,100 workers (32%) by 2018. That is, to sustain laboratory services operation by 2018, 2,100 additional professionals must have entered the workforce beyond what is currently possible and predicted today.

Shortage of Laboratory Professionals with Advanced Skills and Knowledge

Ongoing attrition of staff with valuable professional knowledge and experience will leave unprecedented gaps that can threaten laboratory service delivery sustainability and public safety. Professional development courses are limited for specialized disciplines not currently covered by the general MLT curriculum such as virology, electron microscopy, immunohistochemistry, flow cytometry, tandem mass spectrophotometry, nucleic acid testing, and microarray. Laboratories must rely on in-house programs to
train staff to work in these areas. This training, potentially lacking in standardization from employer to employer, must be delivered within time, cost, and human resource constraints.

Stringent regulation of the MLT profession prevents many graduates of relevant non-MLT BSc and MSc programs from gaining registration with the CLMTO and contributing within a clinical laboratory setting. These individuals may possess knowledge and skills beneficial to laboratories especially in specialized areas. Laboratories must rely on generally trained MLTs to perform complex, specialized testing for which they may not have adequate theoretical knowledge or experience with. It should be noted that a loophole exists in Ontario laboratory licensing regulation allowing for the circumvention of MLT regulation. This is outside of the current, normal pathway and results in laboratory personnel practicing outside of the regulations designed to protect public safety.

Greater Demand for Laboratory Services

As the population base expands, laboratory workloads and volume are reasonably expected to grow in kind. As laboratory human resources decline, Ontario’s population is projected to grow 36.6% (4.8 million people) by 2036 due to natural increase and net migration. The population is also aging with the number of seniors (65 years +) projected to double to 23.4% of the population by 2036 (Ontario Ministry of Finance, 2010). As the population ages, patients will increasingly present with associated complex health problems and co-morbidities, each requiring diagnostic investigation and treatment management. Changes in lifestyle are altering the nature of disease requiring diagnosis and treatment across all ages. The focus on disease predication and prevention is resulting in the introduction of more screening programs and increased use of diagnostic testing to identify those most at risk.

Increasing Cost of Laboratory Services

Laboratory medicine’s ongoing transition to provide more preventative and predictive testing, development of new testing technologies and procurement of highly sophisticated instrumentation contribute to increasing costs for laboratories. Health care expenditures continue to increase in Ontario. If the status quo is maintained, Ontario’s health care spending will increase at least 6.5% annually. Without change, health care spending could consume 80% of total program funding, up from 46% today (TD Economics, 2010). Laboratories contribute to health care spending through employee compensation, physical operations and consumables. Of this, compensation (salary and benefits) accounts for approximately 65% of the total expenses in hospital-based laboratories (CIHI, 2010).

These threats to laboratory medicine services sustainability were the drivers for developing the proposed Education/Career Path Model. The capacity to change the workforce evolves from the processes determining education, certification and regulation. The next section reviews the current state and its inherent barriers, followed by the proposed future state.

4.0 Overview of Current Laboratory Medicine Education, Certification and Regulation in Ontario

The current education, certification and regulatory systems in Ontario are convoluted and difficult to navigate as shown in Appendix A – Laboratory Education Career Pathway: Current State Map. Many barriers exist for individuals to move or advance within the profession (as demonstrated by the red lines in Appendix A). The following is an overview of the current system.

Medical Laboratory Assistant (MLA) programs are post-secondary, offered through colleges and private sector schools, and are not regulated through a medical accrediting body. Entrance requirements, program lengths and clinical placements vary among schools. The Canadian Society of Medical Laboratory Science (CSMLS) and the Ontario Society of Medical Technologists (OSMT) offer MLA certification through successful challenge of a certifying examination. MLAs are not regulated in Ontario. Their scope of practice is limited to pre-analytical processes – including specimen collection and preparation under the supervision of a Technologist (MLT) or designate. Progression to a MLT position requires a MLA to complete a full MLT program where little or no credit is given for knowledge or skills acquired at the MLA level.
Medical Laboratory Technology (MLT) programs in Ontario are post-secondary and accredited through the Conjoint Accreditation Services of the Canadian Medical Association. Currently the MLT programs available are: General MLT (includes biochemistry hematology, transfusion medicine, microbiology and histology), Diagnostic Cytology and Clinical Genetics. Diploma and degree-based MLT programs are available; each with specific entrance requirements. Only the Clinical Genetics program requires either a BSc degree or MLT diploma for admission. Curriculum is based on CSMLS Competency Profiles. CSMLS Certification occurs through the successful challenge of a national exam in one of the three program areas – General MLT, Diagnostic Cytology, or Clinical Genetics. MLTs are regulated through registration with the College of Medical Laboratory Technologists of Ontario (CMLTO). Few opportunities exist for progression to a BSc program for diploma MLTs. Only one university in Ontario offers an integrated MLT/degree (BHSc) program. Most diploma MLTs must apply to non-laboratory medicine based BSc programs to advance and receive little credit for the knowledge and skills gained in the MLT program.

Clinical Scientists (MSc/PhD) and Pathologists (MD) typically are educated through graduate programs offered by Medical Schools or other academic centres. Therefore the introduction of laboratory medicine does not occur until the postgraduate level of learning. Few MLTs in Ontario progress into these graduate programs from MLT programs. This is in sharp contrast to other Canadian jurisdictions where a BSc in Medical Laboratory Science is a logical route to more advanced laboratory roles.

### 4.1 Barriers to Sustainability in Current System

The current education, certification and regulatory systems in Ontario are complicated to navigate. In reality, these systems are fraught with barriers that make it difficult or impossible for motivated individuals to enter and advance within the profession through a process of growth and development.

**Protracted Time and Effort Spent in Educational Endeavors**

Currently, laboratory professionals obtain little or no recognition for education within laboratory medicine across various programs and certain programs have no value to career progression. This results in longer time frames for individuals to begin working in desired positions; increased expense for the individual and government (through the subsidization of educational programs); decreased satisfaction with laboratory medicine as a career choice; and decreased competitiveness to lure younger generations to a career in laboratory medicine. The issues are outlined below.

Laboratory education programs presently function independently from one another with little or no synergy. No natural progression exists from one program to the next through credit transfer or gained experience. In many cases, if an individual chooses to pursue a higher laboratory position they are forced to “back track” to obtain the necessary education before progressing forward. For example, a diploma technologist (MLT) with 15 years experience working in biochemistry and seeking admission to a Master’s program to become a Biochemist will need to complete a full Bachelor program, and may be given little or no credit for laboratory medicine education or experience.

Imposed redundancy of education within laboratory programs also exists. For example, an Assistant (MLA) who wishes to become a Technologist (MLT) must complete the full MLT program with little or no credit given for knowledge and skills gained in the MLA program.

Lack of recognition of education equivalency outside of laboratory medicine is an issue for all laboratory professionals. For individuals seeking entrance to Masters Programs, the ART program is not recognized as equivalent to a Bachelor’s level program by academic institutions.

**Difficulty for Internationally Educated MLTs to Enter Workforce**

Internationally educated technologists (IEMLTs) face barriers to entry to Ontario’s workforce restricting a possible source of proficient professionals. IEMLTs with years of experience in one or more laboratory disciplines must pass the MLT certification exam in one of the three program areas, General, Clinical Genetics or Diagnostic Cytology, to become certified and enter into practice. Applicants may need to
refresh/re-learn several disciplines to successfully pass the exam, and yet invariably end up working in the discipline they had worked in prior to immigrating. This coupled with the lack of available bridging programs and clinical placement opportunities, can lead to time and financial burden for the IEMLT (CSMLS, 2009).

Clinical Placement Shortages

Schools continue to struggle to find adequate numbers of clinical placement sites for students thereby restricting the numbers entering the profession. Lack of resources in the practicum institution (human or financial) may be a factor for declining placements (CSMLS, 2004). This exacerbates the human resources problem as schools cannot increase enrolment without having sufficient clinical placement sites.

Certification and Regulation Limitations for Specialized Skills (non-MLT BSc/MSc)

Prospective laboratory personnel with highly specialized and valuable lab-related backgrounds are deterred from pursuing a laboratory career due to time and financial costs. Individuals with specialized knowledge, skills and experience from relevant non-MLT academic degree programs must complete a full MLT program in order to become certified and registered to work in clinical laboratories in Ontario. Over 60% of MLT program applicants have a full or partially completed degree (CSMLS, 2007). Little transfer of credit occurs for the knowledge and skills obtained in a BSc or MSc program. Today, laboratory directors can and do fill specialized laboratory positions with non-regulated individuals. Working outside of regulatory oversight, these individuals may pose a threat to public safety.

5.0 Proposed Education/Career Path Model

The proposed Education/Career Path Model is simplified from the existing model by defining different levels of practice built constructively to allow an individual to progress, as desired, through various clinical laboratory professions. The proposed Laboratory Education Career Pathway - Future State Map is shown in Appendix B. A more detailed plan of the proposed Education/Career Path model is shown in Appendix C.

The Proposed Education/Career Path Model aims to improve long-term sustainability of laboratory human resources by taking a holistic approach to educating across laboratory professions and building on previous knowledge, skills and experience. The following changes are being proposed:

Reprofiling Laboratory Tasks

To drive greater efficiency and responsiveness in laboratory services, it would be prudent to reprofile laboratory tasks and establish clear roles and responsibilities with the objective of the right person doing the right job. Reprofiling has shown substantial cost savings and enhancement of service delivery in the United Kingdom’s Pathology Service (UK Department of Health/Skills for Health, 2008). A critical step in this process is to map the workforce requirements for the future considering regulatory requirements, scopes of practice and patient/public safety. Concurrently, tasks within each laboratory process need to be mapped; competencies identified; and the level of staff most appropriate to perform the task determined.

Redefining the Medical Laboratory Technician Role (MLA/T)

It is proposed that the Technician (MLA/T) role be redefined with an expanded scope of practice beyond Assistant (MLA) for the performance of more complex specimen processing, limited laboratory testing, and instrument maintenance under appropriate supervision. Technicians could perform a greater proportion of routine analytical processes liberating technologists to undertake complex/specialized investigations, as well as quality assurance, training, research and supervisory duties within the clinical laboratory. The Technician role would require certification and regulation. This role may be highly beneficial to community laboratories with considerable automation as well as doctors’ offices performing limited automated and/or point of care testing to provide efficient patient care.
Constructive Curriculum across the Laboratory Professions

Each education program within the proposed model is built constructively. It creates a seamless continuum of post secondary education removing the need to “back track” in order to progress in a laboratory career. After each level of education an individual can exit into the workforce, applying for certification and registration as applicable.

Technologist (MLT) Core Specializations

A departure from the current education model is the concept of Core Specializations within the MLT program. After completing a multidisciplinary curriculum, students would focus on a Core Specialization for the final portion of the MLT program. These specializations are not the “subject areas” of the past but rather functional groupings consistent with current laboratory operations. Students would choose one specialization and become proficient in each of its disciplines. This focus allows for:

- incorporation of specialized disciplines not currently included in MLT programs
- more flexibility to integrate changes in technology,
- development of a deeper knowledge/skill base aimed at faster orientation and integration into the workforce
- minimization of knowledge gaps in specialized laboratory areas.

Workforce needs will determine the number of student spots available for each core specialization and it should be noted that nothing would preclude a student from pursuing more than one core specialization.

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<th>Proposed Core Specialization</th>
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<td>Blood Sciences</td>
<td>Hematology, Transfusion Medicine, Biochemistry, Immunology</td>
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<tr>
<td>Infectious Sciences</td>
<td>Bacteriology, Virology, Parasitology, Mycology</td>
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<tr>
<td>Tissue and Cellular Sciences</td>
<td>Histology, Cytology</td>
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<tr>
<td>Genetic Sciences</td>
<td>Molecular Genetics, Cytogenetics</td>
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Certification and Regulatory Changes

New Competency Profiles and certification exams for Assistant (MLA), Technician (MLA/T), and Technologist (MLT) Core Specializations would need to be developed in collaboration with stakeholders along with exam administration bodies. Regulation of Technicians (MLA/T) would need to be established. Registration of Technologists (MLT) would be restricted to disciplines successfully challenged by the certification exam.

Building Capacity through Multiple Entry Points

Multiple entry points and pathways for potential laboratory professionals would be established for internationally educated personnel and those candidates with BSc or MSc qualification and specialized experience in a laboratory medicine discipline.

IEMLT - The CSMLS’ aim to build subsidized bridge programs for IEMLTs who require further education/clinical experience in order to meet Canadian standards is supported by this model (CSMLS, 2009). To facilitate efficient integration, IEMLT applicants seeking certification would only have to challenge the applicable core specialization MLT certification exam instead of an examination for all disciplines.

BSc/MSc (non-MLT) - Relevant BSc and MSc degree holders may have acquired valuable knowledge and skills useful for the clinical laboratory but likely lack fundamental clinical laboratory knowledge (i.e. proper specimen handling and identification). To capitalize on their skills, a Laboratory Bridging Program is proposed to prepare these students for work in a clinical laboratory by covering applicable laboratory basics. As assessed by a prior learning assessment (PLA) process, an applicant would have to have thorough knowledge and skill in one of the core specialization areas before entering the bridge program. Subsequent certification and registration will follow the same process as for MLT programs.
5.1 Description of Proposed Levels

Levels in the Proposed Education/Career Path model are shown in the figures below. They detail entry and exit points, didactic and clinical portions, certification and professional registration points as well as proposed curriculum.

Figure 1: Level I - Medical Laboratory Assistant (MLA)
Scope of Practice - With a limited scope, a MLA undertakes a range of clearly defined task and procedural based roles under the supervision of a Technologist (MLT). Roles may include specimen procurement, receiving, order entry, processing, specimen query and customer service.

Figure 2: Level II - Medical Laboratory Technician (MLA/T)
Scope of Practice - With a proposed expanded scope beyond the Assistant (MLA) role, a Technician (MLA/T) will perform more complex specimen processing, limited laboratory testing and instrumental maintenance under appropriate supervision (MLT, Clinical Scientist).
Figure 3: Level III - Medical Laboratory Technologist (MLT)
Scope of Practice - Performance of laboratory investigations on the human body or on specimens taken from the human body and the evaluation of the technical sufficiency of the investigations and their results (CMLTO, 2010)

Figure 4: Level III – Alternate Routes to MLT Certification (IEMLT and BSc/MSc, non-MLT)
**Figure 5: Level IV to VII**

Level IV – Bachelor degree in Medical Laboratory Science

Scope of Practice: Would be similar to that of the diploma MLT however at an advanced level. A university-based program awarding a Bachelor degree either combined with a Level III program (degree MLT program) or as a degree completion program (for diploma MLT programs). Curriculum would include a research emphasis to develop skills necessary to advance medical laboratory profession through scholarly work and publication.

Level V – MSc/MD (Clinical Scientist)

Scope of Practice: Clinical Scientists assess test outcomes, evaluate feasibility and efficacy of lab testing, develop new techniques/procedures and assume a consultative role in the health care team. At this level, there are a variety of academic pathways available building on previous knowledge and skills. Master’s level programs can include MSc, Pathologist Assistant, Education, Management, Research and Quality or alternatively the pathway can lead to the Medical Doctor program.

Level VI and VII – Clinical PhD, Residency, Post Doctorate and Fellowship

Scope of Practice: Would be similar to that of a Clinical Scientist however at an advanced level. Pathologists and other medical staff obtain their medical licensure through an accredited medical program and obtain certification through the Royal College of Physicians and Surgeons of Canada. Clinical Scientists obtain a Clinical PhD, MD or equivalent degree and postdoctoral training and certification through applicable professional associations (i.e. Canadian Academy of Clinical Chemistry).

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**5.2 Benefits of the Proposed Education/Career Path Model**

Many potential benefits of the proposed model exist with positive impacts spanning laboratory, government, and public spectrums.

**To Healthcare**
- Reduced costs due to reprofiling and expanded roles of MLA and MLA/T.
- Availability of personnel to preserve high-quality, safe laboratory service delivery.

**To Human Resources Sustainability**
- Increased number of MLT program spots due to the introduction of core specializations.
- Increased number of IEMLTs entering workplace due to certification in core specializations instead of the current general certification.
- Increased number of relevant BSc/MSc degree holders gaining certification in specialized laboratory areas.
To Employers

- Potential reduction in compensation costs due to reprofiling and expanded roles of MLA and MLA/T staff.
- Workforce flexibility with staff capable of working at different levels within their scope of practice.
- Greater recruitment opportunities through increased commitments to clinical placements for core specializations, MLA, and MLA/T programs.
- Ability to recruit students on part-time/casual employment basis as they progress through MLT programs (employable after MLA and MLA/T portions).
- Niche area positions can be filled sooner with appropriately educated individuals with fewer knowledge gaps thereby reducing the reliance on in-house training programs currently under time and cost constraints.
- Reduced orientation times for new employees as MLT students filling these positions will be better prepared to work as a result of in-depth knowledge/skill base acquired from core specialization education and training.

To Education Institutions

- Development of standard curriculum delivered across programs realized through stakeholder collaboration; proposed model works with college and university based programs.
- Increased revenue potential through program expansion with the inclusion of MLA and MLA/T programs.
- Increased revenue potential through increased student intake; this resulting from the reduction of the number of disciplines required to be taught to all students (Core Specialty program vs. General program).
- Alliation of clinical placement shortages due to clinical site buy-in of a more focused clinical rotation that would result from the core specialty model.

To Students

- Decreased cost of education based on recognition of prior learning.
- Decreased debt loads due to the ability to seek laboratory employment during their progression through the career path and educational programs; early clinical placements will offer valuable experience and networking opportunities.
- Reduced time spent in school before entering laboratory workforce.
- Improved career mobility; it will be easier to navigate the pathway with no “back tracking” in pursuit of further education, certification or advancement in the field.
- Opportunity for continued growth and development in a recognized career path.

To IEMLTs

- Faster integration into the workforce resulting from the opportunity to become certified in a core specialization rather than the current general certification.
- Decreased financial burden due to faster focused integration into workforce.
- Increased bridging program spots available due to a more focused curriculum.
- Increased access to Canadian work experience through increased clinical placements spots; sites potentially will be more agreeable to take students focused on a specific specialization.

To Current Stakeholder Initiatives

- Supports reprofiling and development of a MLA/T role is in line with government proposals to re-allocate functions among health care providers as a means to reduce health care expenditures (TD Economics, 2010).
- Supports the coordination of joint education by Ontario’s colleges and universities to create a more seamless continuum of post-secondary education (CUC, 2010).
- Supports CSMLS’ initiative to increase subsidized Bridging Programs for IEMLTs (CSMLS, 2009).
- Supports government initiatives to integrate new immigrants to the workforce (Ontario Ministry of Citizenship and Immigration, 2010).

To the Laboratory Medicine Profession
- Enhanced recruitment into the laboratory medicine professions with a clearly defined education and career path outlining advancement opportunities; the profession will be perceived as a good career choice.
- Retention of professionals within the laboratory medicine field due to career progression, life-long learning and continuous professional development opportunities.

To Patients/Public
- Improved collaboration amongst stakeholders in working to sustain laboratory medicine.
- Improved assurance of public safety through certification and regulation that eliminate the opportunity and the need to use loop holes in existing legislation to staff specialized laboratory areas.
- Graduates better prepared for practice with a holistic view of the laboratory medicine field and in-depth knowledge and skill base provided by core specialization certification.

5.3 Challenges and Opportunities (Issues and Proposed Solutions)

Securing Stakeholder Collaboration
Issue: Collaboration and agreement is required across the profession. This includes private/public laboratories, governments, certifying and regulatory bodies, professional organizations, educational institutions, managers/leaders and laboratory professionals.
Potential Solution: Develop new or renewed partnerships and continue to solicit input on the proposed model to develop a collaborative solution to sustainability issues.

Confusing Nomenclature
Issue: The similarity in terms and acronyms for the different laboratory professions (MLA, MLA/T, MLT) can be confusing, especially for stakeholders groups without lab familiarity.
Potential Solution: In collaboration with stakeholders, create new nomenclature for the different levels of lab professions and integrate within new competency profiles.

Transforming Laboratory Programs
Issue: Proposed model requires changes in structure and curriculum for MLA, MLA/T and MLT programs.
Potential Solution: Work with the Ministries of Training, Colleges and Universities and Health and Long-Term Care and educational representatives to develop a clear plan and strategies for implementation.

Changing Certification
Issue: Major changes are required to implement this proposed model in terms of education, certification and regulatory processes. New competency profiles and certification exams will be required for MLA, MLA/T, and MLT core specializations. Costs associated with development and administration of profiles and exams will be high at the outset.
Potential Solution: Government funding could be sought to offset costs. Potential cost-savings from laboratory repurposing may be realized after implementation which will offset initial start up costs associated with certification changes. Additionally, alternative sources of pre-existing profiles and exams could be investigated to minimize development time and costs.

Integrating Current MLAs into Expanded MLA/T Role
Issue: The proposed model assumes an expanded scope of practice for MLA/T beyond current state. How do we integrate existing MLAs with appropriate knowledge and skills into MLA/T roles and ensure patient safety?
Potential Solution: Develop fast-track courses/clinical experiences for existing MLAs who wish to upgrade to a MLA/T role. A MLA/T certification exam would be required prior to performing the role in the workplace.

Integrating Changes with Existing Collective Bargaining Agreements
Issue: Reprofiling laboratory tasks and creating a MLA/T role with an expanded scope of practice would pose difficulties with existing agreements in unionized laboratory environments.
Potential Solution: Seek collaboration with union representatives on strategies to implement repurposing and the MLA/T role into unionized labs leveraging anticipated attrition rates of MLTs.
Lack of Synergy between BSc/MSc and Laboratory Medicine

Issue: Specialized knowledge and skills obtained in many relevant non-MLT degree programs could be beneficial to laboratory medicine but the curriculum is not currently aligned to obtain maximal benefit for either party.

Potential Solution: Include relevant non-MLT degree programs in the consultative and collaboration process to seek synergies in and possible re-alignment of curriculum that can be capitalized on by the clinical laboratory.

6.0 Next Steps

- Disseminate Education/Career Path Model to laboratory professionals and appropriate stakeholder groups
- Solicit stakeholder support for Proposed Education/Career Path Model White Paper and seek collaboration in implementing strategies to sustain laboratory medicine
- Seek a common nomenclature/language to better differentiate positions (MLA, MLA/T, and MLT)
- Develop a strategy for reprofiling clinical laboratory tasks to establish clear roles, responsibilities, and required certification at each level.
- Review existing CSMLS competency profiles and investigate alternative sources of pre-existing profiles to modify for use when implementing proposed model in Ontario.
- Determine specific entry requirements for each level of the proposed model to ensure transparency in progression process.
- Develop standard curriculum for MLA, MLA/T, MLT, IEMLT Bridge, BSc/MSc Laboratory Bridge programs
- Investigate alternative sources of pre-existing certification exams to modify for use when implementing the proposed core specialty model in Ontario.

7.0 Conclusion

Sustainability of clinical laboratory service is threatened. Maintaining the status quo is no longer a viable option. The CLMA Trillium Chapter has proposed an Education/Career Path Model that targets education, certification and regulatory processes in Ontario to reduce existing barriers and build capacity within the system. Potential positive impacts of this model span laboratory, government and public spectrums and align with many current stakeholder initiatives. Collaboration will be crucial to creating sustainability for laboratory human resources and strengthening the laboratory medicine community long-term.
8.0 How to Respond to this White Paper

The CLMA Trillium Chapter invites your views on the Proposed Education/Career Path Model presented in this White Paper. We are keen to hear from a wide range of people and organizations that have an interest in sustaining laboratory medicine service delivery.

Feedback on the following specific questions; general comments on the model; or related issues raised are invited.

1. Do you agree with, all or some of, the proposed education/career path model as an approach to improve sustainability in laboratory medicine in Ontario?
   a. if you do not agree with all of it, what parts do you disagree with and why?

2. Do you feel that if implemented this model will:
   a. enable individuals to enter the lab workforce sooner and at less expense
   b. make it easier for IEMLTs to contribute to the Canadian workforce
   c. encourage employers to offer more clinical placements if fewer disciplines need to be covered for each student placed?

3. Do you feel that enabling individuals from relevant non-MLT BSc and MSc programs to enter the laboratory workforce in MLT roles (after completing a Lab Bridging Program) would be beneficial for laboratory medicine?

4. Do you have any suggestions on how to improve sustainability in laboratory medicine?

5. Do you feel that there is enough collaboration occurring within the lab community to address sustainability issues?

The closing date for submission is December 31, 2010.

Submissions should be sent by email or fax to:

   Education Model White Paper
   CLMA Trillium Chapter
   c/o Paula Carroll-Spence, CLMA Trillium Chapter Member
   Paula.carroll-spence@sickkids.ca
   Fax: 416-813-6257

The submission may be marked “Confidential” or Anonymous” if desired.

If you have any questions regarding the White Paper feedback process, please contact Paula Carroll-Spence at 416-813-7654 ext 2010 or paula.carroll-spence@sickkids.ca
References

Canadian Institute for Health Information, *Medical Laboratory Technologists and Their Work Environment* (Ottawa, ON: CIHI, 2010).


Appendix A

Current State Map: Ontario Laboratory Education/Career Pathway

Legend:
- = barrier
? = non-delineated next steps

Mature Student
MLA/T Program
High School
General BSc
BSc Genetics
UOIT BHSc
MCAT Exam (optional?)
Medical School
Lab Related MSc
Research and Test Development
Lab Coordinator
MLA/T Position
OSMT Certification (optional)
Discipline Specific MSc
GCMLT CSMLS Cert Exam
Research & Test Development
Lab Coordinator
Regulatory College Registration
MLT Position
General MLT Program
Diploma MLT Program General
General BSc
Foreign Educated MLT
BSc Genetics
UOIT BHSc
Genetics Work Experience
CSMLS PL Assessment
Genetics MLT Program
MLT Bridging Program
MOHawk
Research
Pathologist’s Asst
Quality
Lab Coordinator
Clinical PhD
Genetics MLT CSMLS Cert Exam
Regulatory College Registration
MLT Position
General MLT Program
Discipline Specific MSc
Research & Test Development
Lab Coordinator
Regulatory College Registration
MLT Position
General MLT Program
Discipline Specific MSc
Research & Test Development
Lab Coordinator
Regulatory College Registration
MLT Position
General MLT Program
Discipline Specific MSc
Research & Test Development
Lab Coordinator
Regulatory College Registration
MLT Position
Genetics MLT CSMLS Cert Exam
Genetics MLT Program
MLT Bridging Program
MOHawk
Research
Pathologist’s Asst
Quality

CLMA Trillium Chapter: Creating Sustainability - Proposed Education/Career Path Model
Future State Map:
Ontario Laboratory
Education/Career Pathway

High School/Mature Student
  Level I
  Level II Part 1
  Level II Part 2
  Level III Part 1
  Level III Part 2
  Level III Part 3
  Level IV (MLS)
  Level V (MSc)
  Level VI (Residency)
  Level VII (Fellowship)

Phlebotomist

ILMLT

IEMLT

CSMLS PLA

MLT Bridge

Appendix B
Proposed Education / Career Path Model

**Level I**
- Medical Laboratory Technician (MLA/T)
- MLA/T Registration
  - MLA/T Certification based on MLA/T Competency Profile
- MLA/T Education Program
  - Level II – Laboratory Fundamentals
- Not Regulated
  - Optional Certification based on MLA Competency Profile
- MLA Education Program
  - Level I – Laboratory Fundamentals
- Direct Entry
  - High School, Mature Student

**Level II**
- Medical Laboratory Technician (MLA/T)
- MLA/T Registration
  - MLA/T Certification based on MLA/T Competency Profile
- MLA/T Education Program
  - Level II – Laboratory Methodologies
- Direct Entry
  - High School, Mature Student

**Level III**
- Medical Laboratory Technologist (MLT)
  - MLT Registration with CMLTO
    - MLT Certification based on MLT Core Specializations Competency Profiles
    - MLT Education Program
      - Level III – Part 3 Core Specializations
      - Level III – Part 2 Laboratory Methodologies
      - Level III – Part 1 Laboratory Fundamentals
    - MLT Bridging Program (if required)
      - PLA
      - CSMLS PLA
      - Lab Bridging Program
- Bachelor degree in MLS
- Direct Entry
  - BSc programs

**Level IV**
- Residency / Fellowship
- MSc MSc/MLT Pathologist Asst Education Management Research Quality

**Level V**
- Clinical PhD

**Level VI**
- MD

Appendix C