



REPORT TO THE MLPAO

MLT Human Resource Shortage

Abstract

Change has been discussed for 10+ years with little meaningful change. Time is up! The lab profession faces challenges with recruitment, retention, retirements and demand expansion. The objective is to improve the supply of laboratory professionals, build capacity, strengthen and modernize education and training pathways, promote faster learning, provide the requirements to work and to advance through a career ladder / pathway based on interest and need. A framework needs to be in place to advance persons with academic degrees and foreign trained into areas of interest.

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REPORT: MLT Human Resource Crisis

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I. METHODOLOGY

In 2019, a Think-Tank, conducted by the Medical Laboratory Professionals' Association of Ontario (MLPAO), brought together over 60 directors, administrators and educators to discuss and deliberate on the Medical Laboratory Technologist (MLT) shortage. The CMLTO and the Ministry of Health were invited as observers. The sessional output was provided to Kris Bailey, Consultant AiCon Inc., to determine strategies related to the MLT Human Resource Shortage. Research, telephone interviews with key stakeholders and in-person interviews were conducted. Interviewees are listed in the endnotes. |

A final report was delivered, by the consultant, in June to the MLPAO with revisions dated July 23 2019. In the initial Report, the consultant interviewed stakeholders from academic health science centre (AHSC) labs, regional hospital labs and rural hospital labs across Ontario. Five (5) organizations providing MLT academic training, one organization providing MLA/T training and the Ministry of Health – Lab and Genetics Branch were also interviewed. The MLPAO board and administration believed that it was important to get grass roots input on the MLT shortage (is it real? will it be real?) and what can be done to alleviate the pain and strengthen the profession.

As agreed, further discussions were held with CSMLS, CMLTO and Accreditation Canada to identify inaccuracies or areas requiring further clarifications from the Report, what their opinions were regarding the solutions, was there anything missed and what could/should their respective roles be within the scope of the recommendations.

This Report is NOT a research paper. It is based on the amalgam of the feedback from the stakeholder input, along with published papers from other jurisdictions in Canada and internationally who have or are dealing with this issue. The Report and research outlines six (6) recommendations (based on the Consultants opinion of the information received), which were created to stimulate discussion among the various stakeholders to determine a vision going forward and what changes, if any, are required. The CSMLS **Call to Action** advocates nationally for many of the recommendations, as presented in this report.

Two companion documents were delivered, by the consultant, in June to the MLPAO, updated July 23 2019 and re-issued October 18 2019:

- i. Report – MLT Human Resource Crisis
- ii. Slide Deck – Career progression from the 1970's, Career Ladder, Proposed Education / Career Path model ¹

II. EXECUTIVE SUMMARY and RECOMMENDATIONS

The profession faces challenges with recruitment, retention, retirements, demand and expansion. The objective is to improve the supply of laboratory professionals, build capacity, strengthen and modernise education and training pathways, promote faster learning, provide the requirements to work and to advance through a career ladder / pathway based on interest and need. A framework needs to be in place to advance persons with academic degrees and foreign trained into areas of interest. Several factors impact the clinical laboratory workforce where the demand exceeds the supply. The key factors are but not limited to:

- The retirement of an aging workforce and leaders coupled with unfilled high vacancy rates;
- An increase in demand for laboratory services;
- Changes in the practice of clinical laboratory science due to technology advances;
- Regionalization, amalgamation, down-sizing and closures of labs; and
- Major advances in medical diagnostics and treatments.

¹ The career Ladder is based on the November 2010 White Paper: Creating Sustainability for Laboratory Human Resources, Trillium Chapter of the CLMA

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To create sustainable, exciting and resilient professionals, it is time to generate meaningful change. Addressing long-term change requires much work with the system stakeholders.

The first two recommendations are longer-term in nature needing a clearly articulated vision with expected outcomes, followed by detailed work and the need to involve the competency creator and the regulator.

1. **Invest in an integrated career framework** with proposed education and career pathways with opt-in, opt-out and upgrade routes for all types of young and mature students and those internationally trained.²
2. **Restructure and redesign the content, the competencies and the syllabus** to mirror the career framework.

Ontario educators and hiring organizations can achieve recommendations #3-6 by working together.

3. **Add more academic seats** and increase retention rates.
4. **Redesign clinical placements.**
5. **Promote Medical Laboratory Science as a career option** to high school and university students and **create a recruitment strategy.**
6. **Each employer-based organization should develop an HHR-MLT plan.**

Relevant change is needed from organizations in Ontario,

- MLA/T and the MLT educators;
- lab organizations (hospitals & private labs who provide clinical placements and hire new graduates);
- professional organizations (MLPAO and the Ontario Association of Pathologists (OAP), who did not participate in this report);
- regulatory body (the College of Medical Laboratory Technologists of Ontario (CMLTO));
- lab licensing branch of the Ministry of Health (MOH); and
- payors (MOH and MTCU – Ministry of Training, Colleges and Universities).

and across Canada,

- competency creator (CSMLS)

all of whom are stakeholders in the change agenda and the redesign. The education accreditor (Accreditation Canada) and the quality accreditor (IQMH) are stakeholders but are not part of the change agenda.

Progressive change is natural in a technology driven and information intensive profession. Consequently, Ontario employers and employees have a high appetite for appropriate and informative education with opportunities for career laddering, supported by the professional association (MLPAO). The universities and institutes respond to this need with entry level programming, post graduate certifications and formal degree-based programs. The role of government (Ministries of Health and Education and Training) supports progressive change and are the providers of financial levers.

The role of the competency creator (the CSMLS) and the regulator (the CMLTO) have mandates and boundaries by which their organizations function. Both rely heavily on the input of educators, lab organizations and others for up to date and relevant competencies to provide the educators with the basis for curriculum, education, accreditation and examinations.

If the report recommendations are to be actioned, Ontario leadership will be required to provide focus and drive. Most of the recommendations involve the educators, the laboratory operators and the professional organization. Ideally, an Ontario-based steering committee comprised of representative *'leader-like'* membership a Project Leader and Sponsor would create and motivate working groups to analyze, create a detailed vision and

² See the Companion PowerPoint Presentation - The Career Ladder and the Proposed Education / Career Path Model

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change plan for each recommendation. Once a clear vision of the future for the system-wide recommendations (#1 and #2) are completed, the CSMLS, the CMLTO and the payors would be engaged.

Research was conducted by the consultant on the identified issues. They are described in more detail in the Research and Issues (Section VI) of this document. Many of the interviewees (laboratory leaders in small, medium, large and academic centre laboratories, educators and government) expressed similar issues as presented.

An accompanying slide deck shows the career progression since the 1970's, Diagram 1-4 Career Ladder and the Proposed Education / Career Path model. Over the past fifty years³ there has been significant change in the tools, processes and technologies used in the industry.

III. IS THERE A HEALTH HUMAN RESOURCE (HHR) CRISIS?

The main hypothesis this report considers is whether there is a current and impending shortage of MLT's. Although the majority of this report focuses mostly on the MLT shortage, it cannot be considered in isolation (discussed in more detail in Section VI (a)). Some of the interviewees absolutely agree there is a shortage, some believe it to be a crisis while others are not as convinced. Below the numbers and context consider this theory.

The numbers

Labour market facts and figures, as completed by the Government of Canada⁴, indicate that the employment outlook will be **good** for Medical Laboratory Technologists (NOC 3211) **in Ontario** for the 2018-2020 period. The MLT labour supply and demand will be **balanced in Canada over the next 10 years**. A moderate number of new positions will be created, and several positions will open due to retirements.

The Canadian Occupational Projection Systems (COPS), as completed by the Government of Canada⁵, predict that the occupational outlook is in **Balance** for MLTs (NOC 3211) and medical laboratory assistants, technicians and pathology assistants (NOC 3212). The labour demand and supply are expected to be broadly in line over the 2017-2026 period **at the national level**. Job openings are projected to result from both expansion demand and retirements. School leavers (graduates) will account for the majority of job seekers; close to one fifth of all job seekers are expected to come from immigration.

In contrast, the US Department of Health and Human Services, Human Resources and Service Administration (**HRSA**) projects a substantial increase in demand/growth for medical and clinical laboratory staff between 2012-2025 (see section VI,a).

The context⁶

Decreasing demand for MLT staff

The numbers do not speak to the contextual factors of which there are a few. The **rural / urban divide**, which is a common problem faced by most health professions, is challenging as many of the rural communities continue to regionalize and consolidate services to urban centres, where new students "prefer" to train and work.

Hands-on demand for MLT staff is also diminishing due to continued regional **consolidation, laboratory automation, middleware solutions and integrated information systems**. Technology and analytical solutions are

³ See the Companion PowerPoint Presentation - Career Progression from the 1970's to the present; Where are we now and What do we do?

⁴ Medical Technologist – Medical Laboratory in Ontario. Government of Canada.

⁵ Canadian Occupational Projection systems (COPS). Government of Canada.

⁶ This is more fully discussed in Section VI, a

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advancing, particularly in the areas of histology, cytology, microbiology, molecular and cytogenetics lessening the manual MLT processes in exchange for automation solutions.

Increasing demand for MLT staff

Testing **volumes are increasing** in most laboratories. The population base is aging. Also growing is the diagnostic demand from those persons greater than 60 and less than four (4) years of age. Chronic disease and population risk profiles are putting an increasing load on the health system.

Innovations in clinical science and technologies and newly developed tests have increased the opportunities for MLTs in specialised and senior roles leaving hands-on work to MLA/Ts.

Staff vacancies in the areas of laboratory leadership (technical and management) and **technically complex testing** needing specialists. Neither can be filled with new graduates. Commercial and academic role vacancies are typically filled with more experienced MLTs.

New laboratory testing markets are opening and expanding in non-profit community-based clinics and the expansion of home and community care using mobile diagnostics.

Ontario-based Recommendation (for employers):

#6. HHR-MLT plan

In order to address expansions / vacancies / retirements, there are several solutions to be used in concert and/or separately by laboratory management.

- a) Create and update succession plans to determine future needs due to demand expansion, technical changes and retirements;
- b) Use efficient utilization tools, such as the scope of practice, to place the most appropriate person (MLT and/or Medical Lab Assistant and/or Medical Lab Technician) in a role;
- c) Work with organizational HR and unions to determine the best mechanism by which to fulfill the technically complex testing roles and those of technical leaders based on competency versus seniority; and
- d) Work on Recommendation #1, to create an appropriate career framework providing post-graduate education.

Fulfilling the needs is not just an MLT graduate pool problem but a career progression of opportunities for MLA/Ts and MLTs from entry into specialties, technical and administrative leadership and other health professions.

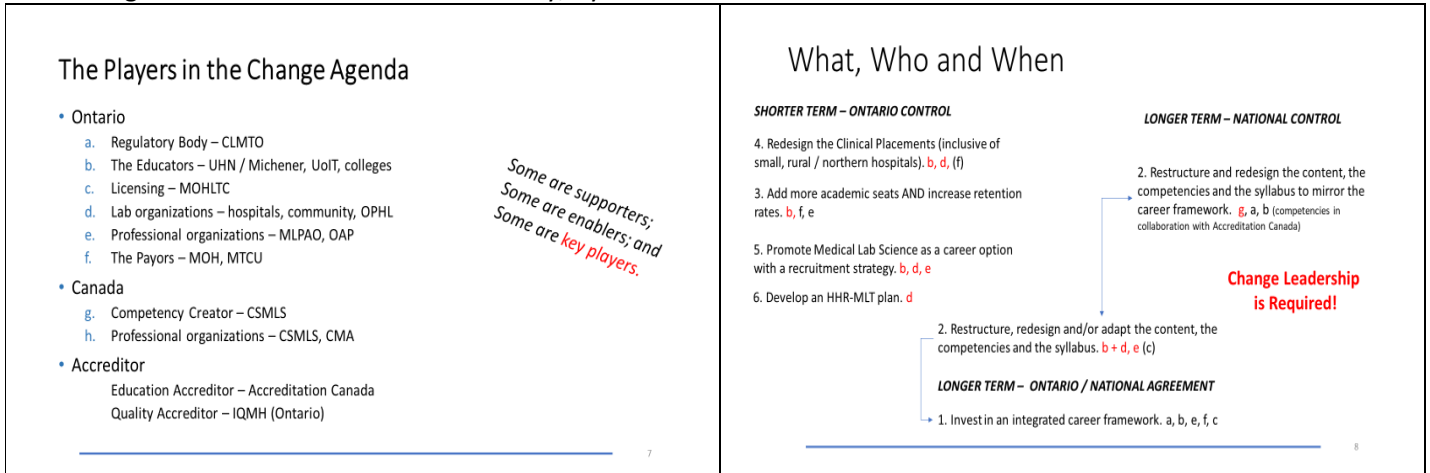
The consultant believes that the approaches, as identified, afford employers with an opportunity to design a skill mix that meets with the public needs while contributing to public health.

Will there be an MLT shortage? **YES**, if the above contexts are not managed with purpose. To lessen the effect, the recommendations provided here and in the Executive Summary will lessen the impact and strengthen the profession.

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IV. THE PLAYERS

The following two pictures⁷ show the various stakeholders. It is of note that the accreditors are not considered primary stakeholders in the change agenda. You will note, that based on the issues and the recommendations, various organizations are considered to be key, by the consultant.



Note: Interview summaries for CSMLS, CMLTO and Accreditation Canada are more fully described in the Appendix⁸.

The Medical Laboratory Professionals’ Association of Ontario (MLPAO)

The MLPAO is the organization that supported the development and publishing of this Report. It is a non-profit health professional organization founded in 1963 having more than 3,000 provincial members, supporting MLTs and Medical Laboratory Assistants/Technicians (MLA/Ts). It represents the interests of Medical Laboratory Professionals (MLPs) with government, regulatory bodies, educational institutions, health care professions and other stakeholders.⁹

The MLPAO is one of the certifying bodies for the MLA/Ts in the province of Ontario, as is the CSMLS. The association's certification program validates that an individual has attained a recognized level of standards and training through MLPAO and the Ministry of Training, Colleges and Universities (MTCU) approved educational institutions. With the use of an examination process, the association has been granting MLA/T certification to over 25,000 individuals, since 1988. Certification by the MLPAO is regarded as the preferred examination by many Ontario employers.

Promoting Medical Laboratory Science as a career option for younger people is critical to increase intake. Although, this has been a tenet from the professional associations for years, there have been few pragmatic approaches with a real impact. How laboratory professionals view themselves and are viewed by health administrators and others constitutes a major weakness. In general, marketing and media interaction of the profession has been poor and is often organizationally based. The top priorities of the MLPAO include rebranding, credentialing, advocacy, career advancement and member profession using local, provincial marketing campaigns to high schools and universities highlighting the STEM and STEAM¹⁰ education.

⁷ See Companion Document – PowerPoint slides, as revised, October 2019

⁸ See Appendix, Section VI

⁹ MLPAO web-site, www.mlpa.org

¹⁰ STEM and STEAM (adds Art/Humanities to Science, Technology, Engineering and Math academic designations)

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V. STATISTICS

In Canada

- In 2016 the median age of an MLT, MLA and PA is 41.6 years old and the estimated median age of retirement is 62 years old.¹¹
- 440 million medical tests are ordered in Canada each year¹²
- 183 million medical tests are ordered in Ontario each year¹³

In Ontario¹⁴

- 13.4 million people of which 5.2% of population are less than 4 years of age and 16.7% of population are 65 years and over. These two age groups represent the predominate usage of health care services.
- In Ontario, hospital employers comprise of 61% of the workforce. Full-time MLT positions are 85% compared to 79% for all occupations and part-time workers comprise 15% compared to 21% for all occupations.¹⁵
- The CMLTO, 2018 Health Human Resources Report stated:
 - . Practicing MLTs in Ontario: 6,371; non-Practicing MLTs: 458
 - . Average age of MLT is 47.3 yrs.; median age of an MLT is 49.3 yrs.
 - . 45% are 51+ years of age; 28% are 55+ years of age and eligible to retire
 - . Significant decline in practising MLTs in the 41-50 yr. age bracket; the >51 age group is remaining constant over a 5-year period; it is noted that the gaussian distribution of age is right leaning to greater than 50 years of age
 - . Self reported employment status: 81% full-time, 95% are considered permanent
 - . Several areas of practice, as reported, which are not described by Ontario Regulation 207/94, Schedule 1, include education, infection control, LIS, management, point-of-care testing, quality management, research, sales, specimen procurement discussed Section VI
- Education seats: MLT College Programs, comprising 220-250 seats closed since the 1990's. The table below describes the five institutions providing the MLT Program today.

Name ¹⁶	Entry Level	Student Seats #	Unqualified Wait List #	Prime Area	Retention Rate
The Michener Institute of Education at UHN (TO)	BSc, High school	72	500	GTA	~90%
UOIT (Oshawa)	High School	40	160	GTA	
Cambrian College (Sudbury)	High School	50	294	North	
St. Lawrence College (Kingston)	BSc, High school	50	350	East	
St. Clair College (Windsor)	High School	56		Southwest	
Total		268	>1,200		63%
# Students					169

In 1994 – Medical Laboratory Technologists were regulated. As of January 1st, 2019, cMLA/T^{MLPAO} credential can be used when the MLPAO exam is written and the person is a member; MLA/Ts are posted on a Certification registry AND are required to perform seven (7) hrs of continuing education per year¹⁷.

¹¹ Canadian Occupational Projection systems (COPS). Government of Canada.

¹² Article: Lab personnel shortage means you could wait longer for medical test results. Leslie Young and Abigail Bimman, Global News, May 1, 2019.

¹³ MLPAO Think-Tank Handouts, Spring 2019 (slide on supply and demand)

¹⁴ Wikipedia, Demographics of Ontario, 2016

¹⁵ Medical Technologist – Medical Laboratory in Ontario. Government of Canada.

¹⁶ MLPAO Think-Tank Handouts, Spring 2019 (slide on Educational Programs)

¹⁷ MLPAO Think-Tank Handouts, Spring 2019 (slide on MLA/T credentialing)

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VI. ISSUES and RESEARCH

There was a consensus on five (a to e) issues raised in the interviews. Research was conducted on each of these topics. Each issue is related to **one or more of the recommendations** (#3-6 can be addressed in Ontario; #1,2 are broad system related recommendations), as presented in the executive summary.

a. Academic Placements and Shortage of MLT Graduates

In the United States, as the unemployment rate falls and older workers feel confident enough to retire, there are higher vacancy and retirement rates. The number of new students graduating is declining with a negative balance of demand and supply.¹⁸ The American Society for Clinical Pathology (**ASCP**) Task Force on the Laboratory Professionals Workforce reviewed the recruitment and retention of qualified laboratory professionals recommending a multifaceted approach to bolster the pipeline of potential candidates for the profession as well as healthcare leaders. The ASCP has made workforce issues a critical top priority.¹⁹ The ASCP projects a nationwide need for a 13% increase in medical laboratory technologists and technicians between 2016-2026. The US Department of Health and Human Services, Human Resources and Service Administration (**HRSA**) projects a substantial increase in demand/growth for medical and clinical laboratory staff between 2012-2025 of 22%.²⁰

In Eastern Canada there is a current shortage in all provinces. In PEI, Queen Elizabeth Hospital was operating 40% short of full staff. All the casual positions are retired employees over the age of 60. Additionally, 20-30% of staff are eligible to retire in the next 3-5 years. In 2003, the government purchased some seats from the colleges, of which 90% of the PEI students stayed in PEI to work. In 2013, a recruitment and retention program were deemed to be more cost effective. Now all students compete for seats resulting in a PEI deficit. The government is being lobbied to resume the bursary program.²¹

In 2016, the **CSMLS** strategies to address the shortage was to increase the number of new graduates, better integrate internationally educated lab professionals into the Canadian workforce and provide incentive programs to recruit MLTs to rural and remote communities.²² The **Call to Action** also requests that organizations plan longer term using succession plans, advocate for full-time roles and create deeper collaborations with educators for clinical placements. These placements are critical to long-term success (see Issue #b).

In 2019, an outcome of the Think-Tank concluded that more academic seats are required. The following table assumes that:

- MLTs do not retire prior to 55 years of age;
- MLTs retire on a straight-line calculation over 7 years; ^{MLPAO DTT2019}
- There is no change in the overall retention rate of 63% (it is worthy to note that the Michener's retention rate is over 90% and the colleges are lower; the CSMLS (for the Ontario schools only) exams pass rate is 94.2%²³; and
- There have been no increases in seat numbers.

¹⁸ AACC Clinical Lab News: The Laboratory Workforce Shortage Demands New Solutions. Kimberly Scott. Nov. 1, 2015

¹⁹ American Journal of Clinical Pathology: Building a Workforce to meet the Future: ASCP. Tsk Force on the Laboratory Professionals Workforce. Volume 141, Issue 2, February 2014, pg 154-157.

²⁰ Article: Addressing the Clinical Laboratory Workforce Shortage; www.ascls.org/position-papers

²¹ Letter: Critical Shortage for lab technologists; www.theguardian.pe.ca/opinion; Feb 12, 2018

²² Article: Looming Shortage of Medical Lab Technologists will hurt patient care in Canada; CSMLS, April 19, 2016

²³ CSMLS National Report Card, from 2015 to February 2019.

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The mathematical variables in the MLT shortage are academic retention rates and the number of academic seats combined with Program Restructuring & HHR Planning (see Section III and Recommendation #6).

In Ontario			
Starting practicing MLTs	6,371	Student incoming	270 / A
MLT > 55 yrs.	28%	Academic retention rate	63%
Attrition rate over 7 years	4.0% / A		
	<i>MLT Outgoing</i>	<i>Student Incoming</i>	<i>MLT ready to work</i>
1 st year – retention rate 63%	255	170	(85)

This negative outlook accelerates over the years, if nothing is done. Some laboratories, or sections of labs, may need to be closed due to insufficient staff, which is a cascading problem for patients and the health-care system. The number of students in the collective programs are less than the number of MLTs leaving. Below is a table that shows the relationship between those leaving and those entering, when the retention rate is varied. Regardless of the retention rate, there are still insufficient new MLT graduates.

2018 Practicing MLTs	6,371	Student incoming	270
MLT > 55 yrs.	28%	Academic retention rate	63%
Attrition rate over 10 years	4.0%		
	<i>Outgoing</i>	<i>Student Incoming</i>	<i>Delta ready to work</i>
1 st year – retention rate 63%	255	170	(85)
1 st year – retention rate 70%	255	189	(66)
1st year – retention rate 75%	255	203	(52)
1 st year – retention rate 80%	255	216	(39)
1 st year – retention rate 90%	255	243	(12)

It is statistically supported that BSc graduates have a higher retention rate and success rate as new entrants to the field. Medical laboratory professions require highly technical skills and a solid foundation in sciences. For this reason, STEM students are aptly prepared for the specialized education and training, with significant skill set similarities necessary for a career in laboratory medicine. The prime student intake for the UHN / Michener are BSc graduates whereas high-school students are the predominate intake for the colleges and universities. The course is demanding and difficult, particularly for high school students...hence lower retention rates. The graduates, as described by the laboratory employers, are not created equal in their readiness for work.

Should the entry to profession be high school with a shorter educational timeframe followed by academic entry and / or upgrade routes? **OR** should the entry be BSc? **OR** should there be an MLT diploma and a BSc-MLT degree? (see Issue #c)

Demand for laboratory testing is increasing. The population base is aging and also growing is the diagnostic demand increasing the load on the health system.

Changes over the last ten years has driven down costs due to regionalization, consolidation of non-core testing, automation of equipment and information and innovations in clinical science and technologies. The latter has also increased the opportunities for MLT's in specialized and senior technical roles, leaving hands-on work to MLA/Ts.

Within organizations there is a wide range of hiring practices. For those with staff numbers that support the mix of MLA/T and MLT, the MLA/T scope of practice can collect and process specimens, ready specimens for testing,

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run QC, feed and care of instruments whereas the MLT focus is on supervision, advancing results, troubleshooting, specialist specific testing and interpretation. There remains a hiring preference for MLT over MLA/T in practice.

Adding more academic seats with no other change is unlikely to make much of a difference as it is only part of the overall staffing strategy. There are other considerations, in order of priority.

Ontario-based and System-based Recommendations:

#6 – HHR – MLT Plan (employers)

#3 – Add more academic seats and increase retention rates (educators and employers)

#5 – Promote medical laboratory science and create a recruitment strategy (educators, employers & prof. org)

#2 – Restructure & redesign content, competencies and syllabus (See Companion Document – Career Framework)

#1 – Invest in an integrated career framework (see Companion Document – Education / Career Path)

Issue related recommendations are also presented below.

Ontario Hiring Organizations (employers) (see HHR-section III, recommendation #6)

- a) Create a *succession plan*
- b) *Re-balance the workforce*, as it may not be necessary to replace MLT on a 1:1 basis. Use MLA/T:MLT ratios appropriate for the geography, workload requirements while maximizing scope of practice and understanding professional and medical risk.

Ontario Educators, Employers and Professional Organizations on # academic seats, retention and recruitment

- c) Create a provincial description of what a successful MLT graduate looks like; creating a *relevant MLT profile*.
- d) Assure the right people are admitted to the Program - *acquire a provincial recruiting and qualification tool*ⁱ
endnote to increase the likelihood of a properly qualified applicant into the MLT Program.
- e) *Increase the retention rate to at least 75%*.
- f) *Restructure Clinical Placements* (see issue #b) using urban and rural experiences (see Issue #e).

For Ontario to create a vision

- g) *Restructure the profession / workforce* to include a career ladder (entry and exit points, upgrade options) (see Issue #c)

Since the Report was first tabled, a few educators have received funding for additional academic seats.

b. Clinical Placements

Education and training are received in an array of settings, including community colleges, universities and institutes, adult schools (MLA/Ts) and private career colleges (MLA/Ts); on the job training for clinical placements and technical specialists.

Many medical laboratory science programs could actually train more students, according to the Lab Administrators and the Educators **if** changes were made. The difficulty comes in finding clinical placements where the students can complete their training in all five (5) disciplines while providing a fulsome experience.

The following two US educators believe that they needed to look at a new paradigm for how students are educated so they can shorten the amount of time students spend in clinical training. The University of Delaware MLS programme has four clinical rotations of four weeks, for a total of 16 weeks and is limited by the number of clinical

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affiliates available to train. At the University of Minnesota's Center for Allied Health Programs, the clinical placements have been reduced from 22 to 12 weeks.²⁴

The National Institute of Health (NIH) is funding the eClinic. The project is developing 30 student learning modules featuring computer-based medical laboratory sciences information using high-quality 3D animated simulations and virtual laboratories for classroom settings.²⁵ The technology, developed by the Athena Group, in collaboration with three universities, is using virtual wet labs and advanced, embedded learning strategies to better prepare students for professional practice to be available nation-wide. The University of Delaware is developing five student-focused modules and five faculty-focused modules for the second phase of the project.

Training programs include didactic instruction accompanied by practical experience. Lab administrators and senior leaders indicate increasing difficulty in providing sufficient clinical rotation spots for students. This impact has reduced the number of CP placements in Canada, the US and Australia. Some lab organizations have eliminated the CP all together, citing increased workload, unfilled vacancies, over-worked staff, being asked to do more with less and no apparent return on investment (ROI) on student training. Reimbursement or grant funding, if present, is negligible. Students are often short-changed in these very typical scenarios.

Many of the research papers indicate that in conjunction with dry simulation training the CP Preceptors / trainers should introduce students to the "living laboratory" (wet environment) to demonstrate competencies not trained in the dry lab (e.g. integrated automation, EQA, troubleshooting, maintenance, risk management, active root cause analysis, disease to diagnostics, interactions with patients, MD's, RN's and others). They should NOT train for "working in my lab" or in the mindset of "how we do things". Together the educational facilities and the organizations should have a 'practicum curriculum'.

In Ontario, some hospitals are very proactive in providing CPs and a few hospitals say they don't get a full roster of requested students. Many hospitals cannot provide CP for all five disciplines (e.g. small and rural hospitals; but that does not mean that they can't add value to the MLT clinical training experience). It was stated by nearly every organization that the CP schedule is far too lengthy. Labs generally do not have educational preceptors, but if they do, many do not have the capacity to support and train properly. Organizations need to support the cost of unproductive trainers. Most senior MLT and charge MLT are scientific leaders who may or may not train students. Often, bench techs are training without a practicum curriculum, experience or aptitude for teaching.

The UHN / Michener provides didactic training uses "dry simulation" to focus on entry to practice. They have emulated a living lab by having instruments and computers linked to a LIS. This reduces the time for "wet lab" CPs. They are running a Pilot for a 20-week clinical placement (5 disciplines, 4 weeks each). Everyone goes at the same time (Sept to Feb). If the student placements were 3 weeks in duration, it would leave a five-week period for enrichment such as a research project, perform test validation, a discipline specialization, QMS (QA, QC, QI, process improvement). College training is provided on stand-alone instruments and workstation learning.

The CSMLS has a position statement – *Use of Simulation to Reduce Clinical Placement Hours* that supports the use of simulation in the academic environment as an educational technique to assist students in achieving CSMLS-defined competencies. The use of simulation to partially replace and/or enhance clinical placement training is acknowledged. Further clarification and edification of each competency is required to determine whether to use a simulation tool or the clinical environment for assessment. Currently, the CSMLS is preparing a guidance document for MLA accreditation via Accreditation Canada. The vision is to complete the same boundary document for MLTs. This requires a collaborative discussion and decision with the CSMLS and the CMLTO (in Ontario), who is

²⁴ AACC Clinical Lab News: The Laboratory Workforce Shortage Demands New Solutions. Kimberly Scott. Nov. 1, 2015

²⁵ AACC Clinical Lab News: The Laboratory Workforce Shortage Demands New Solutions. Kimberly Scott. Nov. 1, 2015

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an accreditation sponsor. A consensus on the role of simulation in MLT education is more rigorous, that is assessed for fairness, as this is a regulated profession. Currently, the CSMLS and Accreditation Canada only recognizes competency assessment in a wet lab.

Ontario-based Recommendation:

#4 – Redesign clinical placements (educators and employers)

Issue related recommendations are also presented below.

Ontario Educators

- a) A *Placement Strategy*, for all schools, needs to be created and fully described to better orient the labs providing the CP experience.
- b) Create opportunities for students to *receive a CP experience in more than one setting* (e.g. highly urban, cities, towns and rural areas in hospitals and private labs) - (see issue #e).
- c) Each academic program should invest in a *placement coordinator* to work with other academic programs and labs to coordinate clinical placements.
- d) Provide didactic training, where appropriate, using “*dry simulation*”.
- e) *CP funding* could be directed to the organization and/or the student for iPads, lab coats, transportation (if using 2 or more CP-sites), accommodation (if using remote / rural site) and other supporting costs.

Ontario Hiring Organizations & Educators, working together to:

- f) Consider reducing wet lab CP to a *maximum of 12 weeks training* for ML – Clinical Sciences ^(see Diagram 1-4) by cycling more students, staggering placements for shorter periods of time and/or sharing placements with another institution to extend the experience (e.g. academic health science center (AHSC), regional hospitals, medium to small hospitals, rural hospitals, outposts, community labs).
- g) The mindset of the trainers should be to demonstrate competency within the day-to-day of the living lab (e.g. competencies not trained in the dry lab) using experienced technical staff.

Competency Creator (CSMLS) and Regulator (CMLTO)

- h) *Clear competencies* need to be reviewed and updated in a timelier fashion prior to any task reprofiling.
- i) CSMLS needs to encourage and recognize training in dry simulation and living lab environments.

Education is not free. Token funding is not relevant for education. Preceptor availability is not really the issue, but more importantly the time and resources to support students realistically is the main issue for organizations.

Organizations need to be encouraged to have a stable, committed workforce that can provide undivided attention to the patient work and the training required. AHSC and regional hospitals have a mandate and funding to provide “clinical training”. Rural facilities can be encouraged to provide a different experience similar to the MD’s who share residency training in multiple facilities).

Every interviewee and research paper concur that CPs add value to the graduate’s experience. Since the Report was first tabled, organizations realize that clinical placements drive hiring practices.

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c. Laboratory Professional Designation and Career Ladder

One of the most important interview discussions centered on the competencies / syllabus and career ladder. The question posed to the interviewees was whether the current degrees/diplomas of General MLT, Clinical Genetics and Diagnostic Cytology will take the profession into the future or needs to be modernized. Overwhelmingly, the response was CHANGE is needed for the General MLT, with impact in Diagnostic Cytology.

The future will continue to transform. Rapid changes in technology, information management, new tests, genomics / molecular diagnostics, automation (genetics and pathology) and mobile diagnostics (mobile DX) are changing the face of medicine and the diagnostics support needed. The profession must advance faster with flexibility to remain viable and relevant. It is presumed that laboratory workload will increase with fewer MLTs and more MLA/Ts and that there will be more places of work connected wirelessly. The virtual living laboratory will be comprised of:

- fixed (e.g. hospitals, community labs, public health labs);
- satellites of the fixed site labs (in acute care in hospitals / clinics);
- physician/ primary group offices;
- mobile acute care (ambulances); and
- "in the home" (homecare, LTC, Nursing Homes, Hospice, home) to name a few.

The type of work and the place of work will cause industry disruption and affect the workforce performing and monitoring the work, as well as providing expertise.

Stakeholders Need to Affect Change

In 1999, the United Kingdom (UK) Department of Health launched a Pathology Modernisation Programme. In 2004, a consultation paper "*Pathology – The Essential service – Draft Guidance on Modernising Pathology Services* was created as a founding document outlining principles and pathways.²⁶ Funding and capital was provided to identify the pathways and framework. By November 2005, the Healthcare Scientist Career Pathway Group (HCS CPG), led by the Chief Scientific Officer (CTO) of the NHS - Professor Commander Dame Sue Hill, constructed and papered *The Career Framework for Healthcare Scientists for the National Health Service* with all major stakeholders represented. The disciplines covered Life Sciences, Physiological Science and Physical Sciences. The nine career tracks represent increasing skill and knowledge requirement associated with growing complexity, autonomy of practice and responsibility. Learning and development are described using skill and competencies (knowledge, training and experience; analytical and clinical skills; patient care and public health; organizational skill and autonomy / freedom to act; planning, policy and service development; financial, physical and human resources; and research and development.²⁷ Following this paper, a Report was tabled "*Report of the Review of NHS Pathology Services in England*", chaired by Lord Carter of Coles. This review centred on managed pathology networks and "finding the sweet spot". It was noted in this report that professional demarcations; workforce planning; skill mix; recruitment, retention and common education and training pathways and enhanced business orientated management skills were foundational requirements.

In 2006, similar to the UK-England, the Greater Glasgow and the Clyde NHS Board embarked on a Laboratory Medicine Modernization Strategy. This paper discussed the structure, configuration and future model of care. The outcome was a unified Laboratory Service for Glasgow, with one specialty lead for each service. Clinical specialty support is provided on each site to coordinate activity.²⁸

²⁶ UK Pathology Modernisation. <http://www.dh.gov.uk/pathologymodernisation>

²⁷ Framework: Healthcare Scientists Career Framework, Supporting Agenda for Change Documentation, Nov 2005.

²⁸ Board Paper to the Greater Glasgow and Clyde NHS Board, Greater Glasgow Laboratory Medicine Moderisation Strategy, Board Paper No. 2006/56

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In Canada / **Ontario**, relevant change is needed from the lab organizations (hospitals, community labs and public health labs who provide clinical placements and hire new graduates), the MLT educators (who design and deliver curriculum and clinical placements) and the professional organizations (MLPAO and the OAP) are stakeholders in the change agenda and the redesign. Employers and employees have a high appetite for career laddering. The national competency creator (CSMLS) and the Ontario regulatory body (the CMLTO), within the boundaries of their mandate, will consider change requests. The **Call To Action**, produced by the CSMLS, mirrors at a national level, many of the recommendations presented within this Report.

As a perspective -- "too much is vested in the rear-view mirror. The CSMLS is preserving the past and tradition of lab medicine. Need to be far nimbler to affect change".²⁹

Changes Needed in the Curriculum for New Students, Specialists and Technical Leaders

The lab was a testing business. Now, it is a data business where specific and personalized data is created to provide information to the clinician for the purposes of diagnosis, monitoring and treatment decisions. This is an area of opportunity and skill set development where information management, bioinformatics and mobile networks comprise the future of laboratory information and bioinformatics management.

Many laboratories are part of formal and informal networks. This integrated service delivery model has a large-scale workforce component where equipment, systems and process are linked to workforce functions, skill sets and mix, so as to connect activity and workflow, including more multidisciplinary work supported by an infrastructure that informs workforce planning by taking a skills and competency-based approach. Strong clinical and technical leaders must be established to work collegially with management and business leaders.

Testing is routine with approximately 80-85% of all laboratory testing fitting into the category of "core lab". Much of the remaining testing is specialized and becoming more so as it relates to subject matter expertise, troubleshooting, root cause analysis and new testing technologies. Testing is either routine / automated, complex and semi-automated or complex and automated. Newer testing and technology entrants are "*personalized medicine*" (advanced molecular and genetic tests). Point-of-care technologies, that can be used in the hospital and clinics, has now the science and technology to be used routinely in acute care, community and home settings. These oversight responsibilities, in both personalized medicine and point-of-care testing, have the effect of reducing technologic efficiency gains but provide clinicians and patients with instant feedback.³⁰

The roles and responsibilities for MLTs have changed over the years.³¹ The current MLT General exam is comprehensive and competency-based, not discipline-specific. The curriculum and the CSMLS competency profile are deemed to be perpetually outdated. It is updated every five (5) years, with 2015 being the most recent, which is to be implemented in June 2019 and the next occurring in 2024. It is believed that the entry level competency profile, as it exists, does NOT meet the needs of today's laboratory. More attention is needed in the areas of information management, quality management, risk analysis, soft skills and disease / diagnostic correlation.³²

In Canada / **Ontario**, the academic institutions are required to teach to the competency profile to write the CSMLS exams. The UHN / Michener constantly reviews and upgrades their competencies to add in additional programming needs that address the modern-day laboratory with a core focus on the CSMLS core competencies.

²⁹ Quote: one of the interviewees but with sentiments from others

³⁰ Article: Pathology 2026: The Future of Laboratory Medicine and Academic Pathology, John. J. O'Leary.

³¹ MLPAO Companion Paper: Career Progression since the '70s; Career Ladder; Proposed Education / Career Path Model.ppt

³² See Appendix – CSMLS interview summary for further information

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The British Columbia Institute of Technology (BCIT) and the UHN / Michener are the only two genetics academic programs (disease and genes, molecular genetics, PCR, DNA sequencing etc.) representing 100% of Canadian teaching. CSMLS did agree to a harmonized program with an updated competency profile, supported by asynchronous review. However, the exam, has yet to reflect the new realities as the question bank needs to be updated and mechanism of scoring revised. Genomics is extremely difficult to recruit to new or replacement positions. Organizations need to work closely with the educators to align intake with need for graduates. The UHN / Michener is the only program for diagnostic cytology, including molecular diagnostics.

In the past, CSMLS offered Subject RT status. This designation was removed several years ago in favour of the general MLT (5-disciplines). Due to complexities of tests and technologies, it is impossible to train new graduates in all areas. There is no accelerated programming for an MLT Specialist in any field. All labs that need specialists are trained in house, with no formal academic or clinical programming. They may learn “how” to do something, but they don’t know “why” or “what it means”. These on the job trained students are not easily transferrable to other organizations. Technical specialities include:

- *Clinical Science*: Chemistry / Immunoassay, Mass Spectrophotometry, Toxicology, Haematology, Coagulation, Transfusion Services, Microbiology, Mol. DX
- *Tissue & Cellular*: IHC – Immunohistochemistry, Flow Cytometry, Electron Microscopy, tissue screening

More focus is needed on informatics - how to manage, manipulate and present data for decision making. Information Management includes LIS, networks, middleware (on-line maintenance, on-line QA / QC, results management), artificial intelligence, quality management, risk analysis and critical incident reviews focused on patient safety. Linking disease with diagnostics leads to better understanding test outcomes.

The syllabus needs to be current, progressive and match the career ladder to enable recruitment, retention and pathways for new graduates and professionals already working. The entire MLT competencies and exams would require re-profiling based on the career ladder recommendation. Currently, there are no identified and substantive education outreach programmes in post-secondary education for specialist roles. Anyone entering the career must start at the beginning and take all 5-disciplines for an MLT-General. The MLT General, as an entry point of education, does not address the major advances in sophisticated technology and techniques that require specialized knowledge and a greater skill set for those that perform and interpret new and evolving methods used for diagnosis and management of disease.

Professional Designations and Career Ladders

In the United States, the general grouping of laboratory personnel includes generalist technologists and technicians with disciplines the same as CSMLS minus Histology. Specialists roles are in immunochemistry, clinical chemistry, hematology, coagulation, microbiology, molecular biology, cytology, histology and genetics.³³

In Ontario, we are in a position where the demand for MLTs may outstrip the supply of trained graduates. Projected retirement rates for senior technical staff is higher than that of bench staff. The rate of staff positions that take longer to fill includes specialty roles and technical leadership.

The academic Program for entry takes too long with no clearly defined career path into specialty disciplines or technical leadership roles. Regardless of previous academic accomplishments (e.g. BSc, MA in science, microbiology genetics), almost everyone starts at the beginning. However, an individual can apply to the CMLTO for registration, and NOT CSMLS certification. The Registration Committee (RC) would deliberate on the case and could direct the

³³ Article: Addressing the Clinical Laboratory Workforce Shortage; www.ascls.org/position-papers

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Registrar to deny registration, provide registration, or to issue a certificate of registration with terms, conditions and limitations, depending on the applicant's ability to meet the registration requirements or provide evidence of substantial equivalence to one (or more) of the registration requirements. More details in appendix for CMLTO follow up

Professional recruitment of intake students, in some cases, is hampered by lack of a clearly defined career ladder. As discussed under Clinical Placements (section VI,b), there is a lack of funding for continuing and advanced education and/or tuition reimbursement in whole or in part. Organizational issues (e.g. union hiring rules, new graduates hired in part-time roles vs full-time and operating fund availability) related to vacancies lead to employee stress and burnout. Employers identify the need for generally trained professionals, those who have been streamed into an area of work and those who may only have credentials to work in a designated / specialty area.

Training Programs need to be formal but offered in a variety of modes:

- *Formal degree Programs*: in class, didactic lab environments, simulation labs, clinical placements
- *Advanced Specialist Program*: After organizational employment, the MLT can apply for a specialty certification whereby the organization and the teaching institution work together to provide an academic program and a clinical placement. A robust distance academic training program can be conducted through continuing education via on line classrooms, self-learning / examinations, the weekend warrior classroom – offered on a priority basis or once a year or every other year to qualified “applicants” based on labour market demands. A single organization may need to provide specialty education with small student numbers where the organization is the centre for influence, academic and practicum training.

What could a new Program design look like?

The full pictorial and description are presented in the Companion Document: **Diagrams 1-4, Proposed Education / Career Path Model**. Below is an outline of the recommended solution for Ontario to improve the supply of laboratory professionals, build capacity, strengthen and modernize education and training pathways, promote faster learning, provide the requirements to work and to advance through a career ladder / pathway based on interest and need.

MLA Program can be divided into 2-streamed programs:

MLA: Phlebotomy

MLA/T: In-Lab processing etc.

MLT Program can be divided after MLT Foundations, (which everyone attends) into one of two programs:

MLT - Clinical Science (no Histology; replace Microbiology with routine Bacteriology / Infectious Disease)

MLT - Tissue & Cellular Foundations (combine Diagnostic Cytology with Histology)

MLT - Technical Specialist Designations

Technical Specialists for Microbiology, Clinical Science Specialties, Tissue & Cellular Specialties

Leadership (Business and People)

Technical (charge technologist, technical supervisor, operations manager, LIS coordinator)

Functional (Information Management, QMS / Risk, OH&S / Safety, Supervisor)

Administrative (Manager, Director, Functional Non-Technical Leaders, VP, Hospital Executive)

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Leaders need to be developed. There are many extraordinary MLTs, who get promoted to management positions without academic (what and why) or mentored support (how) struggle. An extended career ladder is necessary to identify future leaders.

MLA/T: not regulated, MLPAO exam certified, registered with MLPAO or CMLTO, listed on a public registry

MLT: regulated, CSMLS exam certified (or other exams), registered with CMLTO, listed on a public registry

MLT-Specialist: CMLTO accepts specialists with limited license

Ontario-based and System-based Recommendations:

#1 – Invest in an integrated career framework (see Companion Document – Education / Career Path)

#2 – Restructure & redesign content, competencies and syllabus (See Companion Document – Career Framework)

Issue related recommendations are also presented below.

Career Ladder

- a) Introduce an *integrated career framework* encompassing all disciplines and employment groups that clearly identify pathways for progression and transfer, supported by learning and development enhanced opportunities. The framework should encompass all types of intake students and Bridging Programs. With a career ladder, everybody starts together and then streams.
- b) A career ladder needs to include bridging (see- Issue #D), specialist and management roles (see -Issue #c)

Content and Curriculum

- c) *Restructure and redesign the content and the competencies and syllabus* to match the career framework for MLAs, MLA/Ts and MLT-General. It is not necessary to have all five disciplines, as people are either streamed early into a discipline / operating setting OR they use the core functions in a small / rural hospital setting.
- d) Training programs need to be designed to meet the needs of the academic program.
- e) Ontario educators need to harmonize their Clinical Programs and CPs, then all students would be placed. (see Issue #b)

Implications of this recommended change include:

- The career ladder and education proposals correlate with the US, UK and Australian Program graduates.
- Career ladder may require salary adjustments. Currently, an MLT with or without a BSc earn the same salary. Specialist designations do not come with additional compensation.
- The UHN / Michener could provide a BSc-MLT program if they were affiliated with a University. The UOIT can provide the MLT Clinical Science Diploma and the Bachelor of Health Science – MLT designation. The colleges can provide the MLT Clinical Science diploma, which can be a 2-yr MLT course, without Microbiology and Histology. An an upgrade pathway to technical specialties would be available.

In other professions (e.g. nursing, diagnostic imaging) a core base is taught and competencies assessed. Once the graduates are employed and have proven their aptitude and expertise they may be interested in category (discipline) or specialty certifications.

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d. Internationally trained MLT (IEMLT, BSc and MSc students)

For the internationally trained person, the CSMLS assessment of equivalency and the CMLTO process are both slow and expensive. Culture, language, attitude (foreign trained MD's may have an attitude of superiority) and technology can be barriers for education or for living in more remote areas (e.g. lack of a mosque).

CMLTO has designed a *career map for internationally educated professionals*. It describes the registration process and its requirements (none of which are described as non-exemptible), including language fluency and citizenship/residency status. There are six steps described in the registration application process.

Mohawk provides the MLA/T program but no longer the MLT program. Mohawk did have an abbreviated internationally trained Bridging Program, but is currently not accepting any new students. In prior years, Mohawk College had an MLT distance education program and bridging program that was deemed to be excellent. The UHN / Michener has expanded their intake to 20 students twice per year for IEMLTs, as the funding was increased for the Bridging Program. Any program for internationally trained students must include adaption to the Canadian environment (mostly for quality, risk, safety and technologies).

Labs identify the need for specialists to work in a designated area. Dependent on the intake question, some persons with academic science-based degrees have interest in only one area (e.g. microbiology, genetics). They could intake into the MLT Specialist Program, as identified in the **Proposed Education / Career Path**. Most of these students would also require a Bridging Program prior to the Specialist Program.

We are in a global society. Highly skilled people should be able to contribute. Ontario has the OCECCA Project, which creates a centre of excellence of communication competency assessment, an inventory of tools, programs, and resources for internationally educated health professionals.³⁴

Ontario-based and System-based Recommendations:

#5 – Promote Medical Laboratory Sciences as a career option and create a recruitment strategy (educators)

#1 – Invest in an integrated career framework (see Companion Document – Education / Career Path)

Introduce an *integrated career framework* encompassing all disciplines and employment groups. The framework should encompass all types of intake students (including high school, college, university) and Bridging Programs (foreign trained).

e. North and Rural MLT attraction and retention

Most rural lab and small hospital labs do not have histology / cytology / microbiology or any specialty testing. The labs are mostly staffed with MLTs for coverage; lots of overtime (OT) and call backs. They do not like the MLA/T role as this was forced upon them with unintended consequences. Rather than hire more staff, the hospitals spend more for MLTs working off hours and overtime to cover shifts as only a single person is working.

The further north, the bigger the struggle to attract and retain MLTs. The north and rural take few to no clinical placements since they cannot provide the 5-discipline experience. They need MLTs who are independent thinkers, work with patients and often alone – this is different than in large labs where MLTs have been streamed into disciplines or operating areas, work in teams and may never see patients. The CSMLS **Call to Action** advocates for incentive programs to recruit MLTs to rural and remote communities.

³⁴ The OCECCA Project development team. Inventory of Tools, Programs, and Resources for Internationally Educated Health Professionals. 2013

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Small labs often have relationships with another lab which may be formal or informal (companions). Rural hospital labs have scaled core labs, some with POCT, with linkages to larger labs for training, IT integration and interpretation etc. (e.g. LIS, Sysmex Cellavision / scanner for hematology consults with MLT, digital pathology for frozen sections and urgent tissue review requests).

Small labs also provide support for other health care environments (e.g. clinics) using POC technologies and virtual learning. The MLTs may be at the centre of the attraction and retention of clinicians. Without diagnostics, it is difficult to assess, treat and monitor patients in a timely manner.

Lifestyle plays a key part in attracting and retaining staff. More simple life, community and outdoor activities are more attractive in the north / rural versus the amenities provided in the urban centres.

In Canada's West, the CLXT is a combined Laboratory and X-Ray Technology program offered at NAIT (Alberta), Saskatchewan Polytechnic and Red River College (Manitoba). It is unique in that students are trained in both medical laboratory and X-ray disciplines, so that they are able to work in rural community hospitals or health care centres. On completion of their training, graduates are able to perform medical laboratory procedures, diagnostic radiographic procedures and electrocardiograms. Students also receive training on computers and information systems in the medical laboratory and diagnostic imaging departments. **In Ontario**, this designation is not regulated by the CMLTO. It is unclear if the government and/or the regulator have any interest in introducing this professional designation.

Ontario-based and System-based Recommendations:

#4 - Redesign clinical placements (educators and employers)

#5 – Promote Medical Laboratory Sciences as a career option and create a recruitment strategy

#1 – Invest in an integrated career framework (see Companion Document – Education / Career Path)

Issue related recommendations are also presented below.

- a) Market the relevance of the “*Northern Experience*” - there are many opportunities such as seeing patients, QMS, e-QA, POCT administration, full spectrum of core testing without streaming and interaction with Drs, Nurses and clinics. Without marketing and CPs in the northern and rural area, there is no appetite for students to go to these smaller/remote/isolated sites.
- b) Provide for isolation pay and recruitment and/or extended learning and/or conferences.
- c) Provide funding to students to support CP in rural (transportation, travel and accommodation) (see Issue #b)
- d) Educators to provide virtual networks, reciprocity urban / rural training and mentorship with larger labs (preferably referral labs with geographic similarities) providing support to rural labs.
- e) Restructure the general MLT as described in the Career Lab for MLT Clinical Science - Core Lab testing, POCT, basic discipline coverage for haematology, chemistry, bacteriology and infectious disease, transfusion services, QMS, lab / patient safety and Information Management.
- f) CLXT needs to be further reviewed in Ontario by the educators and the CMLTO.

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APPENDIX

In the initial Report, the consultant interviewed stakeholders from academic health science centre (AHSC) labs, regional hospital labs and rural hospital labs across Ontario, five (5) organizations providing MLT academic training, one organization providing MLA/T training and the Ministry of Health – Lab and Genetics Branch were originally interviewed.

This Addenda is a follow-up to the Report, as further discussions were held with CSMLS, CMLTO and Accreditation Canada to identify inaccuracies or areas requiring further clarifications, what their opinions were regarding the solutions and was there anything missed and what could/should their respective roles be within the scope of the recommendations.

The following is a summary of **CSMLS** information as feedback and clarification to the Report.

1. The role of the Canadian Society of Medical Laboratory Science (CSMLS) is the national certifying body for medical laboratory technologists (MLTs) and medical laboratory assistants (MLAs), and the national professional society for Canada's medical laboratory professionals (MLPs). They are a not-for-profit organization that is funded entirely by membership dues and revenues from goods and services. No operational funds are received from governments or other organizations.

The members practice in hospital laboratories, private medical laboratories, public health laboratories, government laboratories, research and educational institutions. The society has over 14,000 members in Canada and in countries around the world. The purpose of the organization is to promote and maintain a nationally accepted standard of medical laboratory technology by which other health professionals and the public are assured of effective and economical laboratory services, and to promote, maintain and protect the professional identity and interests of the medical laboratory professional and of the profession.

One of the major functions of CSMLS is to set qualification standards in medical laboratory science by conducting exams across Canada and issuing certificates to candidates who meet the prescribed standard. CSMLS provides prior learning assessment to internationally educated medical laboratory technologists who are seeking Canadian Certification. The PLA process evaluates an applicant's academic credentials, language proficiency, clinical training and work experience and their level of competency to write the Certification examination.

Once members are certified, CSMLS provides professional development and continuing education programs to help members update their skills and knowledge, and achieve their professional goals. Continuing education service provides distance education programs in technical and scientific subjects and laboratory management.

2. Clarification was required as to what organizations OWN the 6-recommendations. This is complex and multi-layered with a provincial / national focus to ensure standardization of competency through education, accreditation, examinations and certification.
3. Clarification was required regarding certification of MLA and MLA/T. The MLPAO and the CSMLS both provide certification for these professions. Since these professions are unregulated (versus MLT that are regulated through the CMLTO), the hiring organizations may indicate preferences for certification. The MLA or MLA/T were not within the scope of the assignment but are relevant to the day-to-day operations of a medical laboratory and to the Career Track, so were included in the discussions.
4. The use of simulation, as a training tool, in a dry environment was discussed. CSMLS has a position statement – *Use of Simulation to Reduce Clinical Placement Hours* that supports the use of simulation in the academic environment as an educational technique to assist students in achieving CSMLS-defined competencies. The use of simulation can partially replace and/or enhance clinical placement training is acknowledged.

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Further clarification and edification of each competency is required to determine whether to use a simulation tool or the clinical environment for assessment. Currently, the CSMLS is preparing a guidance document for MLA accreditation via Accreditation Canada. The vision is to complete the same boundary document for MLTs. This requires a collaborative discussion and decision with the CSMLS and the CMLTO (in Ontario), who is an accreditation sponsor. A consensus on the role of simulation in MLT education is more rigorous, that is assessed for fairness, as this is a regulated profession.

Just like the curricula, CSMLS will not define the construct with hours or detailed checklist, each program must meet the minimum competencies, but designs their program for the local labour market.

5. Competency profiles may be outdated. This was a spirited discussion as it involves a time lag, experienced input and standardization. The time lag refers to initial review and input by the educators, lab organizations, practitioners, scientists and regulators. This then needs to translate into a draft revision of the competency profile. This draft is then issued to stakeholders across the country for input and validation. This process can take 18-24 months. Experience shows that many educators, workplaces and practitioners do not participate, yet remain highly critical of the outcome.

The process relies entirely on the input of educators, lab organizations and others for an up to date and relevant competencies to provide the educators with the basis for curriculum and accreditation with the requirements(see #6). Once the input is received and finalized, new test questions must be created, and educators often need two to four years to revise and implement their curriculum. It also needs to be tied to incoming students and subsequent exam timetables.

6. Competency profile ownership. The Registrars of the Colleges across Canada and the Ministries of Health and Accreditation want to ensure that the competency profiles are national and that the qualifying examinations for students reflect that competency profile. The CSMLS will not issue a curricula guide or create standardized content, as programs vary from 2.5 y CEGEP, to 3 y college program to 4 y degree programs as they respect freedom across all teaching institutions. The process of accreditation ensures that minimal standards (the competency profile) have been met. Additional competencies or curricula may / should be added based on market conditions by the educators.

The CSMLS and regulators across Canada (CMLTO in Ontario) continually have conversations provincially and nationally to establish requirements to continue to achieve the goals of standardization, portability and access. The medical laboratory profession enjoyed full labour mobility, with the exception of Quebec, long before it was mandated under the Agreement on Internal Trade.

It is recognized by these organizations that bench ready MLT's and MLA/T's are wanted by employers, with minimal orientation and training. Employers report that new graduates are not all created equal.

7. The career ladder, as provided in the Companion document in pictorial format, has some interesting concepts. It was felt that most professionals would not use this, as it obligates the individual to broader training for broader experiences. As new graduates, choosing to have a rural scope vs urban scope might not fit with natural career mobility, as one never knows what opportunities or challenges, they will face, or if their job will continue to exist as it does today.
8. HHR shortage and National change; The Health Human Resource (HHR) shortage associated with MLTs is at a transformative tipping point. An intensified effort by Canada's medical lab stakeholders can push the agenda forward into real and meaningful change. Meeting the laboratory testing needs of Canadians while fixing the MLT shortage is a challenge. The CSMLS **Call to Action** focuses on ways medical laboratory stakeholders can contribute and how MLPs can be employed more effectively. The Call to Action is provided in the endnotes. ii

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CSMLS firmly stands by the need for large-scale transformation to combat the MLT shortage and the impact it has on MLPs, patients and other laboratory stakeholders. Above all, CSMLS is focused on supporting its members and the profession to meet the needs of Canadians, ensuring high functioning laboratory teams and the proactive, safe, effective and affordable promotion of laboratory services that are informed by evidence and delivered in a timely manner across our nation.³⁵

Local change is not within the mandate of the national organization who serves a pan-Canadian profession that is constantly facing change, evolving their programs and services to meet the broader needs of the community. It is important to note that the quality of the change is based on the input received by the various stakeholders in a timely and comprehensive manner. While competency profiles are the minimum requirement, programs tend to customize their education, as well for the local labour market. The participation of employers of Program Advisory Committees cannot be over emphasized.

The following is a summary of CMLTO information as feedback and clarification to the Report.

1. The College of Medical Laboratory Technologists of Ontario (CMLTO) was established in 1993 by the *Regulated Health Professions Act, 1991 (RHPA)*. The RHPA sets out the mandate, duties and objects for all RHPA health regulatory colleges. *The Medical Laboratory Technology Act, 1991 (MLT Act)*, and its regulations define the profession's scope of practice, the controlled acts that are authorized to the profession, as well as MLTs' legal obligations.

The CMLTO is the regulatory body for approximately 7,000 MLTs who practice in Ontario. It protects the public interest by regulating Ontario's MLTs; it sets the standards of practice and code of ethics for the profession, establishes registration requirements for entry to practice, provides a quality assurance program for practising members and investigates complaints related to professional incompetence and misconduct. The CMLTO provides information on its website, including a Public Register, for the public, members and employers.

The CMLTO Council has identified the regulation of medical laboratory assistants (MLAs) and technicians (MLATs) as a strategic priority for the protection of the public; at this point only MLTs are regulated.

Over the past few years, the Registrars of the medical laboratory regulatory bodies across Canada formed the Canadian Alliance of Medical Laboratory Professionals Regulators (CAMLPR) to collaborate on and address policy matters related to certification, entry to practice, labour mobility, quality assurance and standardization. CMLTO is a member of CAMLPR.

2. What are the products of the CMLTO? The CMLTO has designed a *career map for internationally educated professionals*. It describes the registration process and its requirements (none of which are described as non-exemptible), including language fluency and citizenship/residency status. There are six steps described in the registration application process. (Note: this is not the only product of the CMLTO.)

The CMLTO issues certificates of registration in General Medical Laboratory Technology (biochemistry, microbiology, hematology, transfusion science, histology and phlebotomy), Cytotechnology (Cytology OR Cytology and Histology) and Clinical Genetics (Molecular Genetics and Cytogenetics).

The CSMLS is the national certifying body and professional association of MLTs in Canada and plays a key role in this process by conducting a prior learning assessment (PLA) (i.e. assessing the education, experience and clinical practice) of applicants seeking registration with the CMLTO, who have been educated outside of Canada.

³⁵ CSMLS "Call to Action", www.csmls.org

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3. How can an academic Masters degree be certified? Successful completion of one of the CSMLS Certification examinations is one of the registration requirements defined by Ontario Regulation 207/94 under the *Medical Laboratory Technology Act, 1991*. All of the CMLTO registration requirements are exemptible. That doesn't mean that they are regularly exempted, just that the Registration Committee (RC) has the authority to direct the Registrar to issue a certificate of registration if an applicant can demonstrate substantial equivalence to one (or more) of the registration requirements if they do not clearly meet them.

An individual applying to the CMLTO for registration with a Masters, but NOT CSMLS certification would be referred by the Registrar to the RC. The RC would deliberate on the case and could direct the Registrar to deny registration, provide registration, or to issue a certificate of registration with terms, conditions and limitations, depending on the applicant's ability to meet the registration requirements or provide evidence of substantial equivalence to one (or more) of the registration requirements.

Certification by the CSMLS, registration with the College and the authority to use the MLT title are all separate concepts, linked through the registration processes defined by regulation.

4. Competency profile ownership. It is important that the competency profiles remain current and relevant. CAMLPR and the CSMLS want to ensure that the competency profiles are national and that the qualifying examinations for MLT students assess the competency and are fair and valid, holding to quality standards. Portability (labour mobility) across Canada is a legal obligation.

An applicant who successfully meets the College's registration requirements is issued a certificate of registration and authorized to practice in the province. It is recognized that further orientation and training will be required in the employment setting.

The CMLTO's registration practices are also subject to review by the Ontario Fairness Commissioner to ensure they are transparent, objective, impartial and fair, which creates another layer of regulatory oversight.

5. Is the MLT shortage a crisis? The CMLTO believes that the supply and demand of MLTs in Ontario is affected by a wide variety of factors. CMLTO membership has remained relatively consistent over the past 10 years. While the Health Human Resource (HHR) data produced by the CMLTO does point to an aging demographic, CMLTO does not have any data that can either support or discredit the assertion that there is an impending shortage. For further information on CMLTO'S position on this topic, please see:

The CMLTO Presidents Message in FOCUS Issue 4, 2019 at www.cmlto.com.
http://cmlto.com/images/stories/Resources/CollegePublications/FocusNewsletter/cmlto_focus_iss_4_2019.pdf

Like the other groups, the CMLTO acknowledges that MLT health human resource planning is a complex issue and involves numerous stakeholders, including employers and consideration of the skill sets of other lab practitioners, including medical laboratory assistants and technicians.

The following is a summary of **Health Canada** information as feedback and clarification to the Report.

1. The role of Accreditation Canada, is not a major player in the change agenda, but does act at arms length. Accreditation Canada works with 15 different health professions, including medical laboratory technologists. A common standard is used to accredit these educational programs in conjunction with the competency profiles of the respective professions. They do not inform directly but work with the organizations who create the competency profile (CSMLS - Canada) and its' regulator (CMLTO - Ontario).

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Accreditation Canada assesses the quality of the educational program. They do not provide any input or prescription to the admissions criteria but, in the context of the current standard being used, do assess whether the program's admission policies and procedures are fair and equitable and practices are consistent with published information.

The adoption of competency profiles for use in EQual is a function of the EQual Program Council (composed of representatives of regulatory bodies and professional associations in the professions that use Accreditation Canada as an accrediting body for their educational programs), which is external to the assessment process itself.

Examples of excerpts of criteria (bold) and guidelines (not bold) that pertain to QI from current standard being used by EQual (a new standard is currently in development):

- **The program has policies, procedures and tools for the collection of relevant stakeholder input and program performance data for continuous quality improvement purposes.**
The program considers the needs of stakeholders such as employers, governments, regulatory bodies, industry, clinical partners, program personnel and students.”
- **The program responds to performance data analysis and stakeholder input with relevant and timely actions for program improvement.**
Timely actions based on input, feedback and evidence gathered by the program is core to overall quality improvement. The program also responds to broad, overarching institutional directives and new developments within the profession.

The competency profile is the basis of accreditation. Educators need to provide proof of QA and Quality improvement (QI) in their syllabus as it relates to the competency profile and input from the students and the marketplace (employers).

2. The use of simulation was discussed. CSMLS has a position statement – *Use of Simulation to Reduce Clinical Placement Hours* that supports the use of simulation in the academic environment as an educational technique to assist students in achieving CSMLS-defined competence. The use of simulation to partially replace and/or enhance clinical placement training is acknowledged.
3. Competency profile ownership. The process of accreditation ensures that minimal standards (the competency profile) have been met.

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ENDNOTES

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ⁱ **The CASPer™ Test: Computer-Based Assessment for Sampling Personal Characteristics**

All applicants to the Internationally Educated Nursing and Second-Entry Nursing programs at York University are required to complete an online assessment (CASPer™), to assist with the selection process. Successful completion of CASPer™ is mandatory in order to maintain admission eligibility.

CASPer™ assesses for non-cognitive skills and interpersonal characteristics that are important for successful students and graduates and will complement the other tools that used for applicant screening to further enhance fairness and objectivity in the selection process.

In order to take CASPer™, the applicant is responsible for securing access to a computer with audio capabilities and a reliable internet connection on the selected test date. The CASPer™ test is comprised of 10-12 sections of video and written scenarios. Following each scenario, the candidate is required to answer a set of probing questions under a time contract. Each response is graded by a different rater, giving a very robust and reliable view of personal and professional characteristics important to the program.

ⁱⁱ **CSMLS Call to Action**, from the CSMLS web-site (www.csmls.org) The following Call to Action is required:

1. **Public and private laboratories should recognize the negative impact precarious positions and workload burdens have on the employment of current and future workforces and work towards a brighter future for their organizations and MLPs.**

Recognizing the problem of fiscal constraint in today's health care system, CSMLS asks that you evaluate your human health resource and infrastructure budgets under a long-term lens and continue to advocate for permanent full-time positions, create new collaborations with academic partners for clinical placement student spots, reserve positions for new graduates using formalized mentoring models with experienced MLPs and address the mental health issues in the workplace that are plaguing our profession.

2. **We need to increase the number of students received by quality clinical placement sites to support and enrich competency obtainment. This includes building a financial and resource infrastructure to allocate dedicated training time for clinical instructors and preceptors.**

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- a) CSMLS recognizes the importance of hands-on experience for students and appreciates the work by laboratories and academic programs to achieve this. We acknowledge that new clinical placement models are required and welcome evaluated innovation to meet student competency needs for CSMLS certification.
 - b) Laboratories not previously accepting students should evaluate their ability to contribute to the Call to Action and determine their ability in collaboration with academic programs.
 - c) Academic programs have reported evidence that specific competency sign-off can be obtained within a simulated environment. In alignment with accreditation requirements, academic programs should explore the possibility of models that involve such sign-off and network with other programs to identify steps and evidence to accomplish this. Such efforts would facilitate new models for and a potential reduction in clinical hours.
3. **Starting immediately, we need an unparalleled increase in MLT academic student seats to combat the current and future HHR shortage. Academic programs, clinical placement sites and non-clinical placement site laboratories need to formally evaluate their programs with administration and determine how to enhance student clinical placement training and increase student throughput (increase total numbers).**
- a) CSMLS recognizes the shortage is regionally, provincially and nationally relevant, ranging from remote to urban locations, and we recommend that academic programs collaborate, collect and share evidence for seat increase allowances under a multifocal lens.
 - b) The use of system models that include enhanced or new collaborations between programs and laboratories, including pan-Canadian considerations (e.g., inter- and intra-provincial partnerships), shorter clinical placement hours and/or alternative models of and within clinical training (e.g., simulation, standardized objective structure clinical examinations, buddy system and student-to-student exercises), should be considered to meet clinical placement site needs.
 - c) The use of simulation to support hands-on practice in order to complement clinical placement training is encouraged and should be incorporated into academic programs where expertise and infrastructure have been or will be dedicated.
 - d) In line with the [Truth and Reconciliation Commission of Canada: Calls to Action](#), attention should be paid for the inclusion of Aboriginal students in all medical laboratory programs, including designated seats, clinical placement options in Aboriginal communities and collaborations to create guaranteed employment after CSMLS certification. Consideration for other underrepresented populations of students should be considered locally.
 - e) The integration of internationally educated health professionals (IEHPs) into the workforce has been identified as a promising strategy for addressing HHR shortages in many countries. [Using best-practice information](#) for the creation and enhancement of medical laboratory bridging programs as well as for other recruitment and retention strategies is vital.
 - f) Academic admission requirements and processes differ across MLT programs and that contributes to student retention variance. An evaluation of MLT admission requirements and processes should be conducted to ensure that the retention of students entering a program is at optimal capacity. Given that there is not a shortage of individuals wanting to enter the MLP profession, consideration for a formal screening process, compared to a 'first come first qualified' process, should be implemented.
4. **MLAs and MLTs working in the clinical environment with students help shape the professional pride and practice of the future workforce. Efforts to create a working environment that is supportive of this and the Call to Action are imperative to the change process. CSMLS asks that you continue to support each other locally during this critical period, identify areas for change and communicate innovative projects/solutions to your peers nationally.**
- a) CSMLS will support the dissemination of efforts to members in accordance with CSMLS policy
 - b) Ensure best practice methods are used when training students in the clinical environment. When this cannot be achieved, notify your supervisor/manager (in accordance with local policies) as soon as possible to seek solutions that support your work as well as the training of students. Provide the supervisor/manager with a copy of this Call to Action to support your case for change
 - c) It is the professional's responsibility to uphold their actions to the [Standards of Practice](#), [Code of Professional Conduct](#) and [Code of Ethics](#).