Medical Laboratory Technologists Workforce Model Report Newfoundland and Labrador

March 15, 2011

Executive Summary

The 2007 Commission of Inquiry on Hormone Receptor Testing recommended:

> *The Department of Health and Community Services should carry out an analysis of requirements for medical laboratory technologists within the province for the foreseeable future and take steps to address any potential shortage.*

The purpose of this report is to present recommendations for addressing potential shortages in the Medical Laboratory Technologist (MLT) workforce in Newfoundland and Labrador, as well as recommendations for the potential reduction of wasteful practices which have a direct impact on workforce requirements.

The Cameron Task Force Provincial Working Group: Laboratory Technologist and Pathologist/Oncologist developed this report through several iterations of edit and review. Data were obtained from a number of sources both provincially and nationally. Stakeholders from a variety of organizations were closely involved. The scope of the work included all MLTs and Laboratory Technicians employed by four Regional Health Authorities, and all MLTs employed privately in the province.

The need for MLTs (demand) includes those required to replace MLTs who leave the system each year due to retirement or for any reason, and the number of MLTs needed to grow the workforce in accordance with expected trends. The source of MLTs (supply) includes new graduates or experienced MLTs, both from within the province or from outside sources.

Acknowledging that it is impossible to accurately predict all factors that contribute to workforce dynamics, selected assumptions were required and are carefully explained throughout the report. Upon close analysis of all relevant factors, it was concluded that:

> *The current supply of Medical Laboratory Technologists is not meeting employers' needs. This gap is expected to widen in the next decade. Multiple strategies are required to correct the imbalance, including increasing the supply of qualified workers and improving laboratory productivity. Several contributing factors add urgency to the need for quick action to stabilize the workforce.*

A gap of about seven Medical Laboratory Technologists is estimated for 2011, growing slowly but steadily to 11 over the next decade. This is the *annual recurring gap* between the supply of qualified workers and employer's needs.

Increasing the number of graduates from the Medical Laboratory Sciences Program at the College of the North Atlantic is an important factor for balancing supply and demand, however a range of actions are needed. Given issues and opportunities described in this report including utilization of laboratory services, attrition from the Medical Laboratory Sciences Program, the need for specialized training, and distribution/utilization of the workforce, 15 recommendations were developed and are grouped into four strategic directions (recommendations provided in Section 9, page 24):

1. Manage Demand (four recommendations)
2. Increase Internal Supply (five recommendations)
3. Increase External Supply (four recommendations)
4. Improve Planning (two recommendations)

Implementation of these recommendations will address future shortages of MLTs and improve the overall quality and sustainability of laboratory services in Newfoundland and Labrador.

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Prepared by: A. Wells on behalf of The Cameron Task Force Provincial Working Group: Laboratory Technologist and Pathologist/Oncologist.

1. Background

The Commission of Inquiry on Hormone Receptor Testing was established by the Government of Newfoundland and Labrador under the *Public Inquiries Act, 2006* on July 3, 2007. The Honourable Margaret A. Cameron was appointed Commissioner. The Commissioner presented the final report to the Minister of Health and Community Services on March 1, 2009.

The Cameron Task Force Provincial Implementation Committee was established to implement recommendations presented in the Commissioner's final report. The Provincial Implementation Committee established several working groups to address specific sets of recommendations.

The Cameron Task Force Provincial Working Group: Laboratory Technologist and Pathologist/Oncologist (referred to as the "Working Group" in this document), was established to address a number of workforce-related recommendations in the Commissioner's final report including Recommendation 16:

> *"As noted in the report of Mr. Hewlett and Mr. Parks, staff in the laboratory is in constant flux, which is counterproductive to a motivated, highly skilled, and productive technologist work force. While Eastern Health has dedicated three technologies to the IHC service, a succession plan should be implemented to minimize future attrition problems. The Canadian Society for Medical Laboratory Science states that a shortage of medical laboratory technologists will occur as large numbers of medical laboratory technologists retire over the next five to ten years. This shortage must be addressed so that patient waiting times, and therefore timely access to appropriate treatment, are not adversely affected. The Department of Health and Community Services should carry out an analysis of requirements for medical laboratory technologists within the province for the foreseeable future and take steps to address any potential shortage. Addressing any potential shortage of medical laboratory technologists must not be accomplished by lowering the standards for admission into the training program."*

Within Recommendation 16, two distinct recommendations (underlined above) have been identified: 16a and 16b. The focus of this document is the second recommendation, summarized as:

> *Conduct an analysis of requirements for medical laboratory technologists in Newfoundland and Labrador for the foreseeable future and take steps to address any potential shortage.*

The purpose of this report is to present the results of this analysis and recommendations on addressing potential shortages in the Medical Laboratory Technologist (MLT) workforce.

The MLT workforce in Newfoundland and Labrador has been the focus of similar analysis in the past. One such study by the Canadian Society for Medical Laboratory Science (CSMLS) in 2001 examined MLT workforce trends. An article published in the Canadian Journal of Medical Laboratory Science in 2002 (Medical Laboratory Technologists National Human Resources Review – 2002 Update: Nation-Wide Alert!), authored by Kurt H. Davis, Executive Director CSMLS, summarized findings and recommendations by province.

The work involved an analysis of new graduates data and retirement trends. It did not explicitly incorporate trends in workload, turnover for other reasons beside retirement, and other factors. Recommendations for Newfoundland and Labrador included (paraphrased):

1. Careful monitoring of student recruitment and retention into the Medical Laboratory Sciences Program;
2. Careful monitoring of graduate movement is needed as Newfoundland and Labrador can expect aggressive recruitment from other provinces;
3. Retiring technologists with cross training in medical laboratory sciences and medical radiography will be difficult to replace. Careful consideration must be given to the service level expectations in rural areas and the qualifications of the personnel employed to provide these services.

The article concludes:

> *Cutbacks to training programs for general medical laboratory technologists have significantly reduced the supply of new graduates. Based on current figures, Canada is not producing a sufficient number of graduates to replace those who will retire over the next fifteen years.*

2. Scope

MLTs work in all areas of the clinical laboratory including transfusion medicine, histology, chemistry, hematology, immunology and microbiology. They perform a full range of laboratory tests ranging from simple blood tests to more complicated tests used to identify diseases such as HIV/AIDS, diabetes, and cancer. They are responsible for reporting test results to physicians, ultimately influencing the care and treatment a patient will receive. Eighty-five per cent of physicians' diagnosis and treatment decisions are based on laboratory test results.[1]

MLTs must ensure the accuracy of the tests they are performing. They are responsible to recognize anomalies in test results and know how to correct the problems with their instrumentation. They perform equipment validations, calibrations, quality control measurements, and statistical analysis of data.[2]

Competency categories and descriptions are shown in Table 1:

[1] CSMLS: "Disease Response Threatened due to Lab Professional Shortage" downloaded February 16 2011 from http://www.csmls.org/en/media/news/74-disease-response-threatened-due-to-lab-professional-shortage.html.
[2] www.csmls.org

Table 1. General Medical Laboratory Technologist Competency Categories

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

Source: Competency Profile General Medical Laboratory Technologist, May 2005 downloaded from www.csmls.org February 16, 2011.

The entire provincial MLT workforce was considered in this analysis however the majority of MLTs in Newfoundland and Labrador work in Regional Health Authorities (RHAs). A provincial approach was required because supply and demand considerations affect the entire workforce, regardless of the employer.

Within RHAs, the MLT workforce includes:

1. Medical Laboratory Technologists. Currently, to become an MLT individuals must undertake a three-year training program and are required by the employer to obtain certification from the CSMLS by successfully completing a national examination. The existing workforce has a variety of educational backgrounds and certifications.
2. Combined Laboratory/Medical Radiography Technologists (named Combined LX Technologists in the remainder of this report). These technologists originate as MLTs and undertake the "X-Ray Skills for Medical Laboratory Technologists" Program at the College of the North Atlantic.
3. Laboratory Management. Laboratory managers generally have MLT backgrounds. Upon retirement (or turnover for any reason) these managers and directors will likely be replaced by another with an MLT background, who in turn will need to be replaced.

Specialized MLTs have unique supply and demand issues. These groups are not identified separately in the workforce model. For example, MLTs working in the areas of cytopathology (the microscopic examination of individual cells, rather than tissue, to detect diseases) and immunohistochemistry - IHC (used to diagnose types of cancer and to help determine the patient's prognosis) are few in number and have specialized training or experience. It is notable that training programs are not available for some specialized areas of practice. Formal arrangements and partnerships with educational institutions providing this training, and targeted support for students undertaking further training are needed.

RHAs currently have many employees working in positions classified as Technicians and Combined LX Technicians. Training programs for these positions are no longer available. The model identifies all Technicians as belonging to the general pool of employees that will require replacement with MLTs as they exit the system.

Medical Laboratory Assistants, clerks, and others are not included in the scope of the MLT workforce model, however it is important to note that the presence or absence of support staff strongly impacts MLT utilization. This and other external factors are discussed further in relevant sections, including Sections 5 and 6.3.

3. Limitations

The primary limitation of this exercise was the availability of data, mainly due to the fact that MLTs are not yet provincially-regulated. By the nature of their role, provincial regulatory bodies have basic but comprehensive workforce data on where professionals are employed, some demographic information, and in the case where longitudinal data are available, good estimates on those entering and exiting the workforce can be constructed.

Other limitations include:

- Balancing supply and demand at the provincial level does not guarantee that all positions will be filled. Experience has shown that many vacant positions are difficult-to-fill. Targeted recruitment and retention approaches are important, especially in rural and remote areas;
- Existing employees cannot simply move from one area of practice to another without the required experience and mentoring, and specialized training where available. For example, those working in Chemistry cannot move to Microbiology without on-the-job training. This limits flexibility for moving MLTs to address localized shortages;
- The results presented are not forecasts; they are scenarios based on assumptions. It is impossible to accurately predict all factors that contribute to workforce dynamics;
- Demand scenarios reflect employer's need for MLTs. Employer requirements for MLTs do not necessarily reflect population needs in that there are opportunities to improve alignment of services. Such realignment could result in a need for more (or fewer) positions;
- This model does not account for opportunities for improving MLT utilization. General discussion and recommendations are included however a full analysis of utilization issues is beyond the scope of this report. Utilization factors include team mix, scope of practice issues, scheduling/deployment, unnecessary diagnostic testing, work flow, etc.;
- Trends and technologies in diagnostic testing, capital purchases, and other factors can strongly alter employers' need for staff and are not incorporated directly in the model. For example, integration and interfacing of equipment streamlines reporting and creates efficiencies;

- Many trends identified in this report are long-term averages and significant variation can be expected in each year;
- MLT data are employee counts except where noted and do not reflect job types (i.e. temporary or permanent, part time or full time) or work patterns (i.e. earned hours and incidence of overtime, callback, sick leave, etc.).

4. Methodology

This analysis is based on a framework developed to produce provincial models for Social Workers, Registered Nurses, Licensed Practical Nurses, and Pharmacists. In these cases, the majority of data were provided by the respective regulatory bodies. The majority of data used to produce the MLT workforce model originated from RHAs. Further data was gathered from a variety of stakeholders.

Stakeholder involvement was critical for model development. Assumptions and estimates must be reasonable from a variety of standpoints. Relevant stakeholders included:

- Regional Health Authorities and other Employers;
- Department of Health and Community Services;
- Department of Education;
- College of the North Atlantic (CNA);
- Newfoundland and Labrador Society for Medical Laboratory Science (NLSMLS);
- Canadian Society for Medical Laboratory Sciences (CSMLS);
- Individuals as required.

The Working Group developed this report through several iterations of edit and review. Data were obtained from a number of sources both provincially and nationally. In some instances, only anecdotal evidence was available.

An environment scan was completed to gather applicable reports and analysis. Two key sources included the Canadian Institute for Health Information (CIHI) and the CSMLS.

The workforce model considers demand in two components: replacement and expansion. Replacement demand considers basic turnover and the need to replace exiting staff. Expansion demand refers to potential workforce growth (or decline). All MLT supply is considered, including new graduates and experienced workers, both from within the province and from external sources. All factors were combined in a spreadsheet and projected over several years to determine potential gaps. Various scenarios were tested to measure impact of different strategies. All factors (with one exception: the number of new graduates retained from the provincial program) are linked to the size of the workforce. For example, as the workforce grows at an assumed rate, the turnover increases in quantity (noting that the turnover rate is assumed to remain constant).

Recommendations were developed to reflect short and long-term opportunities to stabilize the MLT workforce in the province.

5. Medical Laboratory Workforce

A summary of selected provincial laboratory occupations is provided in Table 2:

Table 2. Regional Health Authority Laboratory Workforce – Employee Counts Dec. 2010.

Position Description (all categories mutually exclusive)	Eastern Health	Central Health	Western Health	Labrador-Grenfell Health	Total
Laboratory Manager and Related	13	5	4	1	**23**
MLT	281	73	58	32	**444**
Combined LX MLT	8	4	8	0	**20**
Laboratory Technician	16	8	1	0	**25**
Combined LX Technician	10	7	0	3	**20**
Total	**328**	**97**	**71**	**36**	**532**

Data in Table 2 are employee counts and not funded positions, therefore vacant positions are not a part of this summary.

Figures include Public Health Laboratory staff housed at Eastern Health. The MLT workforce (Excluding Combined LX Technologists and Managers) is 80 per cent female, 20 per cent male, compared to 85 per cent female for Canada.

Note that there were also 180 Laboratory Assistants as of December 2010; 126 in Eastern Health, 19 in Central Health, 24 in Western Health, and 11 in Labrador Grenfell-Health. Laboratory Assistants are considered a separate job classification and are not within the scope of this report.

5.1. Managers

Evidence shows that attracting qualified applicants for management positions is difficult. For example, Eastern Health reports there were no qualified applicants for a recent Manager of Hematology posting. Stakeholders identified various factors affecting recruitment into management including excessive spans of control (i.e. large numbers of employees reporting directly to a single manager), little financial incentive (due to compression of salary with unionized employees), excessive workload and lack of on-site supervision after hours and on weekends, resulting in poor work-life balance.

Overall, RHAs have identified significant turnover from their management workforce in recent years. Additionally, a high per cent of managers will become eligible for retirement in the next five years. Increasing accountabilities, disincentives related to salaries and benefits, and lack of opportunities for learning and development have been identified as some of the reasons it remains difficult to attract qualified applicants. A full analysis of management issues is beyond the scope of this report.

5.2. Medical Laboratory Technologists

The majority of the MLT workforce has a diploma from a three-year training program and certification with CSMLS. Alternatively, individuals may have studied a specific subject and written a CSMLS certification exam in one or more disciplines, such as Haematology or Chemistry, and are commonly referred to as "Subject RTs". There is currently no option available for certification in one discipline.

Those working as Combined LX Technologists are generally MLTs with cross-training in medical radiography although several Subject RTs also completed this cross-training. Similarly, Managers of laboratory services generally have an MLT background.

RHAs employ a total of 487 MLTs, including Combined LX Technologists, and Managers with an MLT background.

Estimates for the number of MLTs employed outside of RHAs is provided in Table 3:

Table 3. Non-Regional Health Authority MLT Workforce.

Employer	Estimate of MLT Employee Count September 2010
Canadian Blood Services	13
College of the North Atlantic	12
Memorial University	6
Mining and Oil Industries	3
Private Colleges	2
Private Labs[1]	2
Phlebotomists	2
Meat Plants	2
Medical Equipment Sales and Service	2
Cities (water quality testing)	2
Department of Health and Community Services	2
Breweries	1
Dairies	1
Genetic Researchers	1
Provincial Department of the Environment	1
Federal Department of Fisheries and Oceans	1
Provincial Department of Agriculture	1
Total	**54**

Source: Working Group anecdotal evidence.
Notes:
1. Anecdotal evidence suggests significant growth may be expected.

The total number of MLTs in the province is estimated at 541 individuals, with 90 percent employed by RHAs and 10 per cent employed elsewhere.

5.3. Laboratory Technicians

RHAs employ a total of 45 Laboratory Technicians. The technicians in the system are from discontinued training programs or may have no formal laboratory education. Many Technicians work alongside MLTs performing tests and reporting results. Eastern Health reports that because of the lack of on-site supervision in rural areas, stronger quality assurance/control requirements than in the past, and pending regulation that will limit testing to licensed personnel, Technicians are being replaced with MLTs as they exit the system.

5.4. Laboratory Assistants

RHAs employ a total of 180 Laboratory Assistants. Laboratory Assistants are trained for pre-analytical functions, such as phlebotomy, specimen processing, sample set-up, etc. These functions do not require interpretation and reports are not generated. Eastern Health indicated they are requiring and supporting Laboratory Assistants who perform functions other than phlebotomy to be certified by CSMLS. Laboratory Assistants are considered a separate job classification and are not within the scope of this report.

5.5. Demographics

Average ages for the occupations listed in Table 2, and within the scope of the model, are shown in Table 4:

Table 4. Regional Health Authority Laboratory Workforce – Average Age Dec. 2010.

Position Description (all categories mutually exclusive)	Average Age	Currently Eligible for Retirement (estimate)
MLT	43.2	29
Combined LX MLT	42.1	1
Laboratory Manager and Related	51.9	6
Laboratory Technician	55.8	7
Combined LX Technician	57.4	7
Total	**44.6**	**50**[1]

Notes:
1. See section 6.1 for further discussion on comprehensiveness of data and provincial estimates.

The average age of the MLT workforce (excluding Combined LX Technologists and Managers) is 43.2 years. CIHI reports 44.6 years in 2008 for all of Canada. The oldest employee group is the Combined LX Technicians at 57.4 years.

Educating and recruiting Combined LX Technologists has proven difficult. Few MLTs are willing to undertake the post-diploma program offered through the College of the North Atlantic without provision for salary continuance during the 24-week clinical practicum. As a result, in recent years the program has been under subscribed or not offered due to lack of applicants. Combined LX positions are in rural or remote areas making recruitment more difficult. Special attention is required to ensure a stable supply of these professionals, who are key for sustaining laboratory and diagnostic services in rural sites.

5.6. Summary

For the purpose of supply and demand modeling, it is necessary to include the correct occupations in the workforce analysis. This includes 487 MLTs (including managers with an MLT background, and Combined LX Technologists), 54 privately employed MLTs, and 45 Technicians (including combined LX technicians). Therefore, the total pool of individuals within the scope of the model is 586.

It is assumed that turnover, demographics, and retirement trends within RHAs are reflective of the entire provincial workforce.

6. Demand

For the purpose of this document, demand is defined:

Demand: Employer requirements for qualified workers.

Demand is considered in two distinct components:

Replacement Demand: Employer requirements for qualified workers to replace those separating from the organization.

Expansion Demand: Employer requirements for qualified workers stemming from projected growth (or decline) of the workforce size.

6.1. Replacement Demand

Replacement demand is simply the number of qualified workers an employer needs to replace those leaving the organization. If this component of demand is met, the workforce will be sustained, but growth in overall workforce numbers will not necessarily be realized. This section examines replacement demand only, which can be equated to turnover. Turnover figures were available from RHAs only. These data are provided in Table 5:

Table 5. Regional Health Authority MLT Workforce Turnover.

RHA	Average Annual Separations (RHA Data)	Average Workforce Size (Estimated[1])	Average MLT Turnover (Calculated)
Eastern Health	13.0 (2007 to 2009)	238	5.5%
Central Health	3.9 (1995 to 2010)	63	6.2%
Western Health	4.9 (2001 to 2009)	53	9.2%
Labrador-Grenfell Health	2.0 (2007 to 2009)	30	6.7%
Total	**23.8**	**384**	**6.2% (weighted)**

Notes:
1. Workforce size estimates based on figures in Table 7 and timeframe of annual separations data provided by RHAs.
2. All figures are employee counts.

Assuming turnover in RHAs is reflective of turnover for the entire provincial workforce, and applying an average of 6.2 per cent turnover to a total estimated workforce of 586 individuals, annual average replacement demand is an estimated 36 individuals. This figure includes turnover for any reason, including retirements.

The MLT workforce is aging, and it is widely accepted that retirement trends are changing. It is necessary to consider and incorporate these trends yet data on exact numbers of retirements in the past are not available i.e. it is not possible to isolate these individuals' data from general turnover data.

Data were collected on pension eligibility for RHA employees. Data were available for only 467 of 532 individuals in RHAs. Results provided in Table 6 were adjusted upwards proportionally to construct provincial estimates (assuming that those for which data were unavailable, and those employed privately, have similar retirement trends).

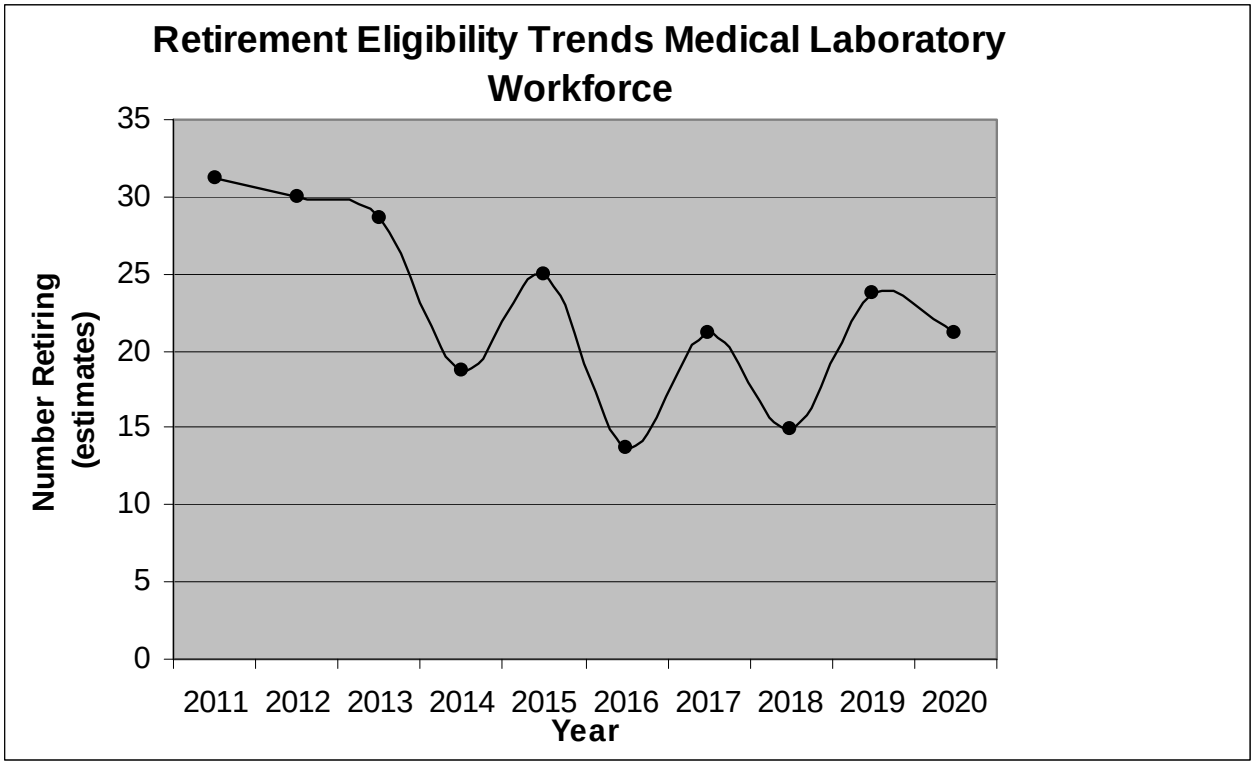
Table 6. Medical Laboratory Workforce Retirement Trends.

Year	Individuals Achieving Pension Eligibility – Proxy for Retirement Trends (Source: Data on 467 Individuals)	Provincial Estimates Retirement trends[1] (Estimated for Pool of 586 Individuals)
Currently Eligible	50	63
2011	25	31
2012	24	30
2013	23	29
2014	15	19
2015	20	25
2016	11	14
2017	17	21
2018	12	15
2019	19	24
2020	17	21

Notes:
1. Adjusted upwards proportionally to construct provincial estimates (assuming that those for which data were unavailable, and those employed privately, have similar retirement trends).

Visually, provincial retirement trends for years 2011 to 2020 are provided in Figure 1:

Figure 1. Estimated Retirements Provincial Medical Laboratory Workforce



Assuming trends in pension eligibility are a reasonable proxy for retirement trends, the data shows existing trends in retirements may be expected to taper off in the future. Noting that turnover data obtained from RHAs reflect past retirement trends, and will be used in the model to estimate future turnover trends, no adjustment of factor is used in the model to "ramp" retirement trends for the future as has been the case in other workforce models for this province. As this large cohort exits the system, turnover related to retirement may decrease slightly in future years, and replacement demand may ease slightly. The model assumes a continued rate of 6.2 per cent turnover for the workforce model, which represents people leaving the workforce for any reason, including retirement (Table 5 page 10).

It has been suggested that there may be a number of individuals waiting for July 2012 to retire, in order to take advantage of negotiated pay raises and associated pension increases. It is not possible to validate this point and it has not been factored into the model.

Finally, the recently introduced *Health Professions Act* sets out an "umbrella model" for the governance of certain health professions (including MLTs) under a Health Professions Council in combination with profession-specific colleges. Regulations are currently under development. A review of existing laboratory employees' backgrounds indicates that up to 50 may have difficulty obtaining a license to practice depending on the exact nature of the regulations. These employees include 35 individuals working in Laboratory Technician positions, including 18 Combined LX Technicians, and another 15 individuals working in MLT positions (including 5 Combined LX Technologists). Central Health employs 20 individuals and has a disproportionate share of the total. Eastern Health employs 25, Western Health employs 3, and Labrador-Grenfell Health employs 2.

6.2. Expansion Demand

Workforce growth (or decline) is an important factor and has many contributing factors. For example, newly funded positions increases demand for workers, while new technologies could increase efficiencies and reduce the demand. For example, a high number of part-time positions means more people are needed to do the same volume of work while good scheduling practices could mean fewer people are required.

Average historical growth rates vary by profession. For example, the Social Work workforce has been growing in number at a rate of about 3.0 per cent (average annual compounding growth) for the past fifteen years. As with all occupations, opportunities for improved workforce utilization (scope of practice, team mix, workflow, etc.) have the potential to stem some of this growth however there is usually no evidence to suggest that growth will not continue in the future. Trends in population needs for health services are widely accepted to be steadily growing.

The importance of workforce utilization is acknowledged and discussed in more detail below. For the purposes of a workforce model and making decisions that are long-term in scope, an assumption on workforce growth is required, regardless of inefficiencies or misalignments.

Historical workforce figures for MLT workforce counts (Excluding Combined LX Technologists and Managers) are provided in Table 7:

Table 7. Regional Health Authority MLT Workforce – Employee Counts

RHA	Employee Count			
	March 2003	December 2009	March 2010	December 2010
Eastern Health	230	238	259	281
Central Health	63	73	75	73
Western Health	52	61	59	58
Labrador-Grenfell Health	21	33	34	32
Total	**366**	**405**	**427**	**444**

Notes:

1. Source: Regional Health Authorities, date as noted. For comparison purposes, combined Lab/X-Ray Technologists and managers with MLT backgrounds are excluded from this table.

A variety of sources were examined to determine historical MLT growth rates in Newfoundland and Labrador, Canada, and the United States. These are shown in Table 8:

Table 8. MLT Workforce Growth.

Data Source	Scope	Years of Data	Compounding Growth (annual)
NL RHAs see Table 7.	NL	7	2.6%
CIHI	NL	9	2.2%
CIHI (five Provinces occupation regulated)	Canada	8	0.6%
Job Futures Canada	Canada	7	1.5%
US Bureau of Statistics	USA	10	1.1%

Table 7 indicates that the provincial growth rate has been 2.6 per cent compounding annually (366 individuals in 2003 to 444 in 2010). Given limitations of data collection efforts in 2003, this growth must be viewed with caution. Overall workforce growth in the same period was about 1.3 per cent (source: RHAs).

Commenting on "best careers in 2011", U.S. News and World Report indicated that for Medical Laboratory Technicians and Technologists in the United States:

> *"Job growth is expected to be faster than average, with the number of clinical lab workers rising about 16 percent between 2008 and 2018"*[3]

This projection equates to 1.5 per cent growth compounding annually.

Workforce growth does not move lock-step with changing workload; however it is useful to examine trends in workload. Consistently reported workload data was available from the Department of Health and Community Services Financial Branch Teledata System for four consecutive years, for three RHAs. Workload data is collected using CIHI's Management Information System (MIS) framework. Data are shown in Table 9:

Table 9. Workload Units, Clinical Laboratory Diagnostic Services.

Year	Workload Units[3]			
	Eastern Health	Central Health	Western Health	Total
2006/07	34,238,884	9,017,912	7,837,094	**51,093,890**
2007/08	34,932,984	9,243,683	8,434,221	**52,610,888**
2008/09	36,363,508	9,594,623	9,001,577	**54,959,708**
2009/10	37,215,086	9,843,114	9,378,519	**56,436,719**

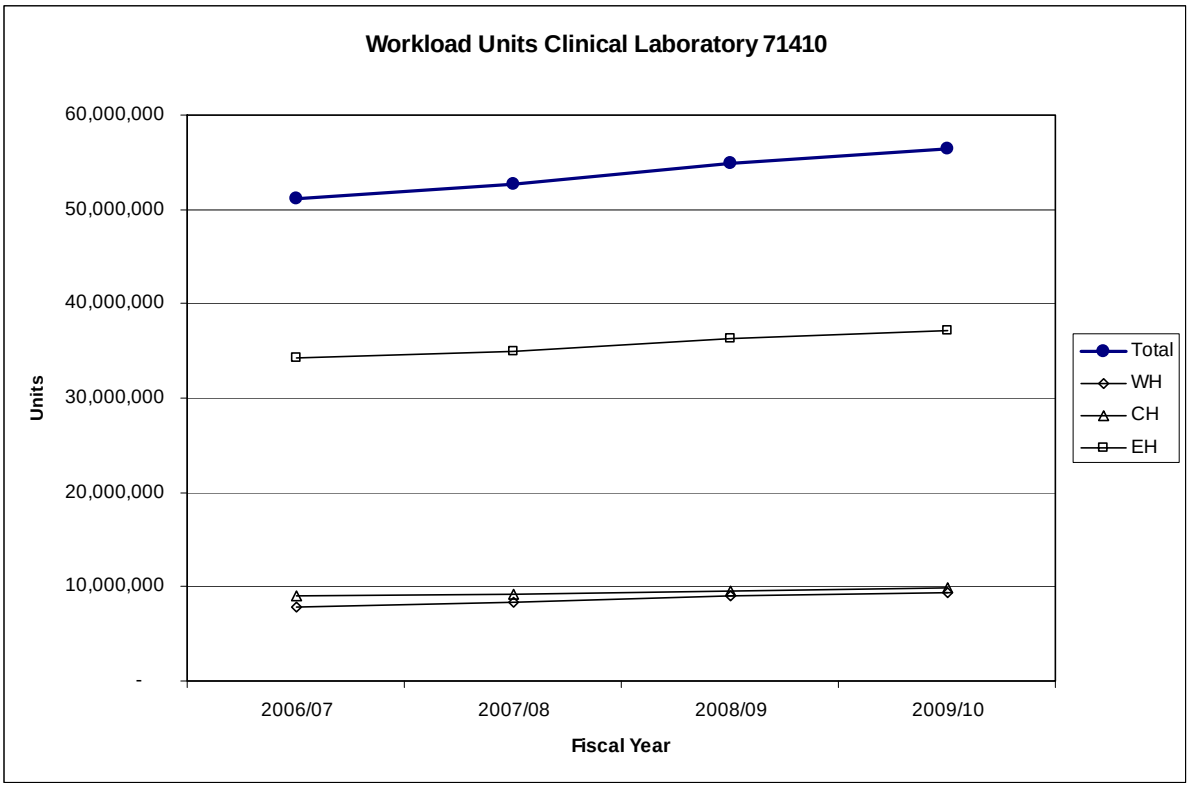
Notes:

1. Source: Workload Units, Teledata System, Financial Branch Department of Health and Community Services.
2. Labrador-Grenfell Health data not available.
3. Defined as: The standard units of time used to express the workload of a service as measured by an appropriate workload measurement system. In Diagnostic Services, one workload unit is equivalent to one minute of unit-producing personnel time spent in the provision of patient care (Regional Health Authorities Reporting Requirements – User Guide, Appendix A-4: Secondary Statistical Accounts – Definitions. Department of Health and Community Services April 2010).

These trends are shown in Figure 2:

[3] http://money.usnews.com/money/careers/articles/2010/12/06/best-careers-2011-laboratory-technician.html Downloaded January 7, 2011.

Figure 2. Workload Units, Clinical Laboratory Diagnostic Services.



The annual compounding rate of growth in workload units, for the three RHAs listed, from 2006/07 to 2009/10 was 3.4 per cent. Although these workload figures do not include all work performed by MLTs, they may be considered a reasonable proxy measure for overall trends in workload. This figure substantiates actual growth rates for Newfoundland and Labrador provided in Table 8.

In summary, historical growth rates and trends in workload support an assumption that the MLT workforce will continue to grow. For the purpose of this report, a rate of 2.0 per cent compounding annually is used. This equates to about 12 new individuals required annually to grow the workforce beyond people required to replace those exiting each year. There are significant opportunities to mitigate some of this growth through improved workforce utilization. Such opportunities fit well with increasing pressures to ensure health system sustainability. The model does not make any allowance for such improvements and a brief discussion follows.

6.3. Workforce Utilization

Before concluding a discussion on expansion demand it is important to highlight opportunities for better workforce utilization. Improving utilization could serve to lessen the pressure on MLT supply but more importantly it would optimize the use of limited resources and better align the workforce with health needs of the population. The two key questions are: 1) Is the right work being done? and 2) Is the work getting done efficiently?

Is the right work being done?

The issue of unnecessary diagnostic testing is well-recognized. Numerous studies are readily available that suggest the problem is wide-spread and long-standing.

> *Several studies have shown that between 25 per cent and 40 per cent of all tests sent to the laboratory are unnecessary.*[4]

If 25 per cent of laboratory tests are unnecessary in this province, this represents a significant opportunity that may exceed the equivalent of 100 full-time MLT positions. Anecdotal evidence from front-line MLTs in the province indicates that unnecessary testing is common practice, and the following examples were provided:

1. TSH test: To screen for and help diagnose thyroid disorders; to monitor treatment of hypothyroidism and hyperthyroidism;
2. HbA1c test: To measure the amount of glycated hemoglobin in the blood;
3. Tests to measure Vitamin B12 and D. Often driven by public "wants" rather than "needs".

On July 7, 2009 CBC news reported that Eastern Health was ending general testing for Vitamin D because its laboratory was being overwhelmed:

> *In the last two years, Eastern Health authority has seen a 10-fold increase in people wanting to be tested for vitamin D deficiency. The request for tests has steadily climbed since July 2007, and peaked in January at 5,000 tests a month… Eastern Health's laboratory medicine director Lynn Wade said at $25 per test, it was costing a fortune to tell people that everyone in the province who isn't taking a vitamin D supplement should be taking one. 'It was just unsustainable here in our lab. It was costing us approximately $500,000 … over the course of the last year,' she said. 'Aside from the cost of it, it was also backlogging our workload. We just were not able to sustain that level of testing.'*[5]

Every test generally requires the following work:

- Pre-analytical work includes a physician visit, and sample collection, processing, delivering;
- Analytical work includes testing and related quality control work;
- Post-analytical work includes entering the results, communication of results, and a return visit to a physician.

Reducing unnecessary testing would relieve pressure stemming from an ever-increasing workload and allow laboratories to redirect resources to important tasks as well as opportunities for improvement.

[4] Pathology tests: is the time for demand management ripe at last? G Gopal Rao, M Crook, M L Tillyer, Journal of Clinical Pathology 2003 56: 243 – 248.

[5] Source: http://www.cbc.ca/canada/newfoundland-labrador/story/2009/07/07/vit-d-707.html#ixzz1D00Evxl7 Downloaded February 4, 2011.

There is an abundance of literature and resources available on the subject of Laboratory Utilization Management. The September 2010 issue of the College of American Pathologists journal "CAP Today" (Vol. 24, No. 9) provides a good overview laboratory utilization management issues, discusses many practical ideas, and provides several examples of success. It also provides a balanced perspective by identifying examples of underutilized tests. The article compares superfluous testing to "digging holes and filling them back in". Some strategies include:

- Developing test algorithms and protocols;
- Revising test order forms to remove certain low frequency tests;
- Color-coded scheme for tests to represent ordering authority (for example, yellow tests may only be ordered by a specialist or on their approval);
- Use information systems, including the electronic health record (EHR), to extract testing trends and automatically flag order outliers;
- Education of stakeholders on proper ordering practices.

It is imperative that physicians and a variety of stakeholders become involved in initiatives to reduce the incidence of superfluous testing. A provincial "showcase" site would be a useful approach to implement and evaluate specific strategies that could provide the leverage needed to develop a provincial strategy. Stakeholders indicated that there have been some improvements made in the province to better manage laboratory utilization.

A useful approach for targeting unnecessary testing is one commonly used in materials management to implement selective inventory control. In this approach, tests would be valued by multiplying their estimated cost by their frequency, and the results sorted highest to lowest. Results are grouped into three bands "A", "B" and "C". "A" tests are approximately 10 per cent of all tests and may represent up to 2/3 of the total value. "B" items are approximately 20 per cent of all tests and represent about 50 per cent of the total value. "C" tests represent approximately 70 per cent of the tests and just 10 per cent of the value. One can then apply stronger management and control techniques to the "A" tests to yield the greatest benefit. It is acknowledged that estimating the total cost involved with a laboratory test is difficult however it need not be exact for this exercise to be successful. Frequency data should be readily available.

Is the work getting done efficiently?

There are potential opportunities to reduce waste and improve efficiencies. Workforce skill mix, scope of practice issues (for example, MLTs doing phlebotomy), staffing and scheduling practices, the presence of support staff, the use of Combined LX Technologists, critical examination of work process, and other areas could yield significant improvements. An example was provided by one RHA whereby call back costs could justify creating a full-time position. Another suggestion was to make better use of limited resources by avoiding call back to do certain tests in cases where slight delays in getting tests results are deemed inconsequential.

Strategies such as Lean and Six Sigma are examples of helpful strategies for improvement. Lean is a production practice that considers the expenditure of resources for any goal other than the creation of value for the end customer to be wasteful, and thus a target for elimination.[6] Six Sigma seeks to improve the quality of process outputs by identifying and removing the causes of defects (errors) and minimizing variability in manufacturing and business processes[7].

The overall organization of laboratory services in the province is also an important consideration. Review of the range of services provided at each site could serve several purposes including improvements in service sustainability and quality, but could also improve MLT recruitment and retention. There may be opportunities to better match resources to the demand i.e. balance workload between busy urban centres and quiet rural centres. Caution is noted that physician recruitment and retention may be linked to the availability of local laboratory testing.

Gains realized through improved utilization of laboratory staff are not incorporated directly into the model. Any gains in this area can easily be redirected into improving services.

7. Supply

For the purpose of this document, supply is defined as:

Supply: Source of qualified workers.

Qualified MLT personnel can be new graduates or experienced people. Either can originate from within the province or externally.

7.1. Internal

As with many health occupations, Newfoundland and Labrador depends heavily on our own supply of MLT graduates.

The College of the North Atlantic Health Sciences Programs has maintained a "first come first admitted" admissions policy for many years. The reasoning behind this policy, and the year of its origin, remain unclear. In this arrangement, a single waiting list is maintained for entry into the common first year for three health sciences programs: Medical Laboratory Sciences, Medical Radiography, and Respiratory Therapy. The wait time to enter the common first year is between two and three years.

[6] Source: http://en.wikipedia.org/wiki/Lean_manufacturing Downloaded February 10, 2011.
[7] Source: http://en.wikipedia.org/wiki/Six_Sigma Downloaded February 10, 2011.

At the end of the common first year, students declare preferences and a competitive process place them in one of the three programs. Historically, the majority of students in first year (capacity 80) favoured the Medical Radiography Program (capacity 14) and the Respiratory Therapy Program (capacity 12) yet the majority of the capacity rests with the Medical Laboratory Sciences Program (capacity 30). Unfortunately this has resulted in many students entering the Medical Laboratory Sciences Program as their second or third preference. Although no evidence is readily available, it is strongly suspected that this contributes to high attrition rates from the program, detailed later in this section. The acceptance of advance-standing students into the Medical Laboratory Sciences Program has helped to fill seats left by those who do not complete the program.

To correct the situation, applicants to the common first year, starting in January 2010, must now declare their program preference. This has effectively changed the wait list from a single line to three lines, although it will take two years to work through the existing single-file wait list which was 197 individuals on February 1, 2011. On the same date, the new Medical Laboratory Sciences wait list was 69 individuals. A portion of these applicants will likely start first year in 2013 and graduate in 2015.

Applicants must meet minimum entry requirements however the application process remains non-competitive. Annex A shows a comparison of admission requirements for Medical Laboratory Sciences Programs in Canada. This comparison shows there are just two “first come first admitted” programs in Canada: Manitoba and Newfoundland and Labrador, out of a total of 15 programs. Nova Scotia also has a “first come first admitted” process but applicants must also do a tour of a medical laboratory and submit a report before final acceptance.

Past and projected patterns of seat capacity and new graduates are shown in Table 10:

Table 10. Medical Laboratory Sciences Program: Capacity and Graduates.

Year Graduate	Seat Capacity	Graduates	Notes
2015	30	26	Projection
2014	30	23	
2013	30	23	
2012	30	22	
2011	30	23	
2010	30	20	Confirmed
2009	30	22	
2008	30	22	
2007	27	11	
2006	27	20	
2005	27	22	
2004	27	30	
2003	27	18	
2002	25	19	
2001	25	13	
2000	25	20	
1999	25	23	
1998	25	23	
1997	25	17	
1996	25	19	
1995	25	15	
1994	25	23	
1993	25	13	
1992	25	27	
Average (1992 to 2009)	**26.1**	**19.8**	

Source: College of the North Atlantic March 29, 2010.

Average attrition from the program is 24 per cent. Given a current capacity of 30 seats, average output is 23 graduates. Recent changes as described mean students now declare program preference upon application to the common first year and for the purpose of the model it is assumed this will eventually reduce program attrition to 15 per cent, although it will take two to three years to work through the current wait list, and a further three years to work through the full duration of the program. It is estimated then that the benefit (26 graduates as opposed to the usual average of 23 graduates) will be realized in 2015 and thereafter.

Considering the total cost to run the Medical Laboratory Sciences Program, and the capacity to provide 30 graduates annually, the cost per potential graduate annually is estimated at $35,000 each year. Existing program attrition accounts for a loss of approximately seven graduates annually therefore the total cost of attrition in terms of unused capacity is about $245,000 each year.

It is important to note that $35,000 per graduate is a preliminary estimate of the cost per graduate at full program capacity, considering three years of investment in each student. The purpose of the figure is to quantify the total lost investment. It is not an estimate of the incremental cost of new seats because new seat capacity could rely in part or wholly on existing infrastructure, administration, student services, etc.

Medical laboratory science is complex work that directly impacts patient care. Advances in technology, more complicated testing procedures and the importance of maintaining strict quality standards means only those suited to the practice of laboratory sciences should be admitted to the program. In addition to application process changes already implemented, the working group recommends raising minimum academic standards and the introduction of a screening/ranking process to ensure the appropriate individuals are admitted to the program. Such a process would determine the applicant's general suitability to the profession. Equitable access to educational programs is a laudable goal however the absence of any measure of applicant capacity for the program or suitability to the work environment means many students may be investing years of effort before realizing they are incompatible with the study and practice of laboratory sciences. An ideal approach would involve a detailed analysis of the all factors contributing to student attrition and recommendations for addressing the root causes. The cost, as well as the implications of delayed action, associated with such an approach, would have to justify the value of the knowledge gained.

Existing training capacity has several constraints including availability of faculty, support staff, laboratory space and equipment, clinical placements, and related funding. The addition of Clinical Educators in RHAs could increase the availability of clinical placements, relieve some of the pressure on existing employees involved with placements, and improve students' learning experiences.

Preliminary discussions with the College of the North Atlantic indicate the possibility of increasing capacity by accepting a one-time "second cohort" of students. In this scenario, up to 15 advanced-standing students could start as early as January 2012 in the second year of the three-year program, graduating in October 2013, in time for the CSMLS certification exam. This scenario is possible because classroom and placement times are staggered with the regular stream of students.

The College of the North Atlantic, working closely with RHAs, would require six months of preparation prior to January 2012 to plan for a second cohort of students. A decision to proceed would therefore be required before July 2011. Preliminary estimates are that two to three additional faculty and one additional support person would be required. This scenario could be periodically repeated in response to projected need for MLTs.

Data on source of past hires by RHAs was collected for three calendar years. Data are shown in Table 11:

Table 11. Historical Source of New Hires in Regional Health Authorities.

All Hires (Jan. 2008 to Nov. 2010)	Classification	New Graduate			Experienced MLT			Totals
	MLT I, II, III, or Manager	College North Atlantic (internal) A	Program Outside NL (external) B	Program Outside Canada (external) C	Resident NL (internal) D	Resident Other Province/ Territory (external) E	Resident Outside Canada (external) F	
Eastern Health	Three -Year Total	26	4	0	17	7	0	54
	Annual Average	**9**	**1**	**0**	**6**	**2**	**0**	**18**
Central Health	Three -Year Total	22	1	0	12	3	0	38
	Annual Average	**8**	**0**	**0**	**4**	**1**	**0**	**13**
Western Health	Three -Year Total	13	2	0	8	0	0	23
	Annual Average	**4**	**1**	**0**	**3**	**0**	**0**	**8**
Lab.-Grenfell Health	Three -Year Total	5	1	0	4	10	0	20
	Annual Average	**2**	**0**	**0**	**1**	**3**	**0**	**7**
Totals	Three -Year Total	66	8	0	41	20	0	135
	Annual Average	**23**	**3**	**0**	**14**	**7**	**0**	**46**

Table 11 shows 66 new graduates were hired from the College of the North Atlantic from 2008 to 2010 (column A) while Table 10 show there were 64 new graduates in the same time period. RHA data may include new graduates from previous years. Acknowledging data comparability issues, the retention of new graduates is quite high, and for the purposes of this report it is assumed to be 90 per cent.

Another source of internal supply includes those who originate from within the province but are not new graduates. Turnover figures presented in earlier sections include those who may exit the workforce to raise a family, care for another person, or some other reason. Often these people will return to the workforce after an absence and must be considered in supply figures.

Data provided in column D represents the hiring of experienced MLTs who were residing in the province at the time of hiring. These hires averaged 14 annually. These data include the hiring of retirees who are an important group for sustaining services and providing coverage; however they are not a reliable long-term source of employees. Evidence from Eastern Health and Western Health indicated that almost 50 per cent of this group were retired individuals returning to the workplace at the request of the RHA.

The figure used in the workforce model for internal supply, excluding new graduates, is 10 individuals annually. This aligns with modeling exercises for other occupations, (including Registered Nurses of which an estimated 1.8 per cent of the overall workforce "reentering" employment after an absence). This figure of 10 assumes there will be a steady annual internal supply of eight and a continual "refolding" of two retirees into the system that are likewise reflected as two or more separations in the turnover figures (i.e. when an employee retires they are included in the turnover figures, and when rehired and subsequently separate again, this is also reflected in the turnover data, inflating the figure slightly). In other words, the turnover data is likely slightly overstated, and rather than attempting to correct it, the supply is adjusted slightly to reflect a modest portion of these entries.

7.2. External

Table 11 shows that hires of new graduates or experienced MLTs from outside of Canada are unlikely (columns C and F). The model assumes this is not a viable source of supply.

Anecdotal evidence from Working Group members suggests there may be opportunities to recruit internationally trained laboratory professionals. This option should be explored however it is necessary to recognize ethical considerations for the recruitment of health professionals from other countries and secondly to establish provincial mechanisms for accessing foreign credentials, before undertaking international recruitment. Provincial mechanisms must also consider implications for labour mobility as per the Canadian Agreement on Internal Trade[8].

Table 11 also shows (column E) that the province has recruited an average of seven experienced MLTs annually from outside the province. Labrador-Grenfell Health has relied heavily on external supply of experienced MLTs, at an average of three annually.

Finally, column B shows that an annual average of three new graduates from programs outside of the province have been hired annually.

An average of 10 individuals recruited externally by RHAs, representing three new graduates and seven experienced MLTs annually , is assumed to be a fair estimate for what can be expected in future years. Data provided in Table 11 is limited to RHA hires, and it was noted in Section 5.1 that RHAs represent 90 per cent of the provincial MLT workforce. It is reasonable to assume that those employers other than RHAs also seek some external supply. To account for this, one individual is added to the ten recruited annually, and the total assumed external supply used in the model is 11 annually.

Over the past three years, external recruitment postings data show a consistent need for MLTs:

Table 12. MLT and Combined LX Technologist Vacancies.

Occupation	2008/2009		2009/2010		2010/2011		Average
	Apr.	Oct.	Apr.	Oct.	Apr.	Oct.	
MLT	8	23	9	19	9	7	13
Combined LX Technologist	0	3	2	4	5	6	3

In October 2010, there was one Combined LX Technician vacancy (posted as a Combined Technologist vacancy, and included in figures in Table 12). Given the small number of Combined LX Technologists and Technicians and their wide distribution throughout rural areas of the province, any vacant positions usually mean localized shortages and pressure on remaining employees to maintain services. Vacancy surveys show that of all health occupations in the province, Combined LX Technologists have the second highest vacancy rate averaged over the past three years, at 18 per cent. For the purposes of this report, the average number of vacant positions is not factored into the workforce model.

[8] More information available at http://www.ait-aci.ca/index_en.htm.

8. Workforce Model

Table 13. Medical Laboratory Technologist Supply and Demand Projections 2011 to 2023.

YEAR	WORKFORCE	*DEMAND*				*SUPPLY*				*PROJECTED GAP (In each year)*
		Expansion	Replacement	Incremental Retirements	**Total Demand**	New Graduates Retained (Internal)	Experienced Re-entering (Internal)	Experienced and New Graduates (External)	**Total Supply**	
Reference:	*Section 5.6 Page 9*	*Section 6.2 Page12*	*Section 6.1 Page 9*	*Section 6.1 Page 9*		*Section 7.1 Page 17*	*Section 7.1 Page 17*	*Section 7.2 Page 22*		
2010	586	-	-	-	**-**	-		-	**-**	
2011	598	12	37	0	**49**	21	10	11	**42**	***-7***
2012	610	12	38	0	**50**	20	10	10	**41**	***-9***
2013	622	12	39	0	**51**	21	11	11	**42**	***-9***
2014	634	12	39	0	**52**	21	11	11	**42**	***-9***
2015	647	13	40	0	**53**	23	11	11	**45**	***-7***
2016	660	13	41	0	**54**	23	11	11	**46**	***-8***
2017	673	13	42	0	**55**	23	11	11	**46**	***-9***
2018	687	13	43	0	**56**	23	12	12	**47**	***-9***
2019	700	14	43	0	**57**	23	12	12	**47**	***-10***
2020	714	14	44	0	**58**	23	12	12	**48**	***-11***
2021	729	14	45	0	**59**	23	12	12	**48**	***-11***
2022	743	15	46	0	**61**	23	13	13	**49**	***-12***
2023	758	15	47	0	**62**	23	13	13	**49**	***-13***

Caution is noted that emphasis should not be placed on exact figures as the model uses trends and averages. Assumptions are made such that resulting estimates may be considered slightly optimistic. Therefore the summary presented in Table 13 may also be considered slightly optimistic.

9. Conclusions

- Medical Laboratory Technologists and Laboratory Technicians are highly skilled individuals having multiple specialized areas of practice and a direct impact on the quality of patient care.
- The workforce is widely distributed throughout the province with many positions in rural and remote areas.
- Attracting qualified applicants to positions in rural and remote areas, positions requiring specialized training and/or experience, and management positions has proven challenging for Regional Health Authorities.
- Strong continued growth in workforce size may be expected.
- Data suggests retirement trends have peaked, however a large number are currently eligible for retirement and may be waiting for the last in a series of wage increases to maximize pension amounts.
- A significant number of retired workers are being rehired to sustain services, especially in rural and remote areas.
- Regulations under development under the *Health Professions Act* may have a significant impact on the workforce and the services they provide.
- There are significant opportunities to improve laboratory productivity through stronger laboratory utilization management and improved workforce utilization.
- Current supply is not meeting provincial demand. A gap of about seven Medical Laboratory Technologists is estimated for 2011, growing slowly but steadily to 11 over the next decade. This is the *annual recurring gap* between the supply of qualified workers and employer's needs.

In conclusion:

> *The current supply of Medical Laboratory Technologists is not meeting employers' needs. This gap is expected to widen in the next decade. Multiple strategies are required to correct the imbalance, including increasing the supply of qualified workers and improving laboratory productivity. Several contributing factors add urgency to the need for quick action to stabilize the workforce.*

The 15 recommendations that follow are grouped into four strategic directions to 1) Manage Demand, 2) Increase Internal Supply, 3) Increase External Supply, 4) Improve Planning.

10. Recommendations

Recommendation 1 Manage Demand.

1.1 Review the range of services provided at each site and the possibility of balancing work between sites to achieve stronger, consistent practices and potential economies of scale.

1.2 Investigate potential improvements in workforce utilization through initiatives to address scope of practice, team mix, deployment and other factors.

1.3 Develop and implement a provincial approach to Laboratory Utilization Management to possibly reduce unnecessary testing, and improve quality of care.

1.4 Re-engineer laboratory-related processes to achieve potential increases in efficiency.

Recommendation 2 Increase Internal Supply.

2.1 The College of the North Atlantic consider raising admission standards to the Medical Laboratory Sciences Program, to reflect current practices across Canada, including higher minimal academic requirements and the introduction of a screening/ranking scheme that determines the applicant's general suitability to the profession.

2.2 College of the North Atlantic partner with Regional Health Authorities to develop proposals to increase the number of graduates from the Medical Laboratory Sciences Program.

2.3 Maintain high rates of new graduate retention and encourage new graduates to accept difficult-to-fill positions by offering targeted incentives, permanent full-time positions, and other recruitment and retention strategies.

2.4 Establish full-time Clinical Instructor positions in each RHA and provide funding for students that encourages clinical placements in rural and remote areas. For example, modest housing and/or travel allowances.

2.5 Provide salary continuation for potential students (current employees of Regional Health Authorities) of the Combined LX program at the College of the North Atlantic during 24-week clinical placements.

Recommendation 3 Increase External Supply.

3.1 Strengthen external recruitment through targeted signing bonuses and other methods.

3.2 Establish formal arrangements and partnerships with educational programs only available outside of the province, to address specialty training requirements.

3.3 Establish bursaries and other supports for students undertaking specialized training through educational programs only available outside of the province.

3.4 Explore opportunities for the recruitment of Medical Laboratory Technologists trained abroad, within the World Health Organization's "International recruitment of health personnel: global code of practice". Do not pursue external recruitment opportunities until legislation for licensing and regulation of Medical Laboratory Technologists is fully implemented, to ensure processes for the assessment of MLT competencies are in place.

Recommendation 4 Improve Planning.

4.1 Refresh data and re-evaluate workforce supply and demand trends each two to three years.

4.2 Undertake targeted succession planning for all positions, starting with management, and employees with specialized training/experience.

Recommendations on managing demand are primarily long-term and could have a profound effect on future requirements for MLTs and the sustainability of laboratory services. Recommendation 2.1 is a policy change that could have a significant impact with little or no associated cost.

Annex A: Admission Requirements for Medical Laboratory Sciences Programs in Canada

Compiled by Robin Power, College of the North Atlantic. Source: Educational institutions websites, Canadian Association of Medical Laboratory Educators (CAMLE) and email correspondence.

The following is not a comprehensive listing of admission requirements and is intended to only show the general variety of requirements among programs across Canada.

Number	Program	Admission Requirements
1	College of the North Atlantic, NL	60% average to enter. First come first admitted.
2	Winnipeg, MB	First come first admitted.
3	Community College, NS	First come first admitted. 70% to 80% average to enter. Must complete a tour of a medical laboratory and submit a written report about their visit.
4	Community College, NB	High School Diploma. First come, first admitted but because we have limited seats, we are oversubscribed. On the first day applications are examined, all that are ranked by marks. If seats are not filled after Nov. 1, it is back to first come, first admitted.
5	Michener, ON	Ranked by academic grades. This remaining pool of applicants then goes through the MMI process which is currently used by many universities to select candidates for medical school. It is similar to a bell-ringer test, where the candidate rotates through 7 different stations.
6	Windsor, ON	Ranked based on grades.
7	Kingston, ON	Ranked based on grades.
8	Sudbury, ON	Ranked based on grades if oversubscribed.
9	Oshawa, ON	Ranked based on grades.
10	Saskatoon, SK	Phase II: Admission requirements worth = 30% Written career investigation = 30% Interview = 40%.
11	University of Alberta AB	Ranked based on grades.
12	Southern Alberta Institute of Technology, AB	Ranked based on grades and interview.
13	Northern Alberta Institute of Technology (NAIT), Edmonton, AB	Academics 35%, Career Investigation 25%, Interview 40%.
14	Prince George, BC	Academic requirements Written career investigation report, Short listed then interviewed.
15	BCIT, BC	Resume, letter of intent (approximately 500 words), detailing the applicant's career goals, etc., applicants must sign a Program Requirements Form. Short-listed applicants will be required to attend a laboratory tour arranged by BCIT. Applicant completes a questionnaire. This questionnaire returned to BCIT and scored by the Admissions committee.