

# Medical Laboratory Technologists and Their Work Environment



Canadian Institute  
for Health Information

Institut canadien  
d'information sur la santé

## Who We Are

Established in 1994, CIHI is an independent, not-for-profit corporation that provides essential information on Canada's health system and the health of Canadians. Funded by federal, provincial and territorial governments, we are guided by a Board of Directors made up of health leaders across the country.

## Our Vision

To help improve Canada's health system and the well-being of Canadians by being a leading source of unbiased, credible and comparable information that will enable health leaders to make better-informed decisions.

# Table of Contents

Preface. . . . .	v
Acknowledgements . . . . .	vi
Highlights. . . . .	viii
Introduction . . . . .	1
What We Know About Medical Laboratory Technologists in 2008. . . . .	5
1.1 What Is a Medical Laboratory Technologist? . . . . .	6
1.2 What Does the Regulatory Environment of the Medical Laboratory Technology Profession Look Like Across Canada? . . . . .	6
1.3 What Is the Supply of Medical Laboratory Technologists? . . . . .	8
1.4 What Is the Demographic Composition of Medical Laboratory Technologists. . . . .	13
1.5 What Is the Educational Path to Enter the Profession of Medical Laboratory Technology? . . . . .	18
1.6 In Which Settings Do Medical Laboratory Technologists Work? . . . . .	25
The Hospital Work Environment for Medical Laboratory Technologists . . . . .	35
2.1 Introduction . . . . .	36
2.2 Why Focus Primarily on the Work Environment of Hospital Clinical Laboratories for Medical Laboratory Technologists? . . . . .	37
2.3 What Is the Role of Clinical Laboratories Within the Hospital Environment and What Are Their Financial and Statistical Reporting Requirements? . . . .	38
2.4 What Does a Clinical Laboratory Setting Encompass? . . . . .	41
2.5 What Was the Cost of Delivering Health Services in Hospitals in 2008 and the Cost of the Resources Consumed by the Clinical Laboratories to Deliver Those Services? . . . . .	44
2.6 What Are the Compensation Expenses in Hospital Clinical Laboratories? . .	45
2.7 What Are the Details of Compensation in Hospital Clinical Laboratories? . .	48
2.8 What Does Medical Laboratory Technologist Staffing Look Like in Hospital Clinical Laboratories? . . . . .	51
2.9 What Comprises Clinical Laboratory Workload in Hospitals? . . . . .	53
Methodological Notes . . . . .	57
Methodological Notes: Part 1 of Report . . . . .	58
Methodological Notes: Part 2 of Report . . . . .	73

Appendix A—Regulation Status of Provinces and Territories, 2008. . . . . 82

Appendix B—Data Providers for the MLTDB. . . . . 83

Appendix C—Twelve-Month Registration Periods, by Province or the  
Territories, 2008–2009 . . . . . 84

Appendix D—Identification of Primary/Secondary Registrations. . . . . 85

Appendix E—Medical Laboratory Technologist Records Where Data Is Not  
Collected and Percentage of Records With Unknown Responses,  
by Data Element and Province or Territory of Registration,  
Canada, 2008 . . . . . 86

References . . . . . 91

## Figures and Tables

Table 1	Number of Active Registered Medical Laboratory Technologists, by Province and Territories, 1999 to 2007 . . . . .	9
Diagram 1	Defining the Total Registered Medical Laboratory Technologist Workforce From the CIHI MLTDB, 2008 . . . . .	11
Table 2	Number and Composition of Registered Medical Laboratory Technologist Workforce, by Province or Territories of Registration, 2008 . . . . .	12
Figure 1	Percentage Distribution of Medical Laboratory Technologist Workforce in the Regulated Provinces, by Five-Year Age Groups, 2008 . . . . .	13
Figure 2	Average Age of Medical Laboratory Technologist Workforce Among Regulated Provinces, by Province, 2008 . . . . .	14
Figure 3	Average Age of the Workforce for Selected Health Care Providers in Regulated Provinces, 2008 . . . . .	15
Figure 4	Percentage Distribution of Medical Laboratory Technologist Workforce Among the Regulated Provinces, by 10-Year Age Groups and Province, 2008 . . . . .	16
Figure 5	Number and Percentage Distribution of Medical Laboratory Technologist Workforce, by Gender, Selected Regulated Provinces, 2008 . . . . .	17
Table 3	Provinces That Offer Accredited Educational Programs by Medical Laboratory Technology Discipline, 2008 . . . . .	18
Table 4	Number of Graduates of Canadian Medical Laboratory Technology Accredited Educational Programs, by School of Graduation, 2005 to 2008 . . . . .	19
Figure 6	Level of Basic Education in Medical Laboratory Technology for the Medical Laboratory Technologist Workforce, Selected Regulated Provinces, 2008 . . . . .	20
Table 5	Number of Medical Laboratory Technologist Candidates Who Obtained CSMLS General Certification for the First Time, by Location of Residence, 2005 to 2008 . . . . .	22
Table 6	Number of Medical Laboratory Technologist Candidates Who Obtained CSMLS Certification for the First Time, by Location of Residence and Area of Certification, 2008 . . . . .	23
Figure 7	Percentage Distribution of Medical Laboratory Technologists, by First Certification Area, Selected Provinces and Territories, 2008 . . . . .	24
Figure 8	Place of Primary Employment of Medical Laboratory Technologist Workforce, Selected Regulated Provinces, 2008 . . . . .	25
Figure 9	Place of Primary Employment of Medical Laboratory Technologist Workforce, Selected Regulated Provinces, 2008 . . . . .	26
Figure 10	Place of Primary Employment of Medical Laboratory Technologist Workforce, by Gender, Selected Regulated Provinces, 2008 . . . . .	27

Figure 11	Positions for Primary Employment of Medical Laboratory Technologist Workforce, Selected Regulated Provinces, 2008 . . . . .	28
Figure 12	Positions for Primary Employment of Medical Laboratory Technologist Workforce, by Selected Regulated Provinces, 2008 . . . . .	29
Figure 13	Positions for Primary Employment of Medical Laboratory Technologist Workforce, by Gender, Selected Regulated Provinces, 2008 . . . . .	30
Figure 14	Number and Percentage Distribution of Medical Laboratory Technologist Workforce, by Full-Time/Part-Time Status for Primary Employment, Selected Regulated Provinces, 2008 . . . . .	31
Figure 15	Number and Percentage Distribution of Medical Laboratory Technologist Workforce, by Age Group and Full-Time/Part-Time Status for Primary Employment, Selected Regulated Provinces, 2008 . . . . .	32
Figure 16	Number and Percentage Distribution of Medical Laboratory Technologist Workforce, by Gender and Full-Time/Part-Time Status for Primary Employment, Selected Regulated Provinces, 2008 . . . . .	33
Figure 17	Laboratory Compensation as a Percentage of Total Laboratory Expenses, by Selected Provinces, 2007–2008 . . . . .	46
Figure 18	Worked, Benefit and Benefit Contribution Compensation as a Percentage of Total Laboratory Compensation, Selected Provinces and Territories, 2007–2008. . . . .	49
Figure 19	Laboratory Percentage of Unit-Producing Personnel Earned Hours for Medical Laboratory Technologists by Employment Status (Full Time, Part Time and Casual), Selected Provinces, 2007–2008 . . . . .	51
Figure 20	Total Service-Recipient Inpatient Workload as a Percentage of Total Service-Recipient Workload, Selected Provinces and Territories, 2007–2008. . . . .	54
Appendix A	Regulation Status of Provinces and Territories, 2008. . . . .	82
Appendix B	Data Providers for the MLTDB. . . . .	83
Appendix C	Twelve-Month Registration Periods, by Province or the Territories, 2008–2009 . . . . .	84
Appendix D	Identification of Primary/Secondary Registrations. . . . .	85
Appendix E	Medical Laboratory Technologist Records Where Data Is Not Collected and Percentage of Records With Unknown Responses, by Data Element and Province or Territory of Registration, Canada, 2008. . . . .	86

## Preface

The Canadian Institute for Health Information (CIHI) collects and analyzes information on health and health care in Canada and makes it publicly available. Canada's federal, provincial and territorial governments created CIHI as a not-for-profit, independent organization dedicated to forging a common approach to Canadian health information. CIHI's goal: to provide timely, accurate and comparable information. CIHI's data and reports inform health policies, support the effective delivery of health services and raise awareness among Canadians of the factors that contribute to good health.

To fulfill its goal, CIHI coordinates and promotes national health information standards and health indicators, develops and manages databases and registries, commissions and facilitates population health research and analysis, coordinates and develops education sessions and conferences, and produces and disseminates health information research and analysis. The Medical Laboratory Technologist Database (MLTDB) and the Canadian MIS Database (CMDB) are two of the databases developed and maintained by CIHI. The MLTDB contains the administrative information for registered medical laboratory technologists across the country; the CMDB records financial and statistical information based on a standardized chart of accounts, applying general accounting principles and procedures, workload measurement systems, service activity statistics and indicators that support management decision-making in health service organizations. The information in the CMDB can potentially be used to cost the activities of health service organizations and forms the basis of management reporting, including annual general purpose financial statements, financial ratio analysis and operational budgeting. Although the two databases may have a different focus, CIHI made every effort in this report to examine the relevant information from both databases in order to better inform health human resources planning and management in Canada.

Any questions or requests regarding this publication or the MLTDB should be directed to

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- Prince Edward Island Society of Medical Laboratory Technologists
- Nova Scotia College of Medical Laboratory Technologists
- New Brunswick Society of Medical Laboratory Technologists
- Ordre professionnel des technologistes médicaux du Québec
- College of Medical Laboratory Technologists of Ontario
- College of Medical Laboratory Technologists of Manitoba
- Saskatchewan Society of Medical Laboratory Technologists
- Alberta College of Medical Laboratory Technologists
- British Columbia Society of Laboratory Science
- Canadian Society for Medical Laboratory Science

CIHI wishes to acknowledge and thank the following expert advisory group, which facilitated the collection and reporting of comparative financial and statistical data to the Canadian MIS Database (CMDB) by implementing and supporting the *Standards for Management Information Systems in Canadian Health Service Organizations* (MIS Standards):

- MIS Technical Working Group

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We wish to extend our thanks and gratitude to all medical laboratory technologists who work with Canadians to improve their quality of life.

## Highlights

This report provides information on registered medical laboratory technologists in Canada and their work environment. Based on both the first-year data collected in CIHI's Medical Laboratory Technologist Database (MLTDB) and data from the Canadian MIS Database (CMDB), this report provides information on medical laboratory technologists as a distinct health care provider group and their work environment in public-sector hospital clinical laboratories. The report is divided into two sections: Part 1 contains information on the supply, demographics, education, certification and employment characteristics of medical laboratory technologists in 2008. Part 2 of the report provides an overview of the medical laboratory technologist work environment based on data for fiscal year 2007–2008, drawn from the CMDB. This is the first report of its kind to provide comprehensive information for the medical laboratory technology profession.

### Highlights for Part 1: Medical Laboratory Technologist Database

#### **Supply, Demographics, Education, Certification and Employment Characteristics of Medical Laboratory Technologists in 2008**

- In 2008, the profession of medical laboratory technology was regulated in seven Canadian provinces: Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and Alberta. The profession was not regulated in the remaining jurisdictions: Newfoundland and Labrador, Prince Edward Island, British Columbia, the Yukon, the Northwest Territories and Nunavut.
- In 2008, there were 19,043 registered medical laboratory technologists who were employed and working in medical laboratory technology in Canada. Due to voluntary registration in non-regulated jurisdictions (Newfoundland and Labrador, Prince Edward Island, British Columbia, the Yukon, the Northwest Territories and Nunavut), this total supply does not represent all medical laboratory technologists who worked in Canada.
- More than 85% of the registered medical laboratory technologists working in 2008 were female.
- Medical laboratory technologists working in seven regulated provinces—Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and Alberta—in 2008 had an average age range of 39 to 47. Half of them were older than 46 and half were younger.

- In the selected provinces of New Brunswick, Quebec, Manitoba and Alberta, most medical laboratory technologists had a diploma in medical laboratory technology (91%).
- From 2005 to 2008, more than 2,000 medical laboratory technologist candidates passed the national exams for general certification offered by the Canadian Society for Medical Laboratory Science (CSMLS) and received their certification for the first time.
- In these regulated provinces, except for Quebec, 35% to 41% of the workforce fell into the “near retirement” age group (age 45 to 54) and became the largest cohort of defined 10-year age groups as of 2008. Quebec had a relatively young workforce, with only 26% of the workforce in this age group.
- In 2008, medical laboratory technologists who were 45 years and older accounted for 54% of the medical laboratory technologist workforce in all regulated provinces. This means that more than half of the current workforce in these provinces could potentially retire in 10 years.
- In 2008, most medical laboratory technologists in New Brunswick, Quebec, Ontario and Alberta worked in general hospital clinical laboratories (74.6%) as their primary employment, with noticeable variation in each province.
- Across the selected provinces of New Brunswick, Quebec, Ontario, Manitoba and Alberta, the percentage of full-time medical laboratory technologists for primary employment ranged from just more than half to three-quarters of the workforce in 2008. Older medical laboratory technologists tended to have a higher proportion of full-time jobs (nearly 70%) compared with their younger peers; only 45.5% of the workforce younger than 35 worked on a full-time basis for their primary employment.

## Highlights for Part 2: Canadian MIS Database

### **Compensation Expense, Earned Hours and Workload in Public-Sector Hospitals; Medical Laboratory Technologists' Work Environment in Hospital Clinical Laboratories**

- Compensation expense is but one component of the total clinical laboratory expenses in public-sector hospitals; nevertheless, it is a major component of all expenses. In fiscal year 2007–2008, for the selected provinces of Nova Scotia, New Brunswick, Ontario, Alberta and B.C., the average percentage of public-sector hospital clinical laboratory expenses related to compensation varied from 58.8% in New Brunswick to 68.7% in B.C.
- Compensation expense includes worked, benefit and benefit contribution expenses. For all provinces and territories except Quebec and Nunavut, the average percentage of total clinical laboratory compensation in expenses related to worked compensation in public-sector hospitals varied from 66.5% in the Yukon to 76.2% in Manitoba in the fiscal year 2007–2008, suggesting that the compensation for benefits varied from 23.8% to 33.5%.

- For the selected provinces of New Brunswick, Ontario and B.C. for fiscal year 2007–2008, the majority of hours worked by clinical laboratory unit-producing personnel in public-sector hospitals were full time, with Ontario having the highest percentage of earned hours that were full time, at 80%. In terms of part-time and casual hours, B.C. had the highest percentage, at 33% and 10%, respectively.
- In fiscal year 2007–2008, for the selected provinces and territory of Newfoundland and Labrador, Nova Scotia, New Brunswick, Ontario, Manitoba, Saskatchewan, B.C. and the Yukon, the clinical laboratory workload that was attributed to inpatient service recipients in public-sector hospitals ranged from 15.8% to 31.8%, indicating that most of these services were delivered on an outpatient basis.

## Introduction

The Health Human Resources and MIS and Costing teams at CIHI are pleased to present *Medical Laboratory Technologists and Their Work Environment*.

CIHI has developed five new databases to further its contribution to the picture of health human resources in Canada. The introduction of the five new databases occurred in phases, with the Occupational Therapist and Pharmacist databases becoming operational in 2006, and the Physiotherapist Database in 2007. The Medical Laboratory Technologist Database (MLTDB) and Medical Radiation Technologist Database (MRTDB) both became operational in 2008, thanks to the participation of the provincial regulatory bodies, provincial professional societies/associations and the national professional society/association. Data in the MLTDB is compiled and submitted by the provincial regulatory bodies and the Canadian Society for Medical Laboratory Science (CSMLS) according to the data submission standards and available administrative information of their members. Since medical laboratory technologists are not regulated in Newfoundland and Labrador, Prince Edward Island, British Columbia, the Yukon, the Northwest Territories and Nunavut, the CSMLS provided membership data for medical laboratory technologists in these jurisdictions for 2008. If a medical laboratory technologist from these jurisdictions was not a member of the CSMLS, the information for this individual was not included in the MLTDB and thus will not be included in this publication.

The Canadian MIS Database (CMDB) is the national data source for financial and statistical information about hospitals and health regions. The data is collected according to a standardized framework for collecting and reporting financial and statistical data on the day-to-day operations of health service organizations. The framework is known as the *Standards for Management Information Systems in Canadian Health Service Organizations* (MIS Standards).

Currently, most information in the CMDB is specific to hospitals. A hospital is broadly defined as an institution where patients are accommodated on the basis of medical need and are provided with continuing medical care and supporting diagnostic and therapeutic services and which is licensed or approved as a hospital by a provincial/territorial government or is operated by the government of Canada. Hospital types in the CMDB are specified as follows: general hospital, pediatric hospital, cancer treatment hospital, psychiatric and substance abuse hospital, other specialty hospital, rehabilitation hospital and extended care hospital (including chronic). In provinces and territories where hospitals are part of a regional health authority, regional data is also submitted, providing a complete picture of health services for that region. Statistical data is also collected and includes the number of earned hours, client visits and beds staffed and in operation.

The variables and concepts used to capture information in the CMDB are based on the MIS Standards. The MIS Standards are a comprehensive set of standards used to report management information that is ultimately submitted to the CMDB and is related to staffing, costs, workload and provision of services. The MIS Standards are designed to apply across the continuum of services, ranging from hospitals to community-based health service organizations, providing a framework to generate, maintain and analyze information required for effective decision-making and accountability.

Based on both the first-year data collected in the MLTDB and data from the CMDB, this report provides information on both medical laboratory technologists and the profession as a distinct health care provider group. Specifically, the first part of this report contains information on the supply, demographics, education, certification and employment characteristics of medical laboratory technologists in 2008. In the second part of this report, supplemental information compiled from the CMDB provides a greater understanding on the work environment in hospitals related to the profession of medical laboratory technology. One employment characteristic that is illustrated in Part 1 of this report is workplace of primary employment. In this section, the four provinces of New Brunswick, Quebec, Ontario and Alberta provide primary employment information. According to the data presented on these four provinces, most medical laboratory technologists are employed in a general hospital clinical laboratory setting. In addition, based on 2008 supply information presented in Part 1, registered medical laboratory technologists for these four selected provinces represented just more than 70% of the total registered workforce. Part 2 of this report focuses on this work environment.

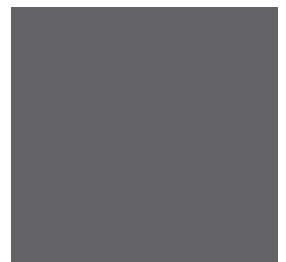
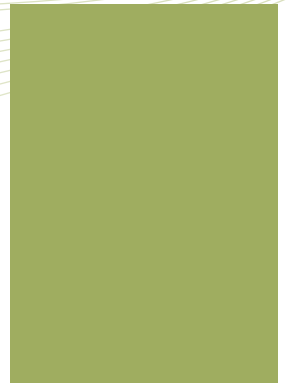
## Data Limitations

It is important to note data limitations pertaining to this report. Many factors—such as voluntary registration with the CSMLS in the non-regulated jurisdictions (Newfoundland and Labrador, Prince Edward Island, British Columbia, the Yukon, the Northwest Territories and Nunavut), unidentifiable Employment Status, CIHI identification of primary/secondary registration methodology, and the point-in-time data collection framework—may result in data quality issues (for example, under- or over-coverage) for the information presented in Part 1 of this report. Some of these factors may contribute to discrepancies between the data in this report and data presented by other organizations.

In Part 2 of this report, the MIS data pertains to the fiscal year 2007–2008 and comprises only the financial and statistical data from submitting hospitals whose data is housed in the CMDB. Data from Quebec and Nunavut was excluded, as was data from all private/community laboratories, as these organizations do not submit data to the CMDB at this time. Additionally, public health laboratories' data may or may not be included, depending on whether the services are performed in the hospital or in a stand-alone laboratory. It should be noted that although Quebec has not endorsed or adopted the MIS Standards, the province does submit data to CIHI based on a slightly different standard, the *Manuel de gestion financière*, which may be mapped to similar MIS-based accounts. At this time, Quebec data is not included in this report. The indicator values presented were calculated from CMDB data. The ability to calculate accurate indicator values is dependent on the provision of accurate financial and statistical data in the jurisdictions' data submissions to the CMDB. As with any database, the CMDB contains some data quality issues, such as the reporting of data that does not meet the CMDB's minimum reporting requirements and the inconsistent reporting of some statistical data elements across jurisdictions. In some cases, these issues prevented the reporting of comparative indicators from all jurisdictions for this report.







# Part 1

What We Know About  
Medical Laboratory  
Technologists in 2008

## 1.1 What Is a Medical Laboratory Technologist?

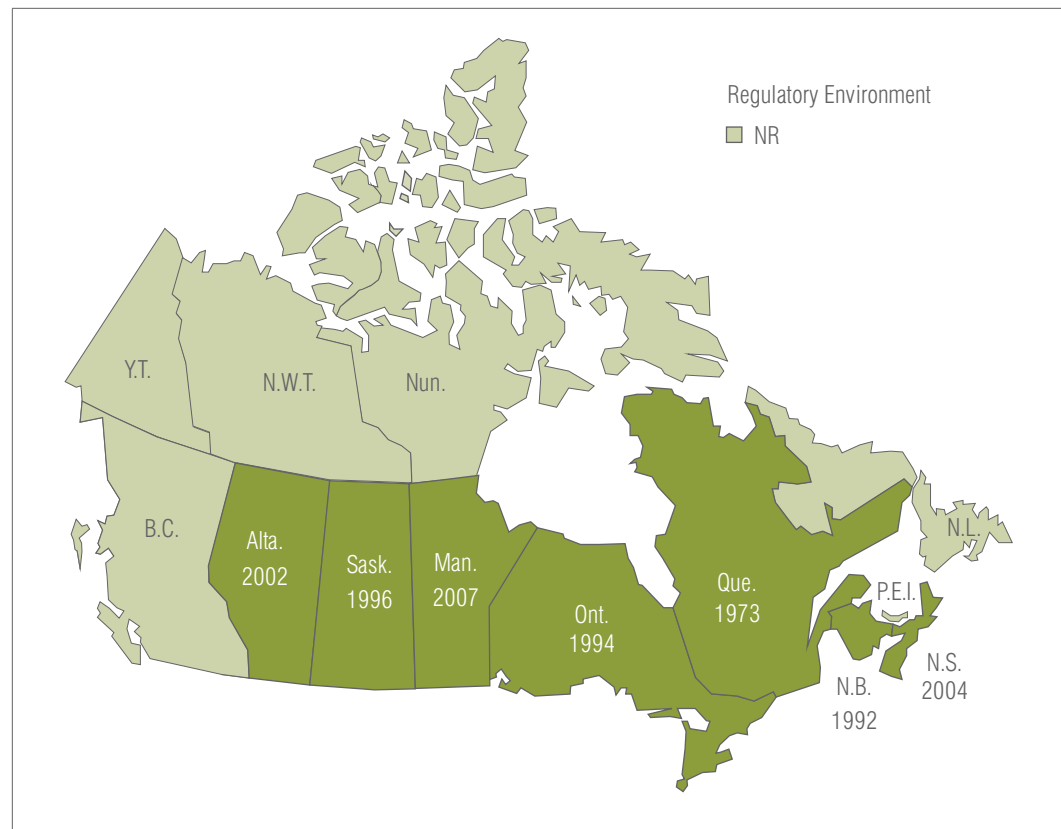
Medical laboratory technologists are health care professionals who perform laboratory analyses and investigations and interpret laboratory results to assist clinicians with the diagnosis, treatment, monitoring and prevention of disease. Medical laboratory technologists work in dynamic, ever-changing and complex environments. They operate highly sophisticated technical and electronic equipment, conducting investigations on blood, body fluids, tissue samples and other types of biological specimens. Medical laboratory technologists interact mostly with other health care professionals in providing technical advice, analytical results and interpretative information. Their interactions with patients are limited and occur primarily through the procurement of blood specimens.<sup>1-6</sup>

Medical laboratory technologists provide services in the clinical laboratory in the areas of pre-/post-analysis, clinical chemistry, clinical hematology, transfusion medicine, anatomical pathology, cytopathology, electron microscopy, clinical microbiology, immunology, histocompatibility and immunogenetics and diagnostic genetics to patients of all ages.<sup>7</sup> They work both independently and within a multidisciplinary team.<sup>1-4</sup>

## 1.2 What Does the Regulatory Environment of the Medical Laboratory Technology Profession Look Like Across Canada?

The map below (current as of 2008) identifies the first year in which it became mandatory for medical laboratory technologists to register with a provincial regulatory body.

The first province to regulate the profession was Quebec (1973). Nineteen years later, New Brunswick followed suit (1992). Shortly after, Ontario achieved regulatory status (1994), followed by Saskatchewan (1996), Alberta (2002), Nova Scotia (2004) and Manitoba (2007). The medical laboratory technologists in these provinces must register with the regulatory body of the province in order to practise. The provinces of Newfoundland and Labrador, Prince Edward Island, British Columbia and all three territories (the Yukon, the Northwest Territories and Nunavut) remained unregulated as of 2008. Medical laboratory technologists in these jurisdictions were not mandated to register with the CSMLS unless otherwise required by their employer.

**Note**

NR: not regulated as of 2008.

**Sources**

Health Personnel Database and the Medical Laboratory Technologist Database, Canadian Institute for Health Information.

## Impact of Regulation Status on the Medical Laboratory Technologist Database

Non-regulation and voluntary registration have a significant impact on the MLTDB. A major concern is that the data in the MLTDB and statistics produced from the database may not represent the entire population of the profession for the non-regulated jurisdictions (Newfoundland and Labrador, Prince Edward Island, British Columbia, the Yukon, the Northwest Territories and Nunavut) and, therefore, for Canada. Statistics for the workforce reported in Part 1 of this report represent only registered medical laboratory technologists in Canada.

## 1.3 What Is the Supply of Medical Laboratory Technologists?

Medical laboratory technologists in Canada are an integrated part of the health care team who provide health care services to Canadians. How many medical laboratory technologists does Canada have? What are the ratios of medical laboratory technologists to the population served across the Canadian jurisdictions? Where do medical laboratory technologists work? How old are they and what is the gender distribution? The answers to these questions can help to provide a bigger picture and better understanding of this profession.

These questions are very basic; nevertheless, they are not easy to answer thoroughly due to the lack of complete information for the non-regulated jurisdictions where medical laboratory technologists may not register with the CSMLS unless mandated by their employers. As a result, the MLTDB, as well as CIHI's Health Personnel Database (HPDB, for historical data)—which collect registration data from the CSMLS and the regulatory bodies in regulated provinces—do not have information for all medical laboratory technologists and their geographic distribution in Canada. However, the MLTDB and the HPDB can provide the information for the registered medical laboratory technologists in provinces and territories. Further information is required to obtain a complete picture of the medical laboratory technology profession in Canada and to provide accurate answers to the questions listed above.

### Active Membership of Medical Laboratory Technologists, 1999 to 2007

Active membership in regulated provinces includes membership in a category in which a medical laboratory technologist is authorized to work in that particular province in that specific year. In the non-regulated provinces and territories, members may register with the CSMLS in similar membership categories. Table 1 shows the number of medical laboratory technologists who actively registered with their provincial regulatory bodies or with the CSMLS between 1999 and 2007. Note that some provinces became regulated during the observation period. The change to the regulation status might have an impact on supply trends for registrations before and after the regulation year. In the table, the data was greyed out if it was not applicable in one of two sections (Regulated Provinces or Non-Regulated Provinces/Territories). While useful for some purposes, this data should also be used within the limitations documented in the Methodological Notes for the following HPDB publications: *Canada's Health Care Providers, 1997 to 2006, A Reference Guide and Provincial Profiles* (for 2007), which can be retrieved from CIHI's website ([www.cihi.ca](http://www.cihi.ca)).

Table 1 Number of Active Registered Medical Laboratory Technologists, by Province and Territories, 1999 to 2007

	1999	2000	2001	2002	2003	2004	2005	2006	2007
<b>Total</b>	<b>17,468</b>	<b>17,789</b>	<b>17,935</b>	<b>18,259</b>	<b>19,092</b>	<b>19,401</b>	<b>20,103</b>	<b>19,841</b>	<b>19,813</b>
<b>Regulated Provinces</b>									
<b>Nova Scotia*</b>						875	947	902	980
<b>New Brunswick</b>	623	643	647	650	654	652	654	639	659
<b>Quebec</b>	2,694	2,724	2,810	2,860	2,931	3,520	3,972	4,139	4,211
<b>Ontario</b>	7,166	7,023	6,846	6,934	7,215	7,246	7,217	7,069	7,128
<b>Manitoba*</b>									864
<b>Saskatchewan</b>	954	972	967	962	938	949	984	977	963
<b>Alberta*</b>				2,149	2,207	2,219	2,267	2,224	2,234
<b>Non-Regulated Provinces/Territories</b>									
<b>Newfoundland and Labrador</b>	329	319	349	358	406	393	415	414	394
<b>Prince Edward Island</b>	103	105	102	96	116	103	109	112	108
<b>Nova Scotia*</b>	754	747	792	821	904				
<b>Manitoba*</b>	938	952	943	952	1,010	960	1,013	985	
<b>Alberta*</b>	1,450	1,843	1,995						
<b>British Columbia</b>	2,409	2,416	2,443	2,437	2,665	2,441	2,482	2,341	2,225
<b>Territories†</b>	48	45	41	40	46	43	43	39	47

**Notes**

Grey cells indicate that the information is not applicable.

Provinces and territories are defined by the data element Province/Territory of Registration.

\* Medical laboratory technology became regulated in Nova Scotia in 2004, Manitoba in 2007 and Alberta in 2002.

† Data for the territories from 1999 to 2002 does not include Yukon data. Data for the territories from 2003 to 2007 does not include Nunavut data.

Data for unregulated provinces and territories, and therefore for Canada, may not represent all medical laboratory technologists in the jurisdictions. Refer to the Methodological Notes for more information.

**Source**

Health Personnel Database, Canadian Institute for Health Information.

## Registered Medical Laboratory Technologists in 2008

Beginning in 2008, the CSMLS and the provincial regulatory bodies for the medical laboratory technology profession in Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and Alberta submitted data to the MLTDB. A total of 20,775 records were received in the database. After excluding 916 records for inactive registrations, a total of 19,859 records represent the total number of active registered medical laboratory technologists across the country.

## Secondary Registrations

From the records submitted, CIHI identified and removed secondary registrations. This group includes medical laboratory technologists who maintain registration in a Canadian province or territory while living outside of Canada, or those whose province or territory of residence and/or province or territory of primary employment is in a Canadian jurisdiction that is different from the province or territory of registration. These registrations are excluded from the analysis in this report to minimize double-counting at the national level. A detailed explanation of the methodology can be found in the Methodological Notes of this report.

In 2008, a total of 112 records were identified as secondary registrations and removed from the analysis, which yielded 19,747 active primary registrations. When a record has missing values for most data elements used in the methodology, the methodology cannot be applied. This was the case for a number of records during the first year of data collection, which may have resulted in the under-counting of secondary registrations.

## Employment Status Other Than *Employed (and Not on Leave) in Medical Laboratory Technology*

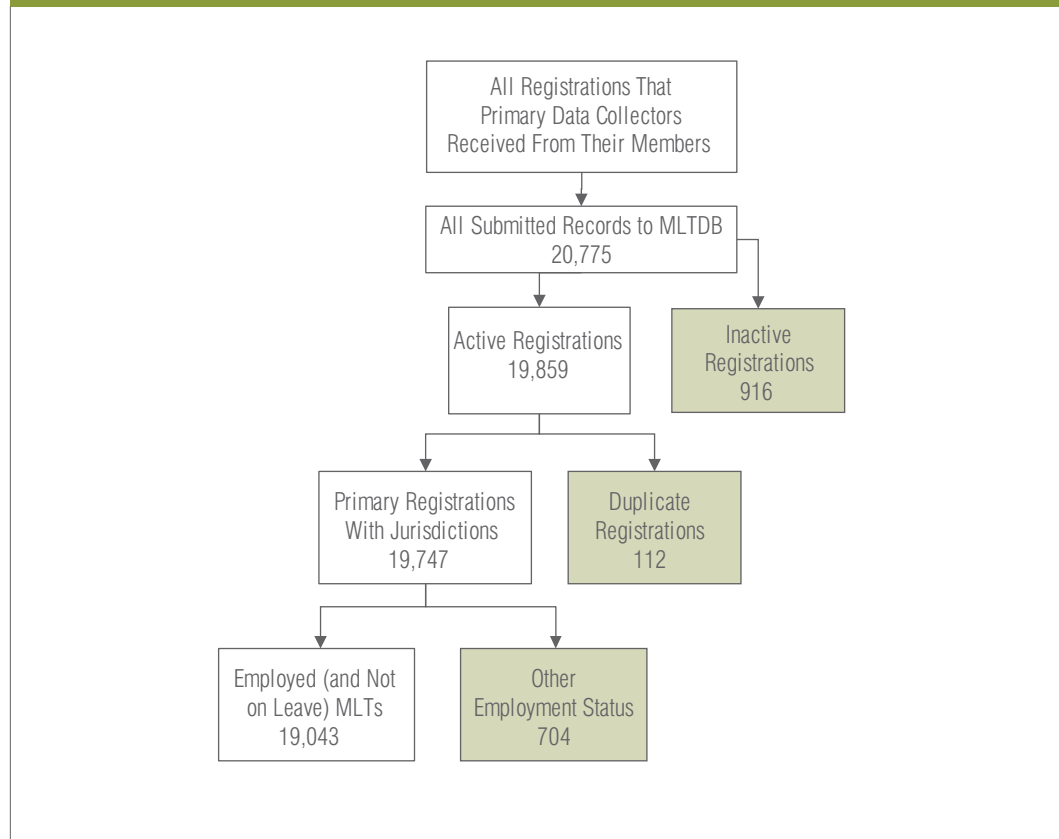
Of the 19,747 active primary registrations submitted for 2008, a total of 704 records were identified with an Employment Status other than *employed (and not on leave) in medical laboratory technology*. A small number of registrations with other Employment Status may be counted in the medical laboratory technologist workforce in some jurisdictions that could not distinguish this group of registrants for 2008. Other Employment Status includes *employed in medical laboratory technology but on leave*, *employed outside of medical laboratory technology*, *retired*, *unemployed* or *unknown*. See further detail in the Methodological Notes in this report.

## Total Registered Medical Laboratory Technologist Workforce

After removing 704 records with Employment Status other than *employed (and not on leave) in medical laboratory technology*, 19,043 records were identified as the registered workforce across the provinces and territories, of the individuals who submitted data to the MLTDB for 2008.

Diagram 1 illustrates the process of defining the workforce and the number of medical laboratory technologists to be included or excluded in each step.

Diagram 1 Defining the Total Registered Medical Laboratory Technologist Workforce From the CIHI MLTDB, 2008



**Source**

Medical Laboratory Technologist Database, Canadian Institute for Health Information.

Table 2 summarizes the descriptions above and breaks down the information by jurisdiction for the number of records that were submitted and the number of records that were identified and removed from the workforce due to inactive registrations, interprovincial duplicates and other Employment Status. The last column indicates the registered medical laboratory technologist workforce by province or territories. The total number for the registered medical laboratory technologist workforce in 2008 was 19,043. Of the regulated provinces, totalling 16,232 records, Ontario (6,552) and Quebec (4,223) accounted for more than two-thirds (66.4%) of the medical laboratory technologist workforce. Alberta (1,958), Manitoba (1,006), Nova Scotia (939), Saskatchewan (913) and New Brunswick (641) together made up the remaining one-third of the workforce among the regulated provinces. After including 2,811 medical laboratory technologists in non-regulated jurisdictions, the percentage for Ontario and Quebec was reduced to 56.6%, and for the remaining regulated provinces, it was reduced to 28.7%; the percentages would have been lower, however, if non-regulated jurisdictions had submitted information representing all medical laboratory technologists working within their boundaries.

Table 2 Number and Composition of Registered Medical Laboratory Technologist Workforce, by Province or Territories of Registration, 2008

	All Submitted Records	Remove Inactive Records	Remove Duplicate Registrations <sup>†</sup>	Remove Records if Employment Status Not Identified as Working MLTs <sup>‡</sup>	Registered MLT Workforce
	(A)	(B)	(C)	(D)	(A-B-C-D)
<b>Total</b>	<b>20,775</b>	<b>916</b>	<b>112</b>	<b>704</b>	<b>19,043</b>
<b>Regulated Provinces</b>					
<b>Nova Scotia</b>	978	39	..	..	939
<b>New Brunswick</b>	670	14	4	11	641
<b>Quebec</b>	4,231	..	8	..	4,223
<b>Ontario</b>	7,468	527	59	330	6,552
<b>Manitoba</b>	1,075	42	9	18	1,006
<b>Saskatchewan</b>	987	59	15	..	913
<b>Alberta</b>	2,300	..	9	333	1,958
<b>Non-Regulated Provinces/Territories</b>					
<b>Newfoundland and Labrador</b>	415	15	1	6	393
<b>Prince Edward Island</b>	112	5	..	4	103
<b>British Columbia</b>	2,488	210	7	..	2,271
<b>Territories*</b>	51	5	..	2	44

#### Notes

.. Information is not available.

\* Territories include the Yukon, the Northwest Territories and Nunavut.

† Duplicate registrations between the provinces/territories are identified according to CIHI primary/secondary registration methodology. See details in the Methodological Notes.

‡ Employment Status included in this column: *employed in medical laboratory technology but on leave*, *employed outside of medical laboratory technology*, *retired*, *unemployed* and *unknown*. See details in the Methodological Notes regarding data inclusions and exclusions.

All cells that have values of less than 5 in this table are composed of different values or are the result of a more complicated methodology that was used so that the individuals represented by these small cells cannot be identified. For this reason, these small cells are not suppressed.

Data for unregulated provinces and territories, and therefore for Canada, may not represent all medical laboratory technologists in the jurisdictions. Refer to the Methodological Notes for more information.

CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

#### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.

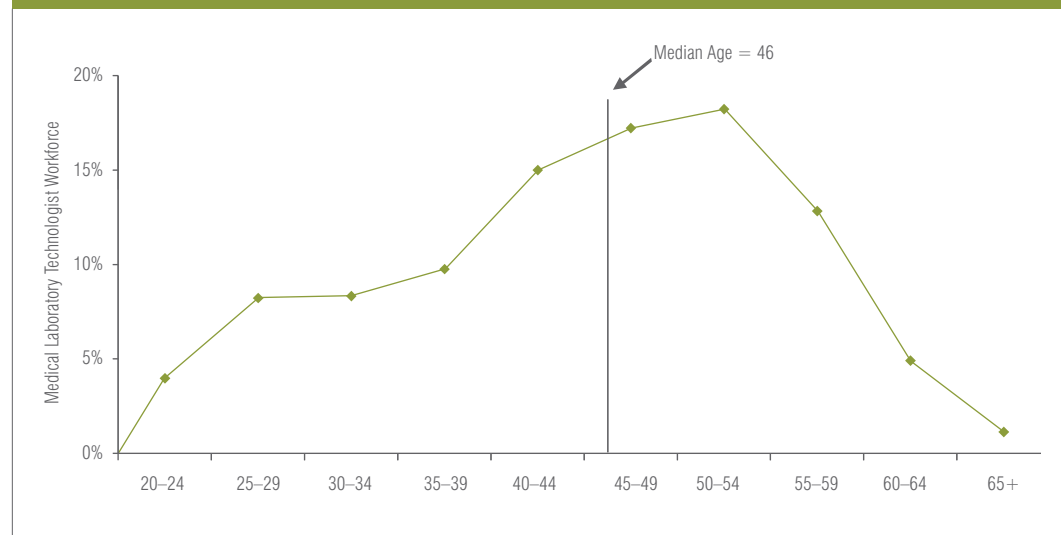


## 1.4 What Is the Demographic Composition of Medical Laboratory Technologists?

### Age Distribution

Figure 1 shows the age distribution of medical laboratory technologists employed and working in seven regulated provinces: Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and Alberta. The largest five-year age group was 50 to 54 in 2008, followed by those age 45 to 49. The median age indicates that half of the medical laboratory technologists were older than 46 and half were younger.

Figure 1 Percentage Distribution of Medical Laboratory Technologist Workforce in the Regulated Provinces, by Five-Year Age Groups, 2008



#### Notes

Includes Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and Alberta.

Excludes 42 records with unknown age (0.3% of the total; 3 for New Brunswick, 2 for Quebec, 2 for Ontario, 9 for Manitoba and 26 for Saskatchewan).

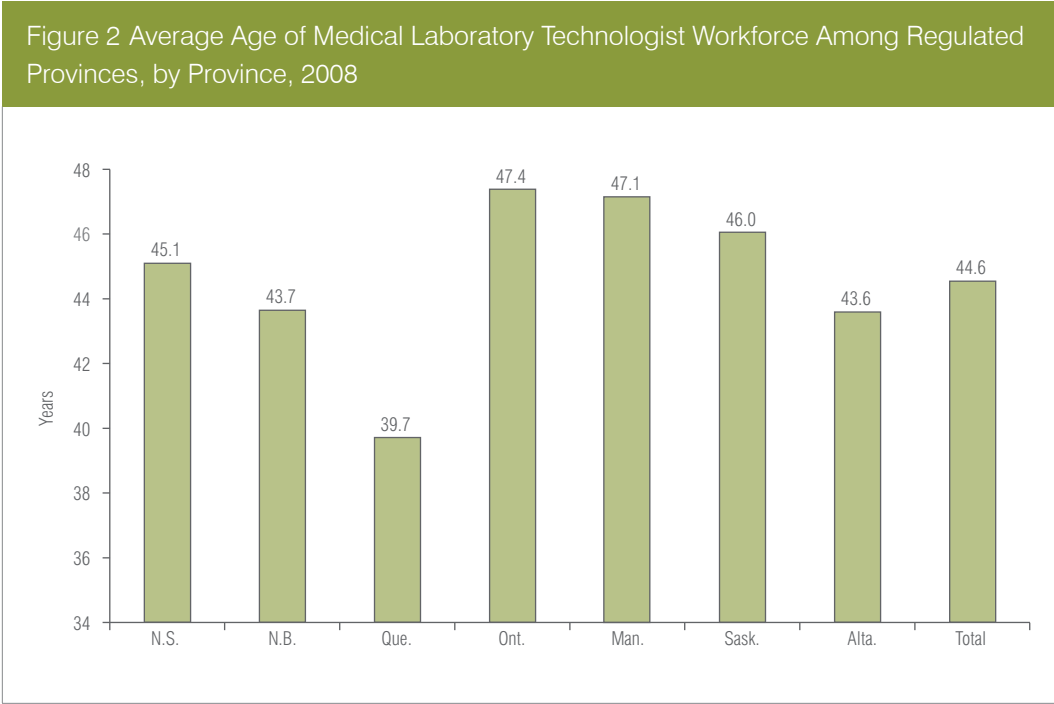
Provinces are defined by the data element Province/Territory of Registration.

CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

#### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.

Across all regulated provinces, the average age of the medical laboratory technologist workforce in 2008 ranged from the lowest in Quebec (39.7) to the highest in Ontario (47.4); those in between included Nova Scotia (45.1), New Brunswick (43.7), Manitoba (47.1), Saskatchewan (46.0) and Alberta (43.6) (Figure 2). Overall, the average age of the medical laboratory technologist workforce in these provinces in 2008 was 44.6. Compared with other professions, medical laboratory technologists were younger than physicians and registered nurses but older than pharmacists, licensed practical nurses, medical radiation technologists, physiotherapists and occupational therapists (Figure 3).



**Notes**  
Excludes 42 records with unknown age (0.3% of the total; 3 for New Brunswick, 2 for Quebec, 2 for Ontario, 9 for Manitoba and 26 for Saskatchewan).  
Provinces are defined by the data element Province/Territory of Registration.  
CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

**Source**  
Medical Laboratory Technologist Database, Canadian Institute for Health Information.

Figure 3 Average Age of the Workforce for Selected Health Care Providers in Regulated Provinces, 2008



#### Notes

\* Data for physicians includes Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and Alberta.

† Data for registered nurses (RN) and licensed practical nurses (LPN) includes Nova Scotia, New Brunswick, Quebec, Ontario, Saskatchewan and Alberta.

‡ Data for medical laboratory technologists (MLT) includes Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and Alberta. Excludes 42 records with unknown age (0.3% of the total; 9 for Manitoba, 3 for New Brunswick, 2 for Ontario, 2 for Quebec and 26 for Saskatchewan).

§ Data for pharmacists (PHARM) includes Nova Scotia, New Brunswick, Ontario, Saskatchewan and Alberta.

\*\* Data for medical radiation technologists (MRT) includes Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and Alberta. Excludes 14 records with unknown age (0.1% of the total; 8 for Nova Scotia, 3 for New Brunswick and 3 for Manitoba).

†† Data for physiotherapists (PT) includes New Brunswick, Quebec, Ontario, Saskatchewan and Alberta.

‡‡ Data for occupational therapists (OT) includes Nova Scotia, New Brunswick, Ontario, Manitoba, Saskatchewan and Alberta. Excludes 36 records for Manitoba.

For more information and data limitations for each profession, please refer to the Methodological Notes for the respective databases.

Provinces are defined by the data element Province/Territory of Registration, except for data for physicians, which uses the province of mailing address.

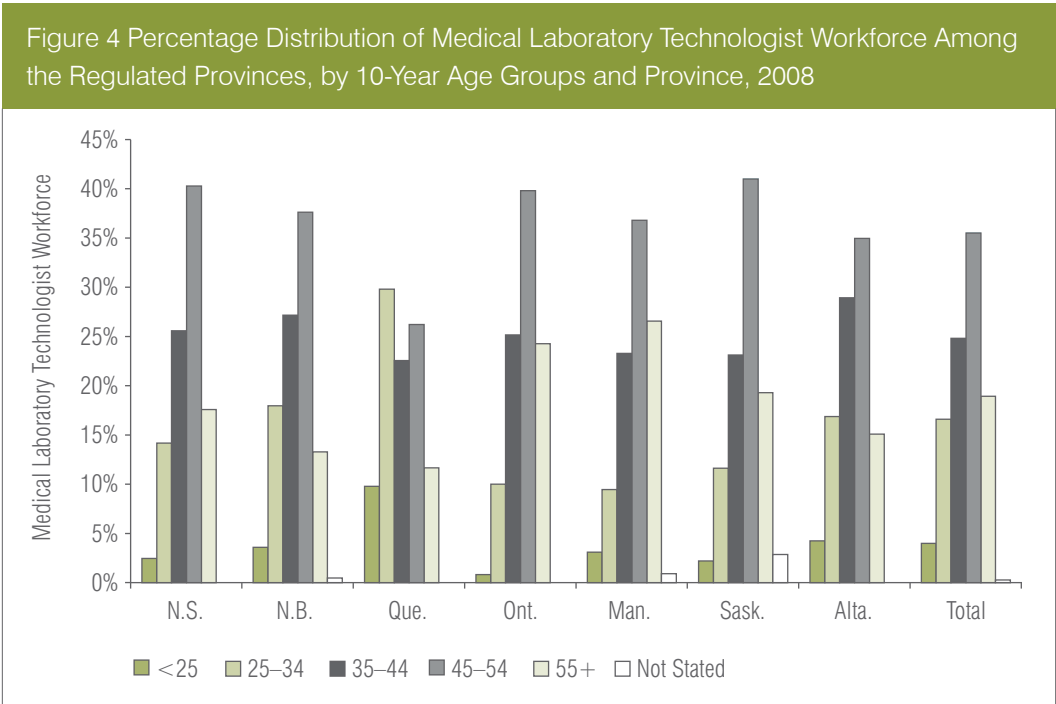
CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

#### Sources

Scott's Medical Database, Nursing Database, Medical Laboratory Technologist Database, Pharmacist Database, Medical Radiation Technologist Database, Physiotherapist Database and Occupational Therapist Database, Canadian Institute for Health Information.

The age distribution of medical laboratory technologists varied widely from province to province. The largest 10-year age group in all regulated provinces, except Quebec, was 45 to 54, which accounted for 35% to 41% of the workforce in these provinces. When medical laboratory technologists reach age 55, many could become eligible for retirement. Data for Ontario and Manitoba shows that in 2008, approximately a quarter of the medical laboratory technologists were 55 or older but still working; in Manitoba, this cohort comprised the second-largest age group. The same age group accounted for 15% to 20% of the workforce in Nova Scotia, Saskatchewan and Alberta. The percentage was less than 15% only in New Brunswick and Quebec. Overall in the regulated provinces, the age groups 45 to 54 and 55 and older together accounted for 54.4% of the workforce, which means that more than half of the current workforce in these provinces could potentially retire in 10 years (Figure 4).

Quebec had a relatively young workforce compared with other provinces. The largest 10-year age group of medical laboratory technologists in Quebec was 25 to 34. Young medical laboratory technologists (younger than 25) accounted for 10% of the workforce, which was twice the overall average percentage for all regulated provinces (Figure 4).



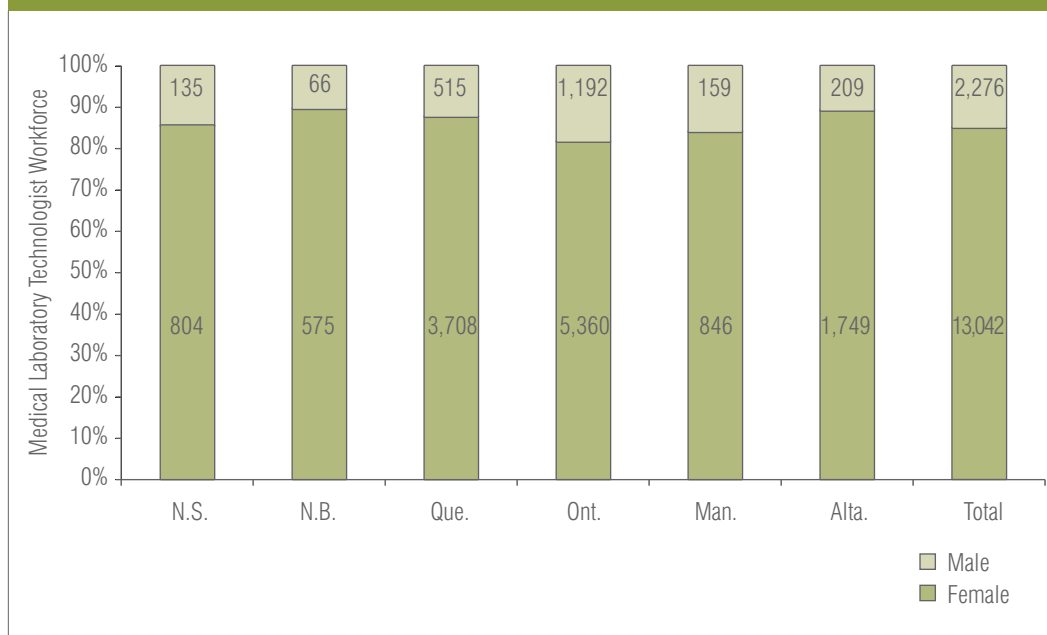
**Notes**  
Provinces are defined by the data element Province/Territory of Registration.  
CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

**Source**  
Medical Laboratory Technologist Database, Canadian Institute for Health Information.

## Gender

Figure 5 indicates that the majority of medical laboratory technologists were female in 2008, representing 85.1% of the workforce in the six regulated provinces (Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and Alberta). Female medical laboratory technologists accounted for 80% to 90% in each of these provinces, ranging from the lowest (81.8%) in Ontario to the highest (89.7%) in New Brunswick.

Figure 5 Number and Percentage Distribution of Medical Laboratory Technologist Workforce, by Gender, Selected Regulated Provinces, 2008



### Notes

Excludes 1 record (from Manitoba) with unknown gender.

Provinces are defined by the data element Province/Territory of Registration.

CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.

# 1.5 What Is the Educational Path to Enter the Profession of Medical Laboratory Technology?

## Basic Education in Medical Laboratory Technology

### Accredited Educational Programs

Today, the first step to becoming a medical laboratory technologist is to receive a postsecondary education in medical laboratory technology through accredited programs. Students may either enrol in a degree program in a bachelor of science or a medical laboratory science program or in a two- to three-year college program in medical laboratory technology.<sup>8</sup> Programs are accredited through the educational programs in medical laboratory technology provided by the Conjoint Accreditation Services of the Canadian Medical Association (CMA).<sup>9</sup> Since the 1990s, the program areas have included the subjects of general medical laboratory technology, diagnostic cytology and clinical genetics.<sup>10</sup> Some programs also require a period of supervised training.<sup>8</sup> Students must complete an accredited medical laboratory technology program as a first step in becoming a medical laboratory technologist.

All Canadian provinces except Prince Edward Island had accredited programs for at least one program area in 2008 (Table 3). Table 4 shows the number of students that graduated from these programs between 2005 and 2008, according to available data. In 2005 and 2006, more than 900 students graduated from more than 20 schools that had these programs. For 2007 and 2008, since the data was not yet complete by the time this report was finalized, a total of 311 (for 2007) and 343 (for 2008) students represent the graduates from approximately 60% of the schools across the provinces.

Table 3 Provinces That Offer Accredited Educational Programs by Medical Laboratory Technology Discipline, 2008			
Province	General Medical Laboratory Technology	Diagnostic Cytology	Clinical Genetics
N.L.	•		
N.S.		•	
N.B.	•		
Que.	•	•	
Ont.	•	•	•
Man.	•	•	
Sask.	•	•	
Alta.	•	•	
B.C.	•	•	•

Source  
Canadian Medical Association.

Table 4 Number of Graduates of Canadian Medical Laboratory Technology Accredited Educational Programs, by School of Graduation, 2005 to 2008

School	2005	2006	2007*	2008*
<b>Newfoundland and Labrador</b>				
College of the North Atlantic	24	20	11	14
<b>Nova Scotia</b>				
Nova Scotia Community College	24	23	..	..
<b>New Brunswick</b>				
New Brunswick Community College	15	42	19	32
Université de Moncton	..	5	4	9
<b>Quebec</b>				
Dawson College	22	18	..	..
CEGEP de Chicoutimi	..	..	18	24
CEGEP de Rimouski	10	16	0	0
CEGEP de Sherbrooke	..	18	25	24
CEGEP de St-Jean-sur-Richelieu	24	24	19	22
CEGEP de Saint-Jérôme	25	8	33	31
CEGEP de Rosemont	..	..	24	23
CEGEP de Sainte-Foy	41	47	..	..
CEGEP de Saint-Hyacinthe	10	4	..	..
CEGEP de Shawinigan	..	..	..	..
<b>Ontario</b>				
Cambrian College	21	14	..	..
St. Lawrence College	35	38	..	..
St. Clair College of Applied Arts and Technology	24	20	35	32
Michener Institute for Applied Health Sciences	28	50	53	49
<b>Manitoba</b>				
Red River College	28	20	..	..
<b>Saskatchewan</b>				
Saskatchewan Institute for Applied Science and Technology	14	14	9	14
<b>Alberta</b>				
Northern Alberta Institute of Technology	19	28	28	30
Southern Alberta Institute of Technology	19	22	17	22
University of Alberta	17	17	16	17
<b>British Columbia</b>				
British Columbia Institute of Technology	28	46	..	..
<b>Total</b>	<b>428</b>	<b>494</b>	<b>311</b>	<b>343</b>

**Notes**

.. Information was not available.

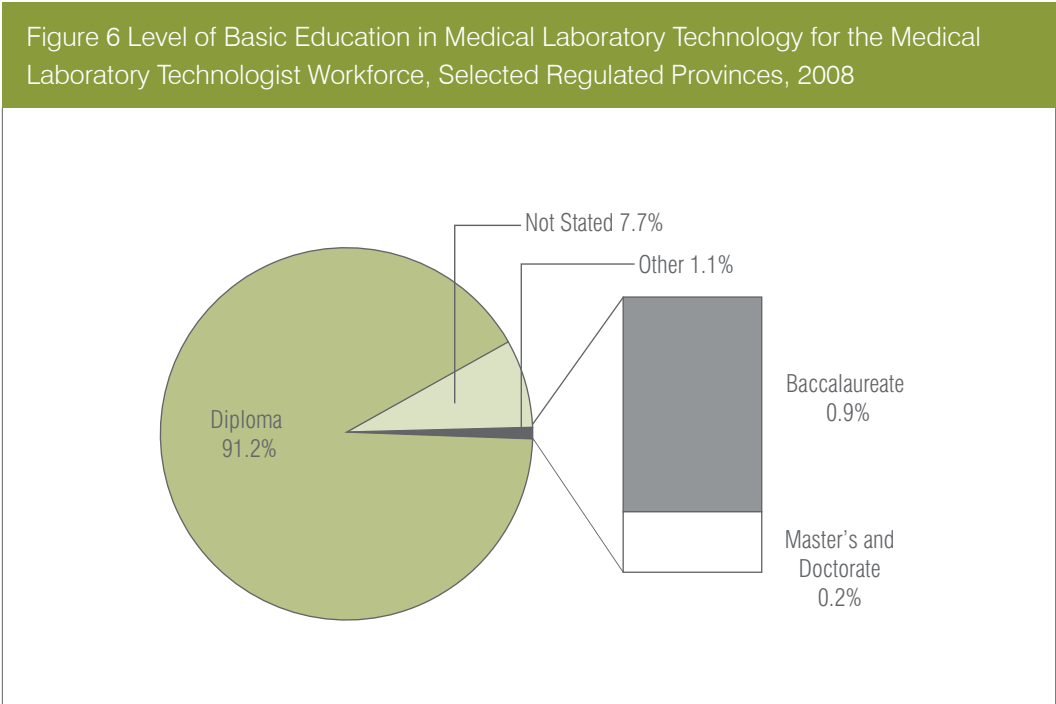
\* Information was not complete.

**Source**

Health Personnel Database, Canadian Institute for Health Information.

Level of Basic Education for the Medical Laboratory Technologist Workforce

The Medical Laboratory Technologist Database collects educational data. In contrast to the information presented in Table 4, which pertains to schools and graduates, educational data from the MLTDB pertains to medical laboratory technologists (those who have graduated and passed the certification exams or Quebec requirements) who register with the provincial regulatory bodies or the CSMLS. Furthermore, certain methodologies were applied to identify the medical laboratory technologist workforce (see section 1.4), which is the primary focus of this report. Data for 2008 regarding the level of basic education collected in the MLTDB is available for New Brunswick, Quebec, Manitoba and Alberta only. Across these four regulated provinces, the majority of medical laboratory technologists held a diploma in medical laboratory technology. Only a limited number of professionals held a higher-level degree than a diploma (Figure 6).



**Notes**  
Includes New Brunswick, Quebec, Manitoba and Alberta.  
Provinces are defined by the data element Province/Territory of Registration.  
CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

**Source**  
Medical Laboratory Technologist Database, Canadian Institute for Health Information.



## Certification Requirements for Medical Laboratory Technologists

### **Certification Examinations**

After graduation from an accredited medical laboratory technology educational program, the graduates are eligible to write a national certification examination offered by the CSMLS. The CSMLS certification is required in the regulated provinces except Quebec in order for medical laboratory technologists to practice in the discipline for which they are certified; it is also required by many employers as a condition of employment in the non-regulated jurisdictions. Working as a medical laboratory technologist in Quebec does not require CSMLS certification,<sup>11</sup> although some graduates in that province decide to take the CSMLS examination. Generally, in Quebec, to obtain a permit to practice in medical laboratory technology, applicants must hold a diploma in Technologie d'analyses biomédicales (TAB) awarded by an institution that is recognized by the Ministry of Education of Quebec. Also in accordance with the *Professional Code of Quebec* and the *Charter of the French Language*, the candidate must have knowledge of French to practice in the profession.<sup>12</sup>

Every year, a number of medical laboratory technology students take the national certification exams offered by the CSMLS. Of the three areas of certification, the general area is the most popular, particularly among new graduates taking the exams for the first time. Since 2005, more than 2,000 medical laboratory technologist candidates (460 in 2005, 531 in 2006, 586 in 2007 and 557 in 2008) have passed the exams and received their first medical laboratory technology certification in the general area. Table 5 lists the number of candidates who obtained the CSMLS general certification by province or territories of residence, with an additional small number of candidates who were foreign-trained students deemed eligible to write the CSMLS certification exam (no formal program) or who lived outside of Canada.

**Table 5** Number of Medical Laboratory Technologist Candidates Who Obtained CSMLS General Certification for the First Time, by Location of Residence, 2005 to 2008

Location of Residence	2005	2006	2007	2008
Newfoundland and Labrador	24	18	8	19
Prince Edward Island	0	0	3	4
Nova Scotia	0	21	31	25
New Brunswick	18	22	20	23
Quebec	146	136	111	74
Ontario	103	122	220	196
Manitoba	21	15	34	38
Saskatchewan	12	14	14	13
Alberta	60	53	61	79
British Columbia	29	44	78	84
Territories*	0	0	3	0
No Formal Program†	47	86	0	0
Outside of Canada	..	..	3	2
<b>Total</b>	<b>460</b>	<b>531</b>	<b>586</b>	<b>557</b>

**Notes**

.. Information was not available.

\* Territories include the Yukon, the Northwest Territories and Nunavut.

† Includes foreign-trained students deemed eligible to write the CSMLS certification exam.

**Source**

Canadian Society for Medical Laboratory Science.

In addition to 557 medical laboratory technologist candidates who obtained CSMLS general certification, 39 candidates received their certification in diagnostic cytology and another 22 received their certification in clinical genetics in 2008. Nearly half of these candidates were from Quebec or Ontario (Table 6).

**Table 6** Number of Medical Laboratory Technologist Candidates Who Obtained CSMLS Certification for the First Time, by Location of Residence and Area of Certification, 2008

Location of Residence	General	Diagnostic Cytology	Clinical Genetics
Newfoundland and Labrador	19	0	0
Prince Edward Island	4	1	0
Nova Scotia	25	8	3
New Brunswick	23	0	0
Quebec	74	7	0
Ontario	196	10	10
Manitoba	38	1	0
Saskatchewan	13	3	1
Alberta	79	6	4
British Columbia	84	3	4
Territories*	0	0	0
Outside of Canada	2	0	0
<b>Total</b>	<b>557</b>	<b>39</b>	<b>22</b>

**Note**

\* Territories include the Yukon, the Northwest Territories and Nunavut.

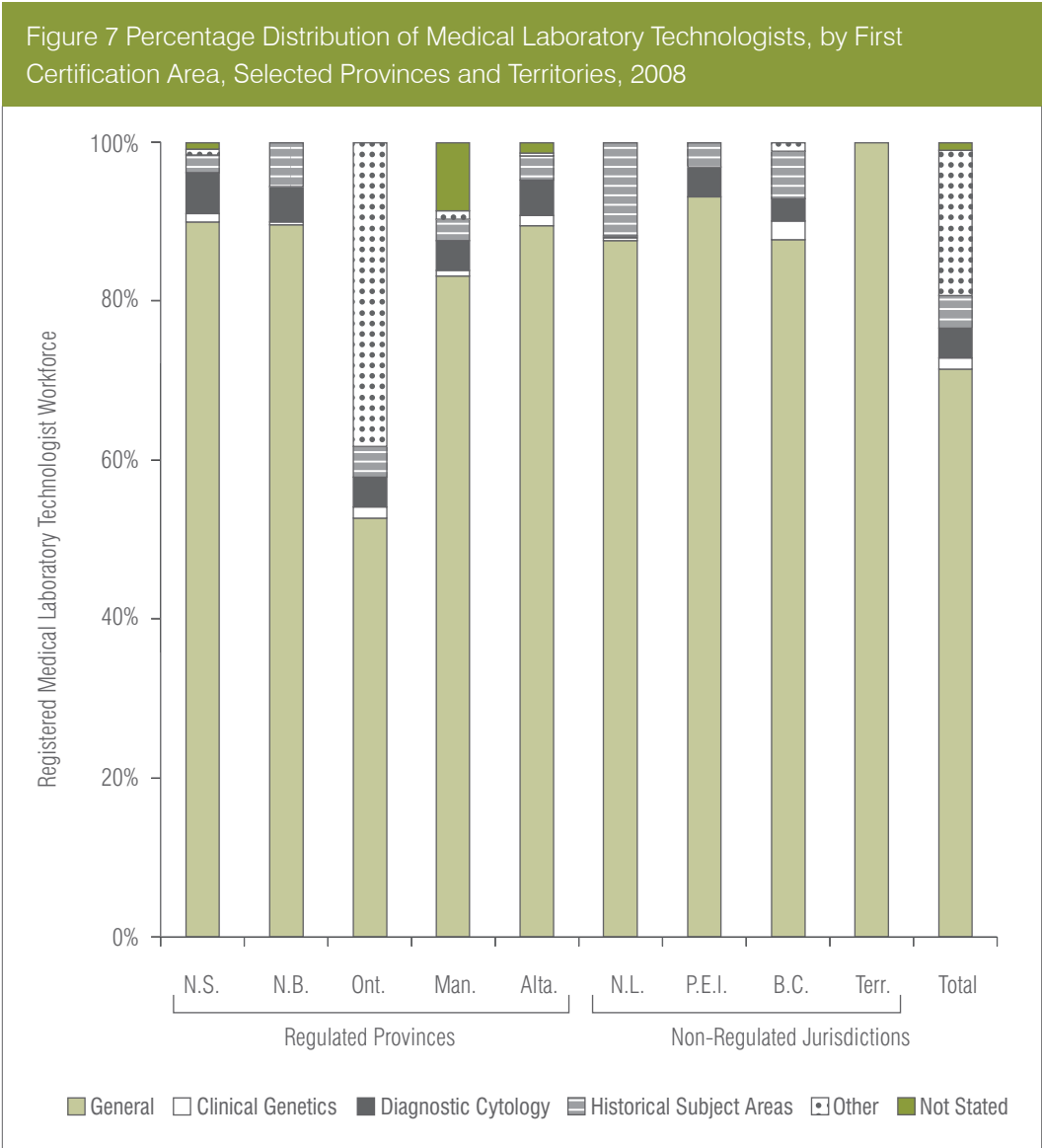
**Source**

Canadian Society for Medical Laboratory Science.

### In Which Areas Are Medical Laboratory Technologists Usually Certified to Enter the Workforce?

Today, medical laboratory technologists in Canada can become certified in one of only three areas: general medical laboratory technology, clinical genetics and diagnostic cytology. Historically, medical laboratory technologists could become certified in a variety of subject areas, including clinical chemistry, hematology, histology, microbiology and transfusion medicine/science. After the 1990s, these areas were grouped into the general area and no longer exist as distinct certification areas.

The MLTDB contains data that records a medical laboratory technologist's first area of certification. Nearly 90% of registered medical laboratory technologists in both regulated and non-regulated jurisdictions received their first certification in general medical laboratory technology. However, since Ontario had eight certification areas<sup>13</sup> that were mapped to the *other* category, the distribution pattern is represented differently for Ontario than for other jurisdictions (Figure 7).



**Notes**  
Terr. includes the Yukon, the Northwest Territories and Nunavut.  
Provinces and territories are defined by the data element Province/Territory of Registration.  
CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

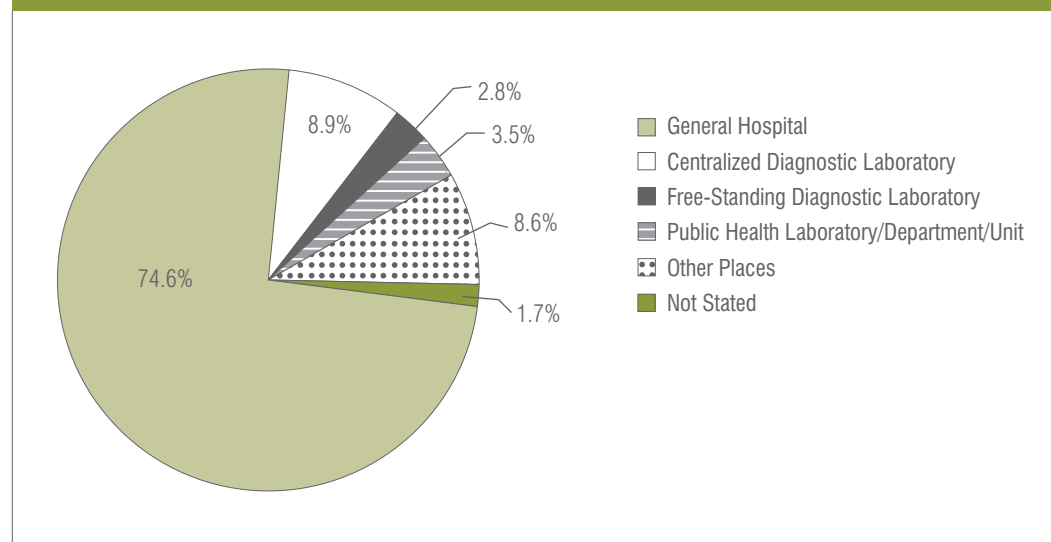
**Source**  
Medical Laboratory Technologist Database, Canadian Institute for Health Information.

## 1.6 In Which Settings Do Medical Laboratory Technologists Work?

### Workplace of Primary Employment

While most medical laboratory technologists work in general hospital clinical laboratories, some work in centralized or free-standing diagnostic laboratories, public health laboratories, educational facilities, blood transfusion centres, specimen collection centres, residential care facilities and other work settings. For example, in 2008, for their primary employment, 74.6% of medical laboratory technologists in New Brunswick, Quebec, Ontario and Alberta worked in general hospitals. The remainder worked with different types of workplaces, such as centralized diagnostic laboratories (8.9%), free-standing diagnostic laboratories (2.8%), public health–related workplaces (3.5%) and other places (8.6%), such as a residential care facility, physician's office/other professional practice office, community health centre, specimen collection centre and blood transfusion centre (Figure 8).

Figure 8 Place of Primary Employment of Medical Laboratory Technologist Workforce, Selected Regulated Provinces, 2008



#### Notes

Includes New Brunswick, Quebec, Ontario and Alberta.

*Other places* includes a residential care facility, physician's office/other professional practice office, community health centre, specimen collection centre, blood transfusion centre, other laboratory facility, postsecondary educational institution, association/government/para-government, industry, manufacturing and commercial, and other.

Provinces are defined by the data element Province/Territory of Registration.

CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

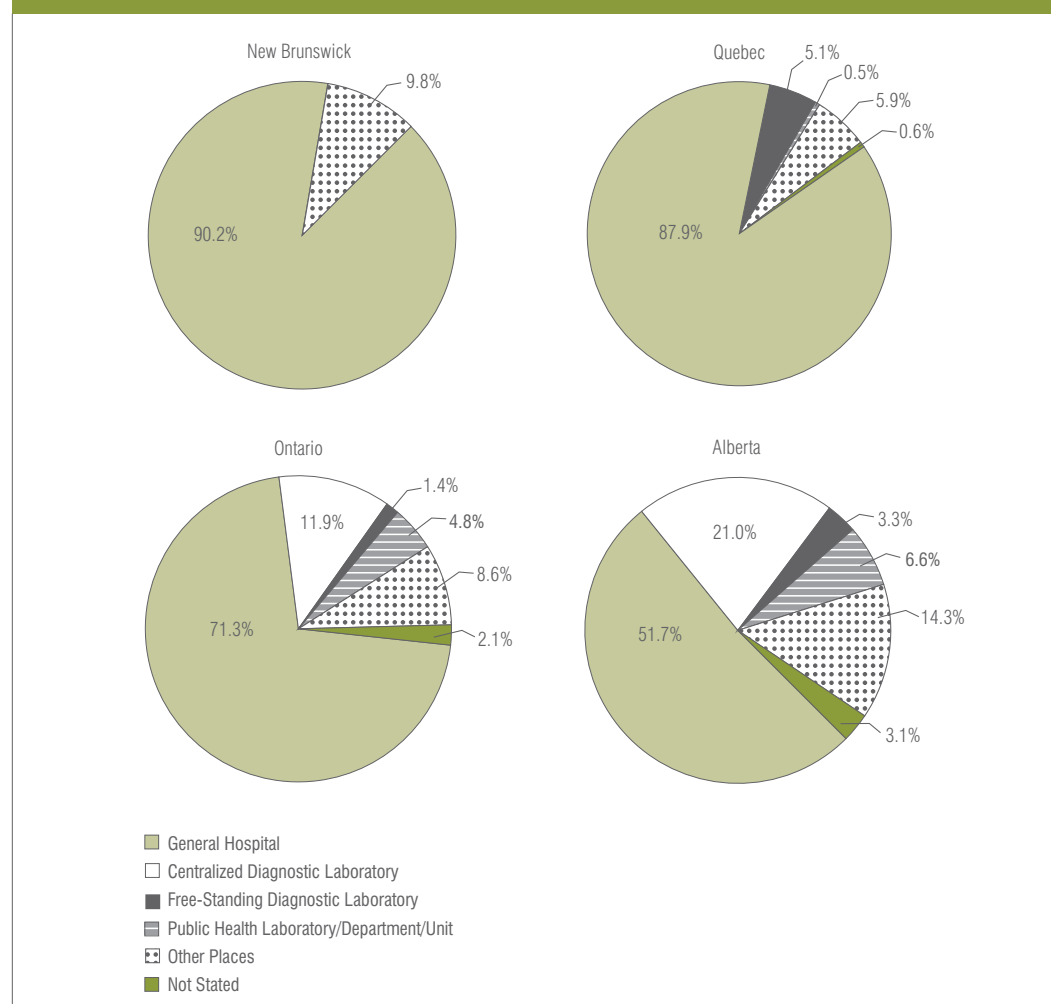
Totals may not equal 100% due to rounding.

#### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.

At the provincial level for primary employment, although general hospitals were primary employers for most medical laboratory technologists, each province had its own unique distribution pattern. The proportion of medical laboratory technologists working in general hospitals in New Brunswick and Quebec was around 90%, while it was 71.3% in Ontario and only 51.7% in Alberta. The differences may be explained by the ways that laboratory services are delivered and organizationally structured differently from one province to another. For example, public health laboratory work is performed in hospital laboratories in New Brunswick, while in Ontario this work is performed in stand-alone public health laboratories.

Figure 9 Place of Primary Employment of Medical Laboratory Technologist Workforce, Selected Regulated Provinces, 2008



#### Notes

*Other places* includes a residential care facility, physician's office/other professional practice office, community health centre, specimen collection centre, blood transfusion centre, other laboratory facility, postsecondary educational institution, association/government/para-government, industry, manufacturing and commercial, and other.

Provinces are defined by the data element Province/Territory of Registration.

CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

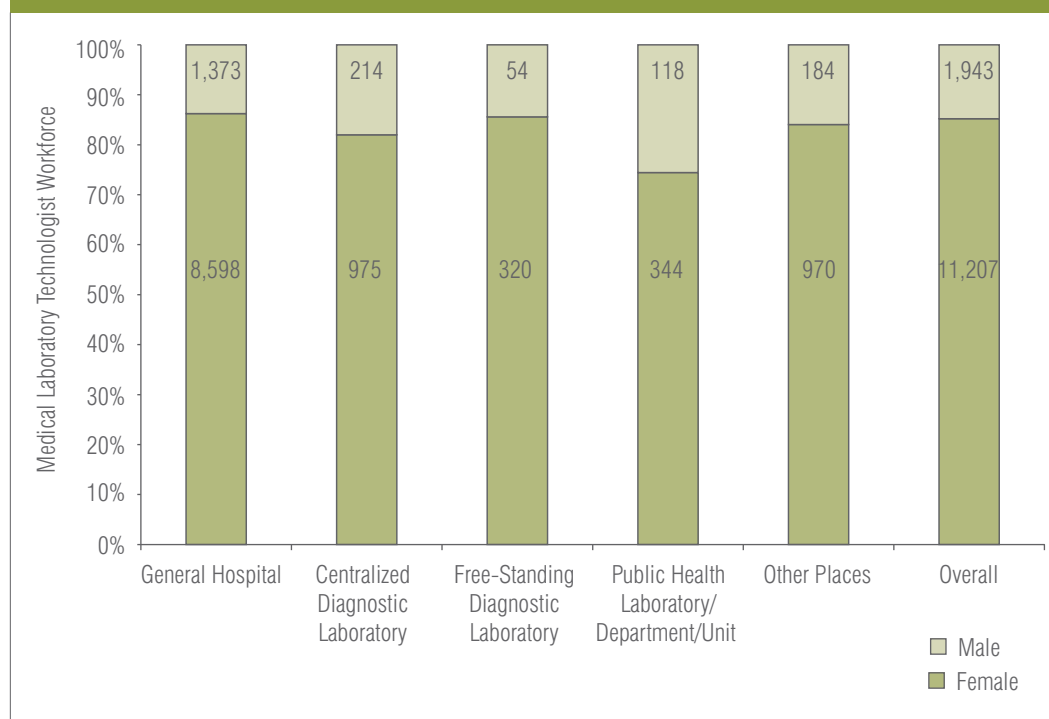
Totals may not equal 100% due to rounding.

#### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.

Although females dominate the medical laboratory technologist workforce, gender distribution differs slightly depending on the type of workplace (primary employment). In the selected four provinces of New Brunswick, Quebec, Ontario and Alberta, female medical laboratory technologists accounted for more than 80% of the workforce in most workplaces; nevertheless, the proportion of female medical laboratory technologists was below 80% in the organizations associated with public health (Figure 10).

Figure 10 Place of Primary Employment of Medical Laboratory Technologist Workforce, by Gender, Selected Regulated Provinces, 2008



#### Notes

Excludes 224 records from the overall distribution (1.7% of the total) because Place of Primary Employment was *not stated*.

*Other places* includes a residential care facility, physician's office/other professional practice office, community health centre, specimen collection centre, blood transfusion centre, other laboratory facility, postsecondary educational institution, association/government/para-government, industry, manufacturing and commercial, and other.

Provinces are defined by the data element Province/Territory of Registration.

CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

#### Source

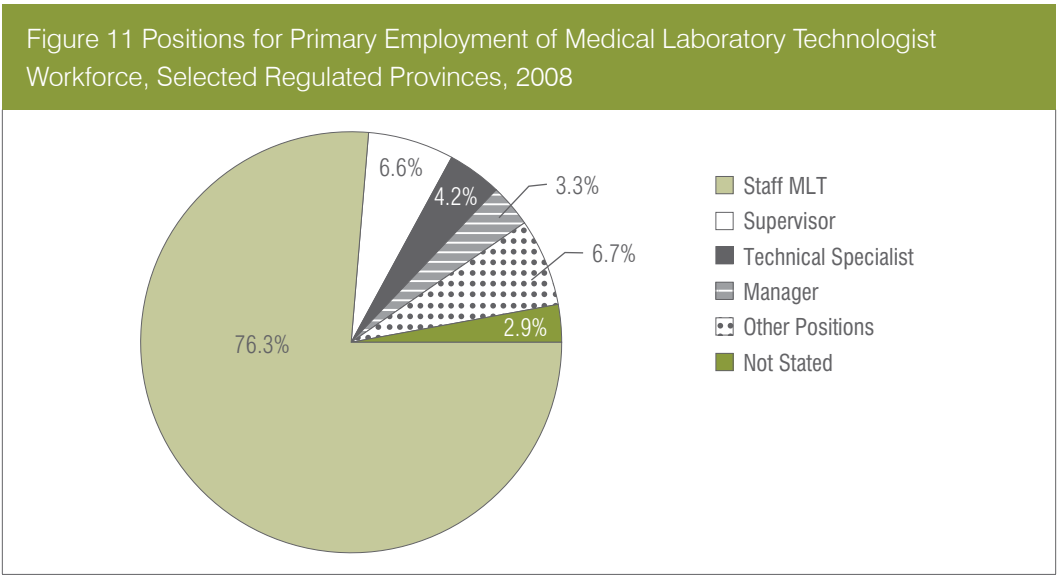
Medical Laboratory Technologist Database, Canadian Institute for Health Information.

## Positions for Primary Employment

The roles of medical laboratory technologists at work include staff medical laboratory technologist, manager, supervisor, technical specialist and laboratory information specialist.<sup>2, 14</sup>

Some medical laboratory technologists branch away from the clinical setting to work in areas such as postsecondary education institutions, university research laboratories, associations, government or para-governmental organizations, as well as industrial, manufacturing and commercial environments. The roles of the medical laboratory technologists working in these environments can be educators, researchers, consultants, technical specialists or salespersons, to name a few.<sup>2, 14</sup>

In the selected provinces of New Brunswick, Quebec, Ontario and Alberta, staff medical laboratory technologists were the largest group, reaching 76.3% of the workforce for primary employment, followed by supervisors, technical specialists and managers (Figure 11). At the provincial level, there appears to be similar proportions of staff medical laboratory technologists for the selected provinces, ranging from 73.1% in Alberta to 79.9% in Quebec (Figure 12). The positions for managers, supervisors and technical specialists may be interpreted differently across the jurisdictions, which can be observed in the variation of percentages for these three positions at the provincial level (Figure 12). However, when combining these three position categories, the gap in distribution patterns between the provinces became smaller: 17.0% for New Brunswick, 12.5% for Quebec, 14.5% for Ontario and 15.2% for Alberta (Figure 12).

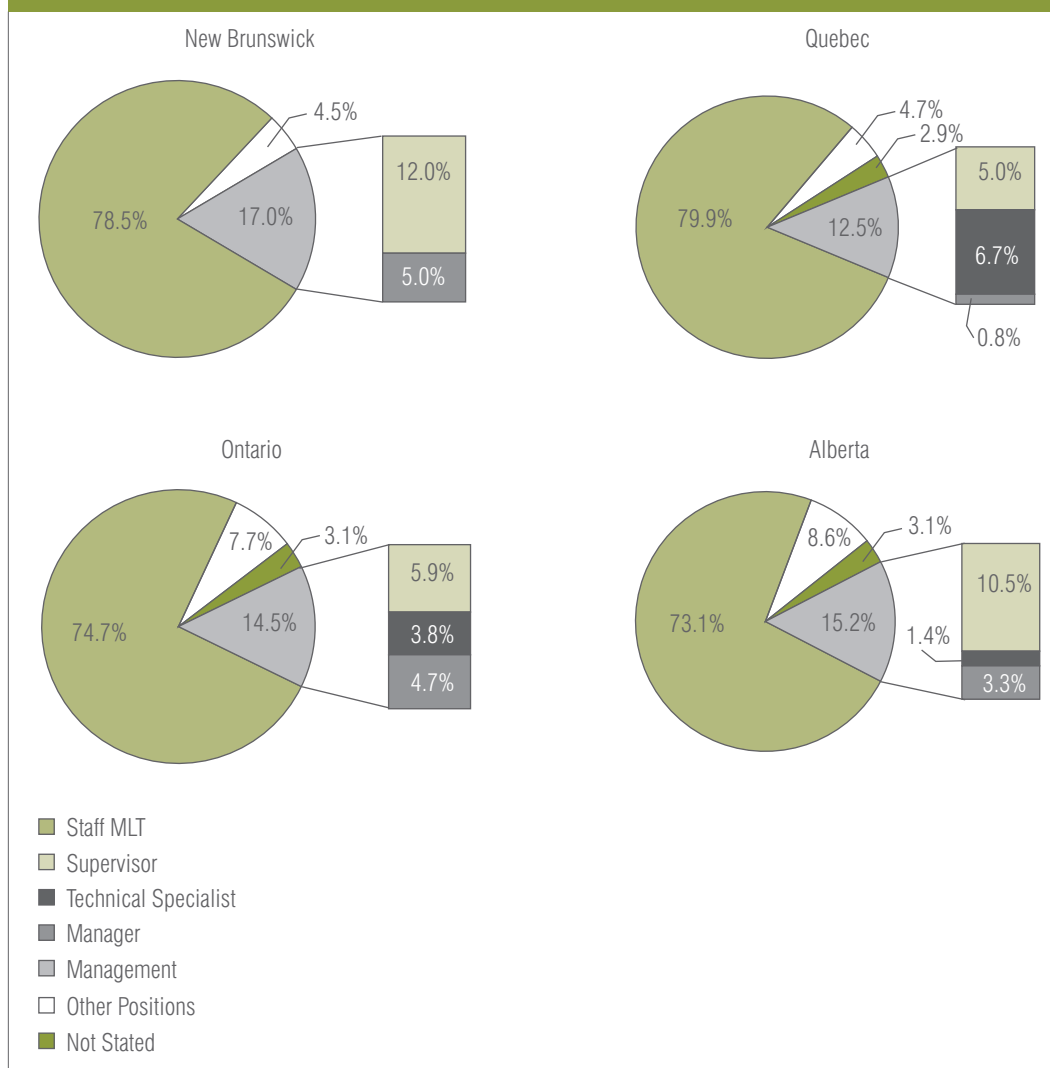


**Notes**  
Includes New Brunswick, Quebec, Ontario and Alberta.  
*Other positions* include educator, laboratory information system specialist, consultant, researcher, sales and other. Some provinces may not define all positions on this list.  
Provinces are defined by the data element Province/Territory of Registration.  
CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

**Source**  
Medical Laboratory Technologist Database, Canadian Institute for Health Information.



Figure 12 Positions for Primary Employment of Medical Laboratory Technologist Workforce, by Selected Regulated Provinces, 2008



#### Notes

*Other positions* include educator, laboratory information system specialist, consultant, researcher, sales and other. Some provinces may not define all positions on this list.

Provinces are defined by the data element Province/Territory of Registration.

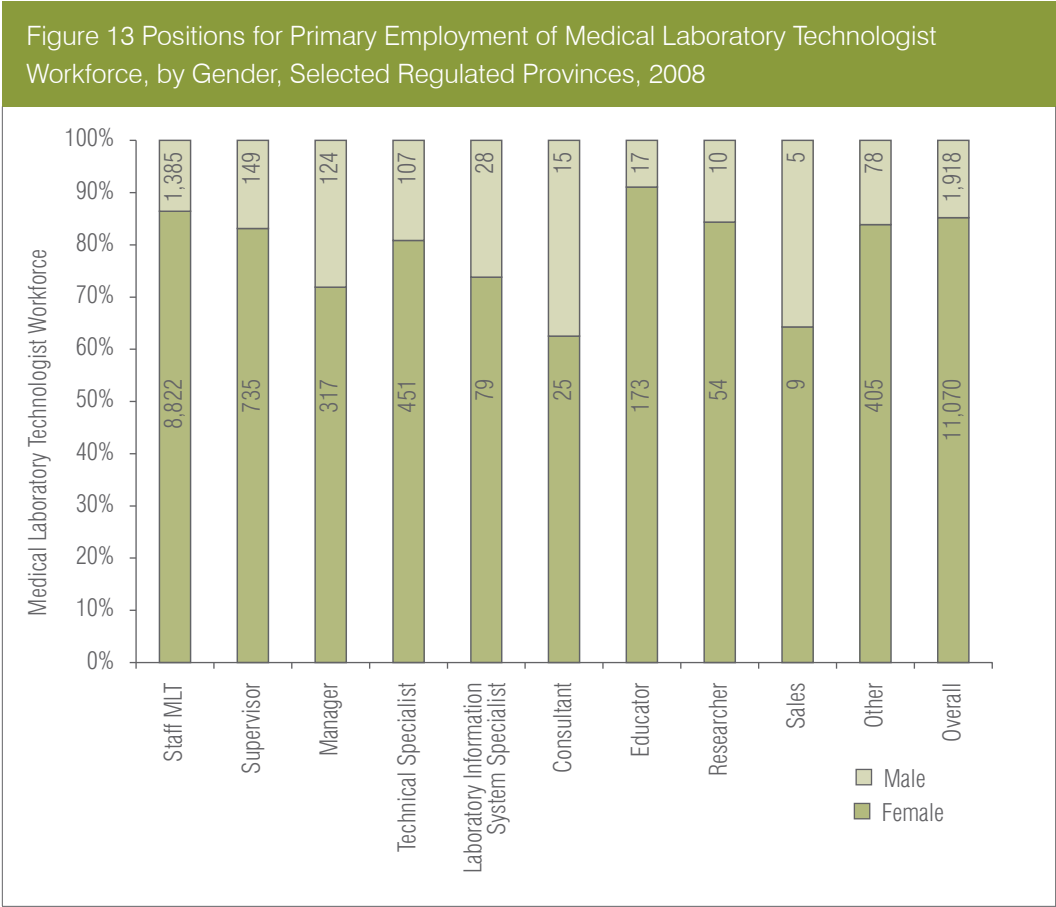
CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

Totals may not equal 100% due to rounding.

#### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.

In general, more than 80% of the medical laboratory technologist workforce in 2008 was female (Figure 4). A pattern emerges when the gender information is broken down by positions. The primary employment position with the highest percentage of females was educator (more than 90%), followed by staff medical laboratory technologist, researcher, supervisor and technical specialist (between 80% and 90%). The percentage of female medical laboratory technologists working in the position of manager or laboratory information system specialist was between 70% and 80%. Among the positions illustrated in Figure 13, consultant and sales had the highest percentage of males.



**Notes**  
Excludes 386 records from the overall distribution (2.9% of the total) with *not stated* Position for Primary Employment.  
Some provinces may not define all positions on the list.  
Provinces are defined by the data element Province/Territory of Registration.  
CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

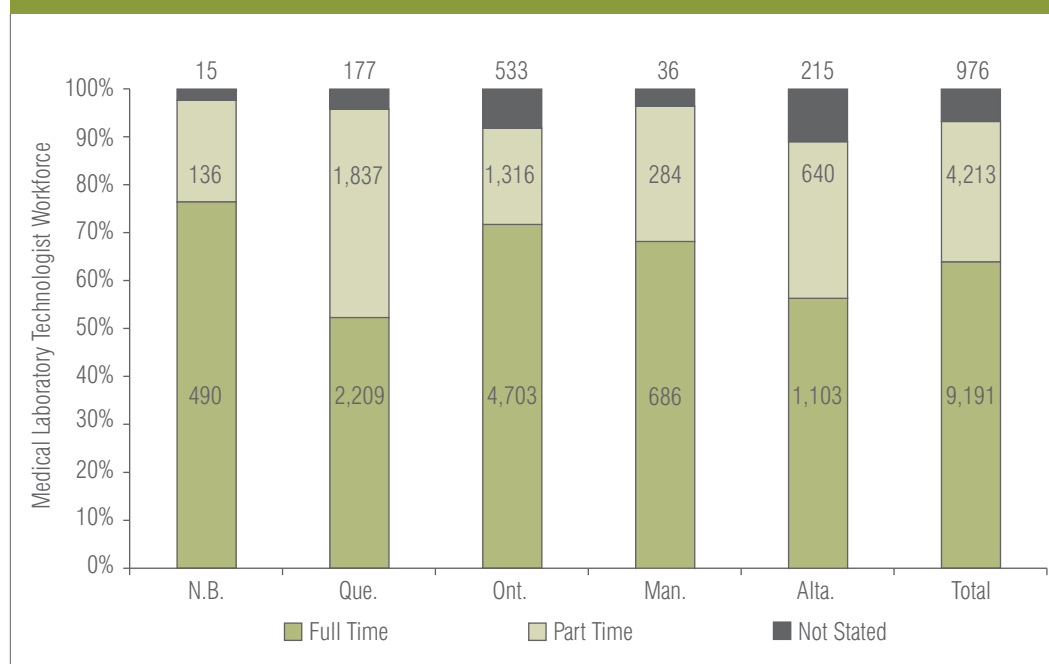
**Source**  
Medical Laboratory Technologist Database, Canadian Institute for Health Information.

## Full-Time/Part-Time Status for Primary Employment

According to the *MLTDB Data Dictionary*, an employee's full-time or part-time status refers to the official status with an employer. For example, if a medical laboratory technologist did not report his or her status, or reported casual employment status at the time of registration with the data provider that submitted data to the MLTDB, the data provider was expected to assign full-time status to the record if the usual hours worked were greater than 30, or part-time status if the usual hours worked were less than 30. Nevertheless, the value for this data element may remain *not stated* in reality.

At the provincial level, the percentages of medical laboratory technologists who worked full and part time for their primary employment varied. In 2008, the proportions of full-time workers in the selected provinces were as follows: New Brunswick, 76%; Quebec, 52%; Ontario, 72%; Manitoba, 68%; and Alberta, 56%. The proportions of part-time workers were therefore smaller. Although the *not stated* status may change the existing distribution between the full-time and part-time status in each of the provinces, especially when the proportion is significant, the fact that full-time status dominated the workforce does not seem to be affected.

Figure 14 Number and Percentage Distribution of Medical Laboratory Technologist Workforce, by Full-Time/Part-Time Status for Primary Employment, Selected Regulated Provinces, 2008



### Notes

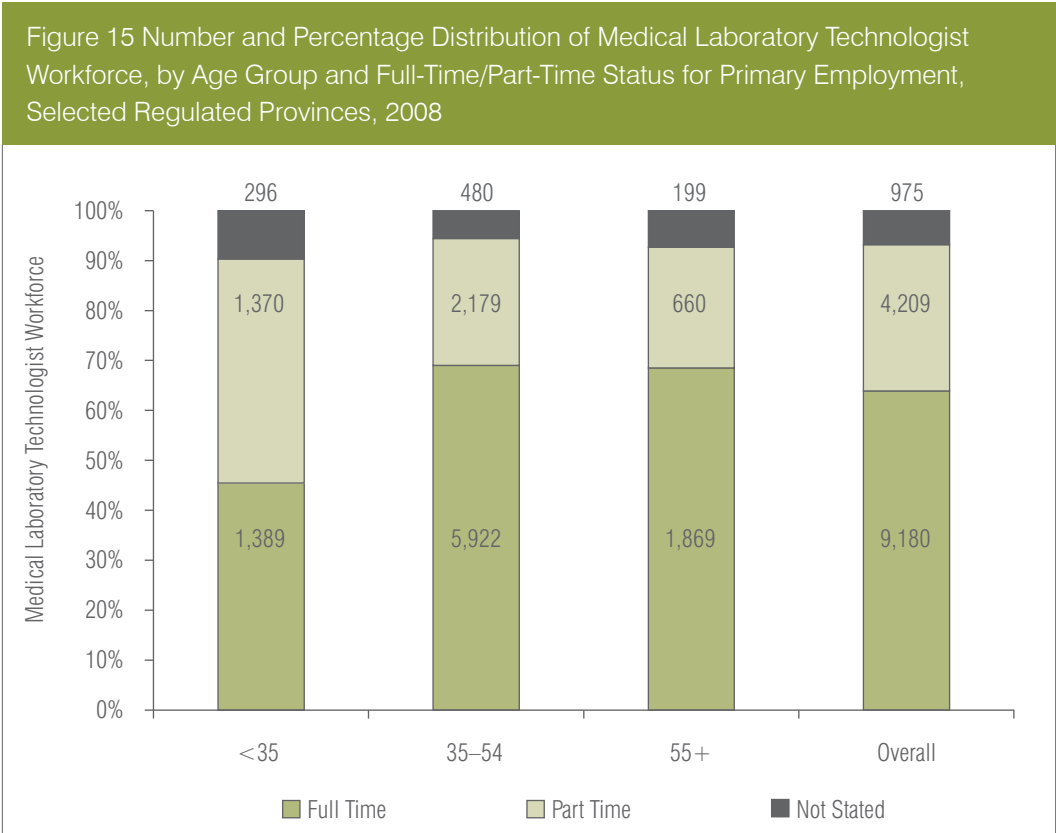
Provinces are defined by the data element Province/Territory of Registration.

CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.

Examining full-time and part-time status for primary employment by age group reveals that older medical laboratory technologists (those older than 35) had a higher proportion of full-time status (nearly 70%) than their younger counterparts (those younger than 35), of which only 45.5% had full-time status (Figure 15). Again, the *not stated* portion might have caused the bias; if all *not stated* values could be cleaned, the current distribution in each age group might be different.



**Notes**  
Includes New Brunswick, Quebec, Ontario, Manitoba and Alberta.  
Excludes 16 records from the overall distribution (0.1% of the total) with unknown age.  
Provinces are defined by the data element Province/Territory of Registration.  
CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

**Source**  
Medical Laboratory Technologist Database, Canadian Institute for Health Information.

Figure 16 shows the percentage distribution of the full-time/part-time medical laboratory technologist workforce for primary employment categorized by gender. Of the full-time medical laboratory technologists, females accounted for 82.2%. The proportion of females with part-time employment was 10 percentage points higher than the proportion with full-time status.

Figure 16 Number and Percentage Distribution of Medical Laboratory Technologist Workforce, by Gender and Full-Time/Part-Time Status for Primary Employment, Selected Regulated Provinces, 2008



#### Notes

Includes New Brunswick, Quebec, Ontario, Manitoba and Alberta.

Excludes 976 records from the overall distribution (6.8% of the total) with unknown full-time/part-time status for primary employment and 1 record with unknown age.

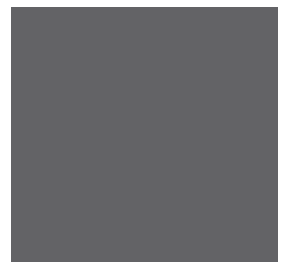
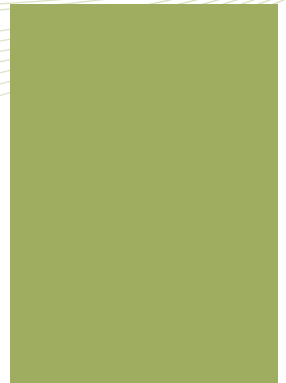
Provinces are defined by the data element Province/Territory of Registration.

CIHI data will differ from provincial and territorial statistics due to the CIHI collection, processing and reporting methodology. The Methodological Notes provide more comprehensive information in this regard.

#### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.





## Part 2

The Hospital Work  
Environment for Medical  
Laboratory Technologists

## 2.1 Introduction

In Part 1 of this report, it was shown that most medical laboratory technologists worked in general hospitals. Part 2 of this report focuses on hospital data housed in the CMDB. However, it must be noted that hospitals are complex environments, involving daily interactions between numerous professionals. The number of people involved in delivering services and collecting and reporting data in a hospital environment, together with the fact that health services are governed, organized and delivered uniquely by provinces and territories, makes direct operational comparisons and analyses complex. To facilitate such comparisons, hospitals and their clinical laboratories utilize the MIS Standards to quantify and report financial and statistical data on the delivery of their services. Though comparative data is presented in this section, the underlying causes of variability can be understood only by understanding the local operational structure of a hospital and its clinical laboratory services.



## 2.2 Why Focus Primarily on the Work Environment of Hospital Clinical Laboratories for Medical Laboratory Technologists?

One employment characteristic that is illustrated in Part 1 of this report is workplace of primary employment. For this section, the four provinces of New Brunswick, Quebec, Ontario and Alberta provided primary employment information. According to the data presented on these four provinces, most medical laboratory technologists (74.6%) were employed in a general hospital clinical laboratory setting. In addition, based on 2008 supply information presented in Part 1, the proportion of registered medical laboratory technologists for these four selected provinces comprised just more than 70% of the total registered workforce.

Since MIS data includes the financial and statistical data from submitting hospitals whose data is housed in the Canadian MIS Database (CMDB) and excludes data from Quebec and Nunavut, the financial and statistical indicator values presented in this section of the report provide a snapshot of the financial and statistical information related to the medical laboratory technologists' main place of work, a hospital setting.

## 2.3 What Is the Role of Clinical Laboratories Within the Hospital Environment and What Are Their Financial and Statistical Reporting Requirements?

### Defining Hospital Clinical Laboratories

Hospitals are complex environments with personnel from many departments interacting with each other to provide services to patients, whether these patients are admitted for a period of time, are present in the emergency department or are present on an out-patient basis. The financial and statistical data collected by hospitals is based on functional centres that include but are not limited to administration, materials management, finance, decision support, IT/IS services, nursing services, respiratory services, physiotherapy, pharmacy, occupational therapy, diagnostic services, including diagnostic imaging, and clinical laboratory services.

Clinical laboratories play an integral role as part of the health care team in delivering those services. Up to 85% of decisions about diagnosis and treatment are based on laboratory test results.<sup>15, 16</sup> In addition, 70% of a person's medical file is composed of medical laboratory test results.<sup>15</sup> On a daily basis, medical laboratory technologists perform laboratory testing on blood and body fluids to assist clinicians in caring for their patients. Throughout the course of their work day, medical laboratory technologists and other laboratory staff often interact with other hospital staff in delivering laboratory services.

In addition, hospitals and their clinical laboratories must manage the resources to deliver health care services. To assist in that regard, hospitals and clinical laboratories utilize the *Standards for Management Information Systems in Canadian Health Service Organizations* (MIS Standards) to quantify and report financial and statistical data in the delivery of those services.

## The MIS Standards

The MIS Standards are a set of national standards for collecting and reporting financial and statistical data related to the day-to-day operations of health service organizations across the continuum of care. These standards provide a framework for developing management information systems needed to identify and track services and their accompanying costs.

The MIS Standards identify the specific types of financial and statistical data that should be collected by the various departments. They also provide direction on how to group the data once it has been collected and how to process it in different ways. Finally, the MIS Standards identify how the information can be used for management purposes, such as in costing activities or developing a budget.

In Canada, the MIS Standards have been endorsed and adopted by all the provinces and territories except Quebec and Nunavut. As such, clinical laboratories in hospitals collect and report financial and statistical data using the MIS Standards in most jurisdictions. By doing so, they are able to quantify the resources used to provide patient care in a standardized format.

The major goals of the MIS Standards are to improve the quality and comparability of the data on a national basis and to better measure resource utilization and activity expenditure by integrating financial, statistical and clinical data. This data, which is housed in the CMDB, can be used to report financial and statistical data at a national level.

The MIS Standards address information at the functional centre and patient-specific levels but do not encompass information related to the care, treatment or clinical status of the patient, nor do they attempt to quantify or assess the quality of such services.

## Submission of MIS Data to CIHI

Each year, hospitals, which includes their clinical laboratories, and health regions from across Canada (except Quebec and Nunavut) are expected to submit MIS Standards-compliant financial and statistical data relating to hospital services to CIHI's Canadian MIS Database. Although Quebec has not endorsed or adopted the MIS Standards, the province does submit data to CIHI based on a slightly different standard, the *Manuel de gestion financière*, which, in the near future, may be mapped to similar MIS-based accounts. At this time, Quebec data is not included in this report. Health regions also submit data for other health service activities. Most provinces and territories submit hospital data through their respective ministries of health.

## Data Quality in the CMDB

The ability to calculate accurate indicator values from CMDB data is dependent on the provision of accurate financial and statistical data by the jurisdictions. As with any database, the CMDB contains some data quality issues, including

- The reporting of data that does not meet the CMDB's minimum reporting requirements; and
- The inconsistent reporting of some statistical data elements across jurisdictions.

In some cases, these issues prevented the reporting of comparative indicators from all jurisdictions for this report. CIHI continues to work with the provinces and territories to improve the quality of data in the CMDB so as to improve the ability to provide interjurisdictional comparisons for analysis.

## 2.4 What Does a Clinical Laboratory Setting Encompass?

The MIS Standards define the clinical laboratory as “an environment that pertains to the performance of investigative laboratory interventions through detailed analysis, assay and examination of clinical specimens.”<sup>7</sup>

Within the laboratory environment, medical laboratory technologists interact with other laboratory staff, such as directors, managers, quality coordinators, clerical and secretarial staff, medical laboratory assistants, pathologist assistants and medical personnel, such as pathologists, medical residents, interns and medical students.

In addition, the MIS Standards provide more detailed information regarding areas within a clinical laboratory as described below.<sup>7</sup>

### Clinical Laboratory Administration

This area of the laboratory is where the provision of clerical, secretarial, quality, utilization, computer, management and operational support of the entire clinical laboratory service takes place.

### Pre-/Post-Analysis

This area comprises the procurement of laboratory specimens from patients, the receipt and handling of all specimens, including registration and data entry, the preparation of appropriate specimens for dispatch to outside health service organizations, results reporting, distribution and specimen disposal when performed in a central location.

### Clinical Chemistry

Clinical chemistry includes the performance of qualitative and quantitative chemical analysis of blood, urine, body fluids, tissues or other materials for the purpose of detecting specific chemical components. Chemistry testing could include routine tests for liver function or levels of glucose, sodium, potassium and cholesterol, for example. Other types of testing could also include urinalysis, therapeutic drug monitoring, toxicology and blood gases.

### Clinical Hematology

Personnel in clinical hematology examine and study the cells and cellular components in blood and body fluids, as well as analyze coagulation disorders and associated hematopoietic functions.

## Transfusion Medicine

In transfusion medicine, personnel are involved in activities related to compatibility testing, the collection, processing, storage and distribution of blood, blood components or blood products, as well as the collection, processing, testing, preservation (freezing) and distribution of bone marrow and other cellular elements or tissues.

## Anatomical Pathology

Personnel in the anatomical pathology area are involved in the preparation and staining of body organs and tissue samples, such as a liver biopsy, for microscopic, sub-microscopic and histochemical examinations, as well as the preparation and staining of body organs and tissues taken at autopsies.

## Cytopathology

In cytopathology, personnel are involved in the preparation and microscopic examination of exfoliated cells and cellular specimens collected from various body organs or tissues. One of the most common activities includes the microscopic examination of the Papanicolaou (Pap) smear.

## Electron Microscopy

In the electron microscopy area of the clinical laboratory, personnel prepare and examine body tissues and other cellular material using an electron microscope.

## Clinical Microbiology

Personnel in clinical microbiology are involved in the identification of the causative agents of infectious diseases, such as bacteria, fungi, parasites and viruses, the susceptibility and resistance of patients to such diseases and the effect of drugs on the causative agent.

## Immunology

In the immunology area, personnel are involved in the investigation of auto-immune disorders and in the performance of investigative procedures on behalf of patients with conditions (including allergies) related to the body's defence mechanism against the invasion of foreign substances.

## Histocompatibility and Immunogenetics

In this area of the laboratory, personnel are involved in the typing of human lymphocyte antigens and in the performance of tissue cross-matching between donor and recipient.

## Diagnostic Genetics

In diagnostic genetics, personnel participate in activities pertaining to the analysis of blood, body fluids, tissues or other material for the purpose of identifying specific genetic constituents using DNA probes or other molecular markers. They also participate in activities pertaining to the investigation of cellular constituents related to the heredity of patients with known or suspected chromosomal abnormalities.<sup>7</sup>

As noted above, there are many different areas within a clinical laboratory. Depending on the size of the facility and the population it serves, the clinical laboratory will vary in the number and types of areas within it. Medical laboratory technologists may work in one area on its own or in a combination of areas. This will depend on a number of factors, such as the laboratory's size, number of staff and coverage 24 hours a day, 7 days a week.

## 2.5 What Was the Cost of Delivering Health Services in Hospitals in 2008 and the Cost of the Resources Consumed by the Clinical Laboratories to Deliver Those Services?

Delivering health services to patients can be a costly endeavour. Total health expenditure was estimated at \$161.0 billion in 2007 and is forecast to have reached \$173.6 billion for 2008 in current dollars. Included in those costs were those related to the services provided by clinical laboratories.<sup>17</sup>

Laboratory services can include hospital-based clinical laboratories, community-based clinical laboratories, public health laboratories and other service delivery mechanisms. Of the \$173.6 billion forecast to be expended in 2008 for health expenditures, the largest single component continues to be expenditures in hospitals, making up 28%, or \$48.5 billion. This section focuses on those services that are delivered from hospital-based clinical laboratories.<sup>17</sup>

In delivering those services, hospital-based clinical laboratories consume various resources to deliver patient care. Resources can be in the form of health human resources or material resources.

The consumption of resources generates expenses in the clinical laboratory, including such costs as

- Compensation (such as salaries);
- Supplies (such as reagents);
- Sundries (such as continuing education fees and materials);
- Equipment expenses (such as amortization of the cost of analyzers); and
- Contracted-out services (such as the cost of testing performed at a reference laboratory).

In clinical laboratories, measuring the amount of resources consumed is facilitated by collecting and reporting statistical information for both service activities and workload by the category of service recipient.

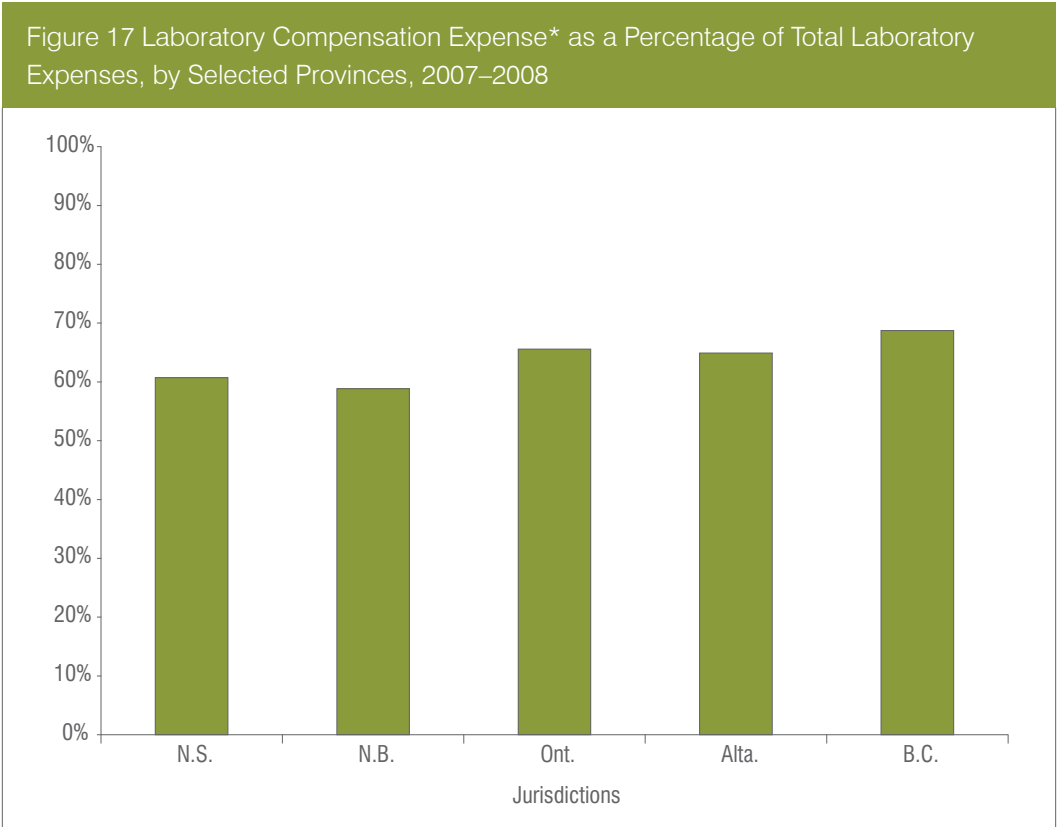


## 2.6 What Are the Compensation Expenses in Hospital Clinical Laboratories?

Delivering clinical laboratory services would not be possible without staff, including medical personnel, management and operational support personnel, and unit-producing personnel (UPP). UPP carry out the hands-on service mandate of the clinical laboratory. Medical laboratory technologists and medical laboratory assistants are two examples of UPP. Typical duties of UPP include collecting laboratory specimens (such as a blood sample) and measuring and generating results (such as a blood sugar or complete blood count).

For rendering services, clinical laboratory staff are compensated with a monetary payment in the form of a salary and benefits. Compensation expense is only one component of the total clinical laboratory expenses, which also include supplies, sundries, equipment and contracted-out expenses. Without personnel, there would be no services.

In Canada, across the selected provinces of Nova Scotia, New Brunswick, Ontario, Alberta and British Columbia, the proportion of expenses that encompassed compensation varied. Figure 17 illustrates that the weighted average percentage of clinical laboratory expenses related to compensation in 2007–2008 varied from 58.8% in New Brunswick to 68.7% in British Columbia. See the Methodological Notes for further information on weighted averages.



**Note**  
\* Includes compensation for management and operational support personnel and unit-producing personnel working in the clinical laboratory, excluding medical personnel.

**Source**  
Canadian MIS Database, Canadian Institute for Health Information.

There are many factors that can affect the compensation rates across hospitals and jurisdictions, such as the economic situation in the jurisdiction, the local job market and the staffing mix (for example, medical laboratory technologists versus assistants). Compensation rates may be affected by the negotiation of salary rates, including overtime rates, shift differentials and rates for working on a statutory holiday. Further details about this information are not available in the CMDB but may be available at the provincial or local level. The proportion of personnel with many years of service and the level and amount of benefits received by personnel may also affect the rates.

The breadth and complexity of the services provided by laboratories may determine the number of specialized positions and supervisory staff required, as well as the staffing mix. Laboratory size may also determine whether there is staff on site 24 hours a day, 7 days a week or whether staff is scheduled on stand-by for after-hours service.

The amount of clinical laboratory services that are contracted-out from the hospital may be another cause of variation for this indicator. The extent to which this occurs may depend on the complexity of testing requested, the scope of services provided and the availability of specialized equipment or expertise.

Technology is another significant factor that may affect this indicator. A more highly automated laboratory may have proportionally less compensation than a less automated laboratory. Laboratories with larger volumes of testing are more likely to have higher levels of automation. The type and age of equipment in the laboratory may also affect the proportion of compensation.

Geographical location may also affect the proportion of expenses related to compensation. For example, a laboratory housed in a remote hospital with no other clinical laboratory services nearby may require backup/duplicate equipment/systems to ensure continued patient care when one piece of equipment or the system malfunctions. Furthermore, geographically isolated laboratories may pay a higher price for equipment, reagents and personnel as a result of elevated transportation or travel costs.

## 2.7 What Are the Details of Compensation in Hospital Clinical Laboratories?

Compensation expense includes three major components: worked compensation, benefit compensation and benefit contributions compensation. Worked compensation is those salaries that are paid to personnel for the hours in which they are present and available for work. This includes regular salaries, overtime, call-back and standby salaries, as well as salaries for statutory holidays that are worked.

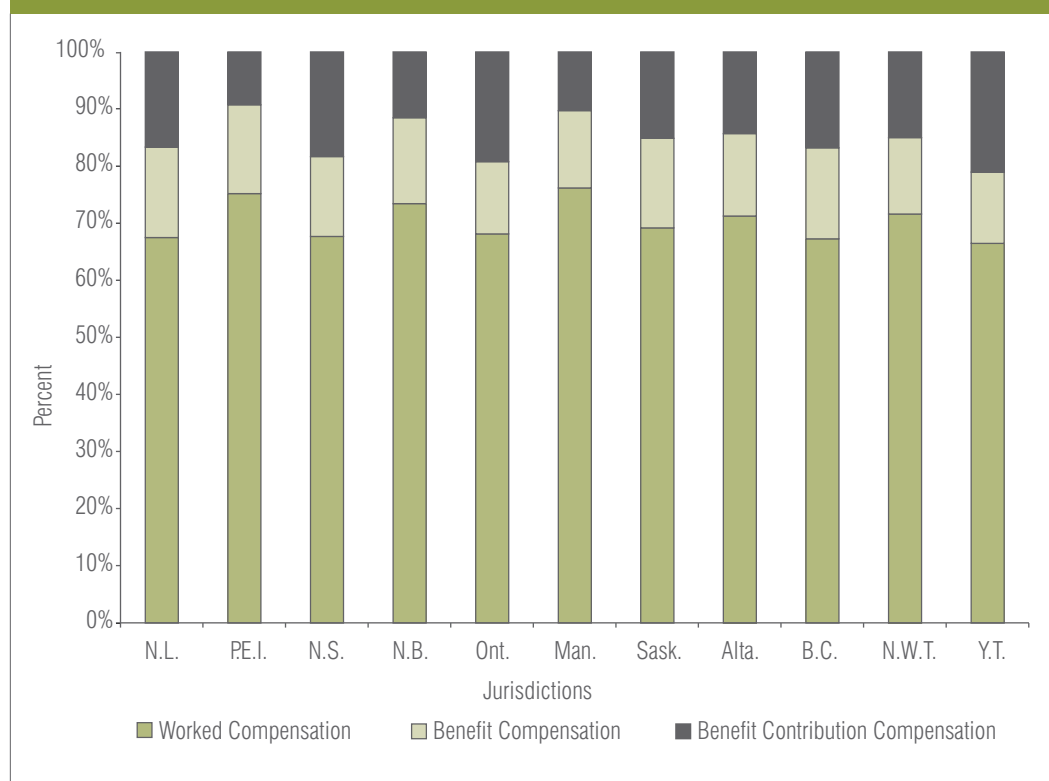
The second major component of compensation expense is benefit compensation. Benefit compensation is the salaries that are paid to personnel for the hours in which they are not present and available for work. This includes vacation, sick time, education leave and other paid leaves.

The benefit contributions component of the compensation expense is the employer's share of employee benefit contributions. These may include the employer's share of Canada Pension Plan, Employment Insurance, pension contributions and medical, dental or other health benefits.

Figure 18 illustrates the proportions of worked salary, benefit salary and benefit contributions in hospital clinical laboratories in all jurisdictions except Quebec and Nunavut in 2007–2008.

The weighted average percentage of total clinical laboratory compensation expenses related to worked compensation varied from 66.5% in the Yukon to 76.2% in Manitoba. Benefit compensation ranged from 12.5% in the Yukon to 15.9% in B.C., whereas benefit contribution compensation ranged from 9.3% in P.E.I. to 21.0% in the Yukon.

Figure 18 Worked, Benefit and Benefit Contribution Compensation as a Percentage of Total Laboratory Compensation, Selected Provinces and Territories, 2007–2008



#### Notes

Includes compensation for management and operational support personnel and unit-producing personnel working in the clinical laboratory, such as medical laboratory technologists and medical laboratory assistants, but excludes medical personnel for provinces and territories that use the MIS Standards.

At present, Quebec and Nunavut have not endorsed and adopted the MIS Standards and therefore do not submit their financial and statistical data to the CMDB. Quebec does submit data to CIHI based on a slightly different standard.

#### Source

Canadian MIS Database, Canadian Institute for Health Information.

Several factors may affect these proportions. The amount of overtime may affect the proportion of worked salary, because in many cases, overtime is paid at a rate higher than benefit salaries. Therefore, an organization with more overtime may show a higher proportion of worked salary and thus a lower proportion of benefit salary and benefit contributions. Further details about this information are not available in the CMDB but may be available at the provincial or local level.

Staff seniority levels, collective agreements and other policies may affect these proportions. For example, staff with more seniority may be entitled to more vacation, thus increasing the benefit salary component. Similarly, the number of statutory holidays in a given jurisdiction may also affect the proportion of benefit salaries, as would the use of sick time or other leave.

The number of benefit programs to which the employer contributes may also vary, as could the proportion of the employer's share. For example, the amount contributed by the employer to the employee pension plan may vary from one jurisdiction to another. These differences may affect the proportion of benefit contributions.

The use of purchased services may also affect this indicator. Purchased services are those hours for which the clinical laboratory reimburses another organization to provide staff to work in the clinical laboratory (for example, a temporary agency). In this case, all compensation is considered worked salary, even though the hourly rate may include a component of administration, vacation or other benefits. A clinical laboratory with a high proportion of purchased services may also have a large proportion of worked salary. In the above situation, purchased services are included in worked compensation and represent 1% or less of total compensation.

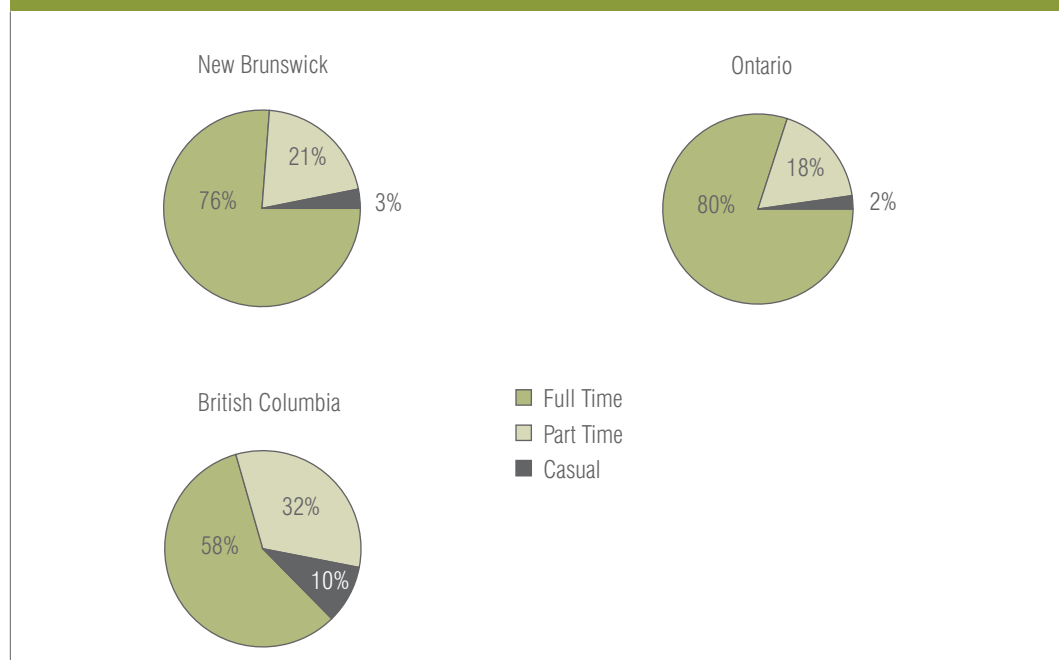
As indicated in Section 2.1 of this report, hospitals are complex environments, involving daily interactions between numerous professionals. The number of people involved in delivering services and collecting and reporting data in a hospital environment, together with the fact that health services are governed, organized and delivered uniquely by provinces and territories, makes direct operational comparisons and analyses complex. Though comparative data is presented in this section, the underlying causes of variability can be understood only by understanding the local operational structure of a hospital and its clinical laboratory services.

## 2.8 What Does Medical Laboratory Technologist Staffing Look Like in Hospital Clinical Laboratories?

Medical laboratory technologists are employed either as unit-producing personnel (UPP) or as management and operational personnel in the clinical laboratory. UPP perform activities that directly contribute to the fulfillment of the mandate of the functional centre. This staffing category describes the individuals who perform testing in the clinical laboratory service.

The UPP may be employed as full-time, part-time or casual employees. In some cases, individuals may choose their Employment Status, whereas in other cases, Employment Status may be determined by the availability of positions. Figure 19 shows the distribution of earned hours for 2007–2008 among the health service organizations represented in the CMDDB, by Employment Status (full time, part time and casual) for the selected provinces of New Brunswick, Ontario and British Columbia. Ontario had the highest percentage of full-time earned hours (80%), while British Columbia had the highest percentage of part-time and casual hours (33% and 10%, respectively).

Figure 19 Laboratory Percentage of Unit-Producing Personnel Earned Hours for Medical Laboratory Technologists by Employment Status (Full Time, Part Time and Casual), Selected Provinces, 2007–2008



**Note**

Includes only unit-producing personnel who are medical laboratory technologists.

**Source**

Canadian MIS Database, Canadian Institute for Health Information.

The data in Figure 19 does not identify the number of individuals in each of the three categories of Employment Status (full time, part time or casual), but rather the total earned hours by Employment Status. The earned hours include worked hours, benefit hours and purchased service hours. Refer to the Methodological Notes section for further information on worked, benefit and purchase service hours.

One factor to consider in interpreting the data is that the earned hours include both worked and benefit hours. The proportion of full-time earned hours includes benefit hours, such as statutory holidays, vacation and sick time. Part-time or casual employees, however, may receive compensation in lieu of these benefit hours, so the proportion of part-time or casual hours may not necessarily include the benefit hours. Refer to the Methodological Notes for the definitions of full time, part time and casual.

Another factor that may affect the data is the staffing structure. Clinical laboratories may differ in staffing mix and operational needs. They may also vary in terms of balance (that is, the proportions of full time, part time and casual staff) to ensure staff retention and enable staff to remain current and competent.



## 2.9 What Comprises Clinical Laboratory Workload in Hospitals?

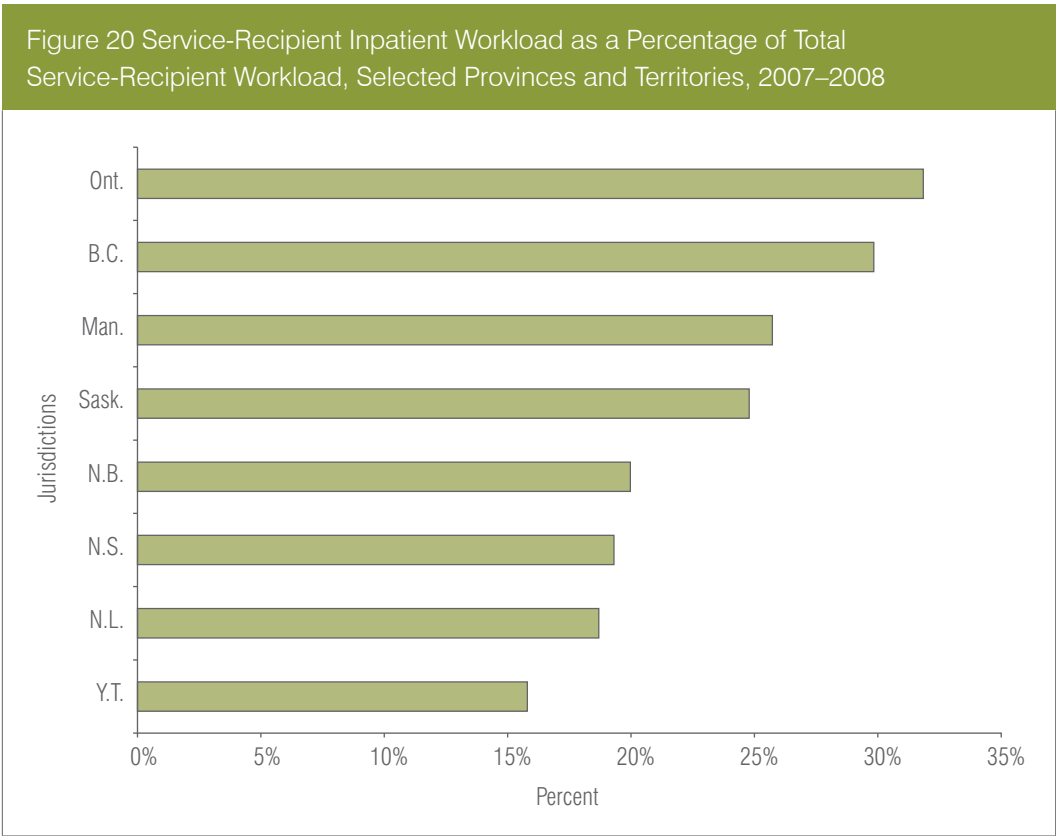
### Defining Clinical Laboratory Workload

Workload is measured in the clinical laboratory using a national workload measurement system (WMS). In the WMS, one unit represents one minute of time required to perform an activity. Workload is divided into two major categories: service-recipient and non-service recipient activity. The service-recipient activity category includes workload that is related to the mandate of the functional centre (for example, testing) and is being performed for an individual service recipient. This workload category is further divided into the categories of service recipient described earlier: inpatients, clients such as those in emergency, day surgery or clinics, or patients being referred to the laboratory by the physician. In addition, clinical laboratories may receive referred-in work from other facilities for various reasons, including esoteric testing or on a contract basis.

### Distribution of Workload in Clinical Laboratories

The proportion of total workload that can be attributed to the inpatient service recipient may vary across facilities and jurisdictions depending on the operational make-up of the clinical laboratory and the population that it serves.

In the clinical laboratory, the patients served are either inpatient or outpatient service recipients. In Figure 20 below, the proportion of total workload in the clinical laboratory for the selected jurisdictions of Ontario, British Columbia, Manitoba, Saskatchewan, New Brunswick, Nova Scotia, Newfoundland and Labrador and the Yukon that can be attributed to inpatient service recipients ranged from 15.8% to 31.8% of the total workload in 2007–2008.



**Source**  
Canadian MIS Database, Canadian Institute for Health Information.

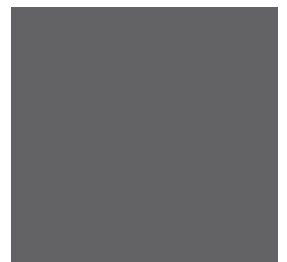
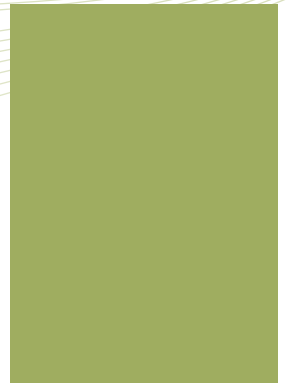
The amount of workload related to inpatients may vary depending on the complexity and types of services provided in the inpatient setting. If inpatient services include more laboratory-intensive programs (for example, oncology services), then the proportion of inpatient workload will likely be higher.

The patient population served may also affect this indicator. If the inpatient population consists of patients who require more laboratory services, it is likely that the proportion of inpatient workload will be higher than that for a population requiring fewer services. For example, a diabetic person may normally monitor his or her blood sugar at home, only occasionally using a clinical laboratory to test it. However, if he or she is admitted to the hospital, blood sugar will be monitored by the clinical laboratory, sometimes up to four times per day. If the population served has a high proportion of diabetics, the proportion of inpatient workload may be increased as the result of increased testing for the inpatient diabetic population.

Other factors that may impact this indicator are physician and hospital testing practices. For example, if pre-admission laboratory testing is performed on an outpatient basis, the proportion of inpatient workload will be lower than in settings where this testing occurs on an inpatient basis.

The proportion of the service-recipient workload for inpatients may also vary according to the other categories of service recipients being served. For example, if a large proportion of the outpatient workload is being performed by non-hospital laboratories, such as community or private laboratories or public health laboratories, the hospitals may have a higher proportion of inpatient workload.





# Part 3

Methodological Notes

## Methodological Notes: Part 1 of Report

These notes outline the basic concepts behind the data provided in Part 1 of this publication, the underlying methodology of the data collection, as well as key aspects of data quality. They will help provide a better understanding of the strengths and limitations of the data and illustrate the ways in which the data can be used effectively. This information is of particular importance when making comparisons with data from other sources and in regard to conclusions based on changes over time.

The Canadian Institute for Health Information relies on superior principles of data quality, privacy and confidentiality. CIHI's commitment to ensuring the collection of quality data in a privacy-sensitive manner is applied to data collection, processing, analysis and dissemination. For further details regarding CIHI's privacy principles, outlined in *Privacy and Confidentiality of Health Information at CIHI: Principles and Policies for the Protection of Personal Health Information*, please visit our website at [www.cihi.ca](http://www.cihi.ca).

### Background

Policy reports and research papers have consistently demonstrated that there is very little standardized data available on health professionals on a national basis, with the exception of physicians and regulated nursing professionals. Based on consultations with federal and provincial/territorial ministries of health, the profession of medical laboratory technology, together with four other professions,<sup>i</sup> has been identified by CIHI, Health Canada and other stakeholders as a priority for the development of such data. As a result, the Medical Laboratory Technologist Database (MLTDB) was established in 2008, when the database started its first-year data collection from across Canada.

### Purpose of Part 1 of This Report

Supply and distribution information is a key component of health human resources planning at the pan-Canadian and provincial/territorial levels. Any planning or projection of the number of health professionals required for a particular jurisdiction must begin with an understanding of the current supply and how that supply is changing. The presentation of clear, objective data and data analysis enables informed decision-making and supports policy formulation.

The analysis in Part 1 of this report primarily focuses on selected information from the previously published *Medical Laboratory Technologist Database, 2008 Data Release*. It covers information on the regulatory environment and supply of medical laboratory technologists, their demographic composition, education requirements, certification process and workplace settings, and it helps readers better understand this profession through descriptive analysis of these characteristics.

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i. The four other professions are medical radiation technology, occupational therapy, pharmacy and physiotherapy.

## Scope of the MLTDB

### **Population of Interest**

The population of interest for the MLTDB includes all medical laboratory technologists who are qualified to work in Canada.

### **Population of Reference**

The population of reference for the MLTDB includes all medical laboratory technologists who register with provincial regulatory bodies or the Canadian Society for Medical Laboratory Science (CSMLS), given that these organizations submitted data to the MLTDB, regardless of whether the registrations were active or inactive.

### **Period of Reference**

For any given year, the population of reference includes those medical laboratory technologists who register between the start of the registration period for the provincial regulatory bodies or the CSMLS and August 1. For 2008, the period of reference began with the registration start period and ended on August 1, 2008.

### **Regulation Status**

The profession of medical laboratory technology is not regulated in all Canadian jurisdictions. Currently, it is not regulated in Newfoundland and Labrador, Prince Edward Island, British Columbia or the territories (the Yukon, the Northwest Territories and Nunavut). Unless mandated by the employer, medical laboratory technologists who work in non-regulated jurisdictions are not required to register with a provincial professional society or the CSMLS. In all other provinces, medical laboratory technologists must register with the provincial regulatory body in order to practise. A summary of regulation status by province and territory is presented in Appendix A.

The circumstance of non-regulation and voluntary registration has a significant impact on the quality of the data; particularly, under-coverage becomes a major concern for jurisdictions that are not regulated. For more detail, see the Under-Coverage section of this document.

### **Data Inclusions for the MLTDB**

Data collected for the MLTDB includes all registrations received by the provincial regulatory bodies and the CSMLS before August 1, 2008. See Appendix B of this document for the list of data providers.

### **Data Exclusions for the MLTDB**

Data collected for the MLTDB does not include

- Medical laboratory technologists residing and working in non-regulated provinces and territories who chose not to obtain a voluntary membership with the CSMLS; and
- Medical laboratory technologists who registered with regulatory bodies or the CSMLS after July 31, 2008.

### **Scope of Part 1 of This Report**

Part 1 of this report focuses on describing the workforce of medical laboratory technologists. The workforce data elements included in the analysis were extracted from the MLTDB and selected because their coverage and relevance supported the purpose of the report. In addition to presenting the workforce data, the report describes the educational path for medical laboratory technologist candidates to enter the workforce and clinical laboratory settings. Information regarding the accreditation status was obtained from sources other than the MLTDB.

### **Point-in-Time Data Collection**

The point-in-time approach to data collection provides a snapshot of the medical laboratory technologist workforce across jurisdictions on a specific day. Using the same approach consistently enables comparability in time, which is necessary to accurately determine a trend. However, this approach may not capture the year-end totals equally in every province and territory, as the registration start dates can vary from one to another.

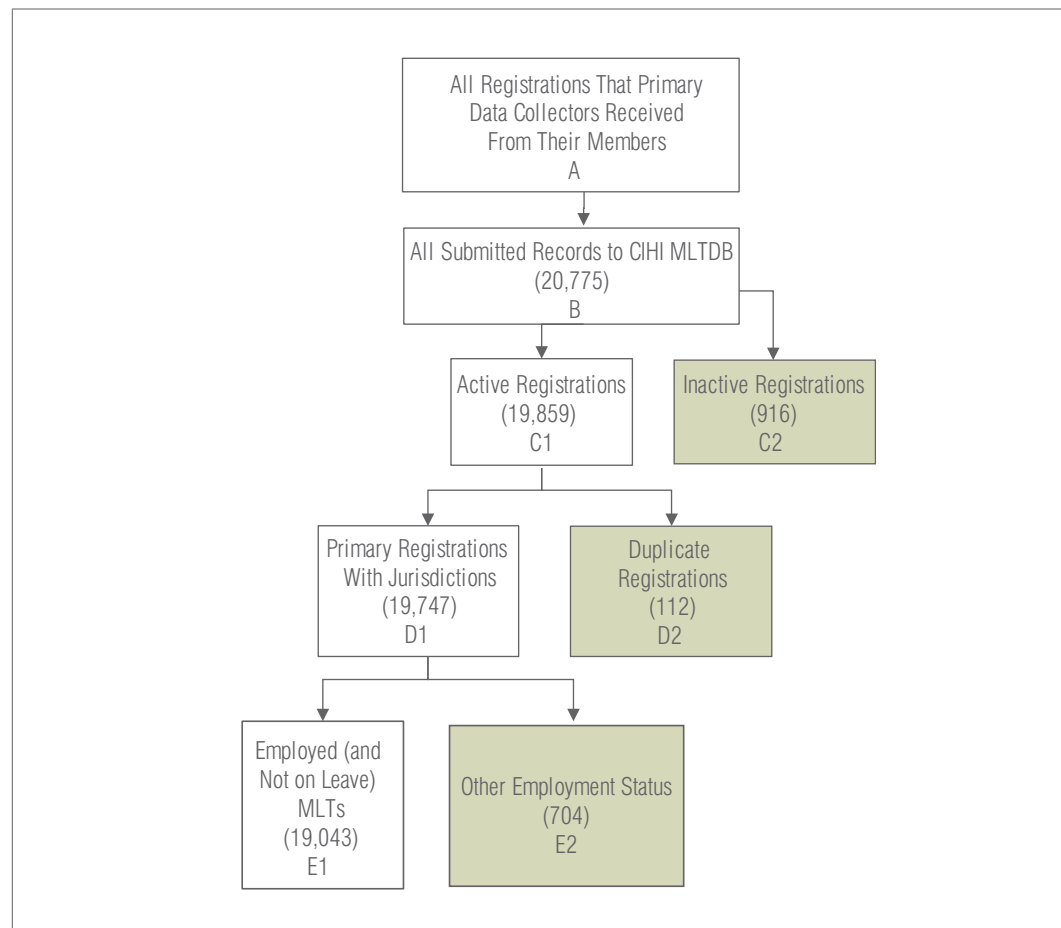
Data collection begins at the onset of the data provider's respective annual registration period and ends on August 1. This collection period was identified as the period that captures most of the registrants renewing or applying for membership. The registration periods for provincial and territorial jurisdictions for the 2008 registration year are presented in Appendix C.

### **Data Flow From Primary Data Collector to CIHI**

As part of their registration/licensing process, the provincial regulatory bodies and the CSMLS collect membership data on an annual basis. This administrative data is submitted to the MLTDB according to established standards.

The diagram below illustrates the data flow based on this methodology. Explanations of each step within the data flow are provided following the diagram.





**Box A:** Includes all registrations that the medical laboratory technologist regulatory bodies or the CSMLS received from their members.

**Box B:** Includes all registrations that are submitted by medical laboratory technologist regulatory bodies or the CSMLS to the CIHI MLTDB. The cut-off date for data collection is August 1 of the year.

**Box C1:** Includes registrations that are identified as active.

**Box C2:** Includes registrations that are identified as inactive. These records are removed from the final count.

**Box D1:** Represents primary registrations where the province or territory of registration reflects the registrant's primary jurisdiction of practice.

**Box D2:** Medical laboratory technologists in Canada can work in more than one jurisdiction concurrently as long as they meet the requirements of the provincial regulatory bodies or employers. In the interests of preventing double-counting of medical laboratory technologists across jurisdictions, this box represents the secondary registrations or interprovincial duplicates to be removed from the final count. The methodology that identifies primary and secondary registrations is explained in detail in the Data Processing Methods section.

**Boxes E1 and E2:** In most cases, statistics produced by provincial regulatory bodies or the CSMLS include all active registrations, regardless of Employment Status. In contrast, CIHI statistics, whenever possible,<sup>ii</sup> include only those registrants who explicitly stated they were working in medical laboratory technology (Box E1) at the time of registration or renewal. Those who were on leave, employed outside of medical laboratory technology, retired or unemployed, or whose Employment Status was unknown at the time of registration or renewal, are excluded from the final statistics for publication (Box E2).

### **Impact of CIHI's Methodology of Identifying the Medical Laboratory Technologist Workforce**

By carefully selecting the reference population for the medical laboratory technologist workforce, CIHI is able to provide standardized comparable data suitable for analysis and trending purposes. As explained previously, the population of reference for CIHI's publications includes all medical laboratory technologists who registered with the provincial regulatory bodies or the CSMLS and were working in medical laboratory technology as of August 1, 2008. The interprovincial duplicates are removed. The population of reference for reporting by other organizations may differ for various reasons, such as differences in the time frame used, the inclusion of other registration types (such as inactive and others), differences in Employment Status (employed versus unemployed) and the inclusion of secondary registrations. Discrepancies between the data in the CIHI publication and data presented by other organizations are often the result of these differences. We therefore caution readers to be mindful of these differences when comparing MLTDB data with other data holdings and publications.

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ii. Registered workforce excludes medical laboratory technologists who have Employment Status other than *employed in medical laboratory technology*. Nevertheless, the data providers for Newfoundland and Labrador, Prince Edward Island, Saskatchewan, British Columbia and the territories (the Yukon, the Northwest Territories and Nunavut) were not able to distinguish Employment Status. Consequently, all records are included for the workforce.

## Data Collection Methods

### Data Sources

The sources of data for the MLTDB are the provincial regulatory bodies and the CSMLS, which collect the data in written or electronic format. See details of the data sources in Appendix B.

### Data Collection

Paper or online registration forms completed by the registrants for registration/licensing purposes serve as the primary source of data collected for the provincial regulatory bodies and the CSMLS.

Once in electronic format, an extract of the data is prepared for submission to CIHI. Only those data elements defined in the *Medical Laboratory Technologist Database Data Dictionary* (available at [www.cihi.ca](http://www.cihi.ca)) are submitted to CIHI. The data extract must conform to the specifications of the MLTDB, as outlined in the *Medical Laboratory Technologist Database Data Submission Specifications Manual* (available at [www.cihi.ca](http://www.cihi.ca)).

A letter of agreement governs CIHI's collection of medical laboratory technologist data. Each year, data providers who participate in the MLTDB will review the core set of elements that they collect on their registration forms. Under the current agreement, each data provider agrees to make every reasonable effort to collect and submit the 86 data elements for each registrant according to the definitions outlined in the *Medical Laboratory Technologist Database Data Dictionary*.

### Key Concepts and Definitions

Only data elements used in the analysis presented in Part 1 of this publication are described below. For a complete list of data elements in the MLTDB, as well as complete data element names and definitions, please refer to the *Medical Laboratory Technologist Database Data Dictionary*, which can be downloaded from the CIHI website ([www.cihi.ca](http://www.cihi.ca)), or contact the MLTDB program area.

### Demographics

#### Gender

The reported sexual category of a registrant at the time of registration or renewal, used for administrative purposes.

#### Age

Derived from the year of birth of the registrant.

## Geography

### *Location of Residence*

Canadian province or territory of residence or locations outside of Canada.

### *Province/Territory of Registration*

For regulated provinces, refers to the province in which the organization submitting medical laboratory technologist data operates. For non-regulated jurisdictions, the CSMLS provided information for this data element based on CIHI's criteria.

## Education

### *Level of Basic Education in Medical Laboratory Technology*

Initial educational program used to prepare a medical laboratory technologist for practice. This refers to the initial educational program used, in whole or in part, for consideration of licensure as a medical laboratory technologist in Canada.

### *First Certification Area for Practice*

Based on the Certification Area 1 defined in the *Medical Laboratory Technologist Database Data Dictionary*, reflects the entry-level certification issued by the CSMLS.

### *Place of Primary Employment*

At the time of registration or renewal, the workplace of primary employment where service is delivered, either as an employee or self-employed.

### *Positions for Primary Employment*

At the time of registration or renewal, the main role within the primary employment. For registrants with multiple roles within primary employment, this reflects the role associated with the most weekly hours worked.

### *Full-Time/Part-Time Status for Primary Employment*

The official status with an employer. If official status is unknown, the classification of status based on usual weekly hours of work at the time of registration or renewal.

According to the *MLTDB Data Dictionary*, an employee's full-time or part-time status refers to the official status with an employer; if the official status is unknown, the employee will be assigned (by data providers to the MLTDB) full-time status if the usual weekly hours of work are equal to or greater than 30, or part-time status if the usual weekly hours of work are less than 30. Employees with casual work status will be reclassified with full-time or part-time status based on their usual number of hours worked.

### About Entry-Level Medical Laboratory Technologist Certification

In order to practise the profession of medical laboratory technology in Canada, medical laboratory technologists must become certified with the CSMLS, except in Quebec, which has its own certification process. The CSMLS certification process involves participation in a Canadian accredited training program that incorporates a competency profile established by the CSMLS in its curricula. Students must first successfully pass the Canadian accredited training program exam before they can take the national certification exam offered by the CSMLS. Certification is the nationally accepted standard for entry into practice. In 2008, medical laboratory technologists could become certified in one of three areas: general medical laboratory technology, diagnostic cytology or clinical genetics. A medical laboratory technologist can work only in the area in which certification has been obtained.<sup>iii</sup> In Quebec, to obtain a permit in medical technology for medical biology, applicants must hold a diploma in Technologie d'analyses biomédicales awarded by an institution recognized by the Ministry of Education of Quebec. Also in accordance with the *Professional Code of Quebec* and the *Charter of the French Language*, the candidate must have knowledge of French to practise in the profession.<sup>iv</sup>

## Data Processing Methods

### File Processing

Once data files have been received by CIHI, all records undergo processing before they are included in the national database.

### Data Validation

The MLTDB system first ensures that records are in the proper format and that all responses pass specific validity and logic tests. If submitted data does not match CIHI's standard or a relationship between specific fields does not make sense (for example, if the Year of Graduation is earlier than the Year of Birth), an exception and/or anomaly report will be generated. Together with a data file summary (identifying and explaining the errors), the reports are sent to the data provider.

Errors and/or anomalies are reviewed jointly by CIHI and the respective data provider representative. The data provider then corrects the data and resubmits its data file to CIHI, where it is reviewed again. In cases where the data provider is not able to make the corrections, CIHI may make them directly with the explicit consent of the provider. If a correction cannot be made, the code is changed to the appropriate default/missing value.

iii. Information is compiled in accordance with statements on the CSMLS website ([www.csmls.org](http://www.csmls.org)).

iv. Information is compiled in accordance with statements on the website of the Ordre professionnel des technologistes médicaux du Québec ([www.optmq.org](http://www.optmq.org)).

## Derived Variables

Once the file has passed all validity and logic tests, some variables with high interest or importance are derived in the database for reporting. Examples include age, highest education in profession and health regions. These derived variables help the reader better understand the data reported from the MLTDB.

## Identification of Primary or Secondary Registrations

As a part of the derivation process, each record is analyzed and marked as either primary registration or secondary registration, according to the CIHI methodology. If a submitted record indicates that an individual lives outside of Canada, it must be identified and removed from the analysis to avoid over-counting the medical laboratory technologists within Canada.

Similar to the advantages of a Canadian medical laboratory technologist maintaining an international registration, there are administrative incentives for medical laboratory technologists to maintain their registration in one Canadian jurisdiction while living and/or working in another. To avoid double-counting at the national level, CIHI evaluates each registration to ensure that it reflects the primary jurisdiction of practice. All secondary registrations that are deemed duplicate registrations are excluded.

Primary registrations are defined as records meeting the following conditions:

- Province/territory or country of residence is either in Canada or not provided.
- For medical laboratory technologists employed in medical laboratory technology, Province/Territory of Primary Employment equals Province/Territory of Registration; if Province/Territory of Primary Employment is not provided, then Province/Territory of Residence equals Province/Territory of Registration.
- For medical laboratory technologists not employed in medical laboratory technology, retired or unemployed or for medical laboratory technologists with an Employment Status of *unknown*, Province/Territory of Residence equals Province/Territory of Registration.
- If the registrant does not provide any information on Province/Territory of Primary Employment or Province/Territory of Residence, the registrant is assumed to have primary registration with the province/territory that submitted the data (that is, Province/Territory of Registration).

See Appendix D for the flow diagram illustrating the process for identifying primary/secondary registrations.

The purpose of this methodology is to remove secondary registrations. However, it is not without its limitations. For example, a medical laboratory technologist living in the United States but working in Canada will be erroneously removed as living abroad. Also, when a medical laboratory technologist is registered and employed in a Canadian jurisdiction and decides to provide short-term relief staffing in another jurisdiction, depending on the information provided by the registrant, the identification of primary (versus secondary) registration may not be accurate.

### Data Verification With Compare Reports

Once a data submission from a data provider has been accepted in the national database, values for each submitted data element are aggregated to the provincial/territorial level. Three compare reports are prepared for this information: one for active registrations, one for inactive registrations and one for the data that is filtered for the workforce and to be published by CIHI. All three reports are sent to the data provider that submitted the data for review and approved the use of the data.

After the compare reports were signed off, a few more data quality issues were identified during the preparation of the *Medical Laboratory Technologist Database, 2008 Data Release* (released in January 2010). All the issues were raised with the corresponding data provider for clarification and verification. With the data provider's consensus, some changes at the value level were made. As a result, in some tables and figures, value distribution within a data element may differ slightly from the values shown in the compare reports.

### Processing the Missing Values

When a data provider is unable to provide information for a registrant for a specific data element, a missing value in the terms *not collected* or *unknown* has to be provided to the MLTDB. When the data collected is not relevant to a registrant, the data provider is required to submit *not applicable* to the database. See definitions of the terms in the Missing Values section of this document.

The MLTDB derives some variables such as Age (from Year of Birth) when data is loaded to the system. If the reference data element(s) has missing values, the variable derived from it is usually assigned an *unknown* value.

Throughout the publication, *not collected*, *unknown* and *not applicable* have been combined into the term *not stated*. Because *not collected* data elements are not included in the figures and *not applicable* usually has a particular meaning,<sup>v</sup> the majority of the *not stated* values listed in the figures are *unknown*.

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v. For example, *not applicable* for the level of other education than medical laboratory technology means the registrant does not have other education. *Not applicable* in this case is a known value.

## Data Quality Assessment

To ensure a high level of accuracy and usefulness, CIHI developed a framework for assessing and reporting the quality of data contained in its databases and registries. This framework focuses on the five dimensions of data quality: timeliness, usability, relevance, accuracy and comparability. Briefly, they are as follows for the MLTDB:

- Timeliness is achieved by collecting data at a point in time that is determined and agreed upon by the data providers and that reflects a majority of total records. This allows CIHI to analyze and release the data in a timely manner.
- Usability refers to the availability and documentation of the data and the ease of interpretation.
- Relevance of the data set includes the adaptability and value of the data when used by decision-makers, policy developers, researchers and the media.
- Accuracy is an assessment of how well the data reflects reality or how closely the data presented in this publication reflects the population of reference. Under- or over-coverage issues and CIHI's methodologies of point-in-time data collection, primary/secondary registration identification and missing data values all have an impact on accuracy.
- Comparability measures how well the data for the current year compares with the data from previous years and how data from the MLTDB compares with data from other sources or between jurisdictions. This publication presents medical laboratory technologist data for the 2008 registration year. Previous data years are available only in aggregate counts from the Health Personnel Database at CIHI.

It is important to note that the levels of accuracy and completeness necessary to meet the financial and administrative requirements of a registry can differ from those required for research. An extensive mapping exercise took place collaboratively with each data provider to ensure alignment between the data collected on the registration forms and the data elements of the CIHI *Medical Laboratory Technologist Database Data Dictionary*. Any discrepancies were documented and accounted for in the analysis and described in the Methodological Notes or the footnotes. In some cases, data providers supplied user guides to their membership to assist in the completion of registration forms, which facilitated a higher level of data accuracy.



## Under-Coverage

Under-coverage results when data that should be collected for the database is not included in the frame for the MLTDB. This section outlines where caution must be applied when analyzing data presented in this publication.

- Medical laboratory technologists who work in Newfoundland and Labrador, Prince Edward Island, British Columbia and the territories (the Yukon, the Northwest Territories and Nunavut) are not required to register with the CSMLS unless otherwise required by their employer. Due to this state of voluntary registration, statistics for these jurisdictions may not represent the entire population of the profession. However, it is estimated that a high percentage of the workforce does register.
- The point-in-time data collection approach may invite an under-coverage issue. This approach may not capture the year-end totals equally in every province and territory, as the start date for registration can vary from one jurisdiction to another.
- According to CIHI's methodology for identification of primary/secondary registrations, MLTDB records for medical laboratory technologists who live outside Canada are excluded from publications for the workforce since they are identified as secondary registrations. For publications on the medical laboratory technologist workforce, under-coverage occurs among registrants who work in the profession in Canada but live in another country. However, such instances are not often observed across the country.

## Over-Coverage

Over-coverage is the inclusion of units on the frame beyond the population of reference.

For the publications on the medical laboratory technologist workforce, over-coverage may occur when a medical laboratory technologist does not work in the profession but is included in the database or publication.

- Employment Status has seven values defined in the *Medical Laboratory Technologist Database Data Dictionary*: *employed in medical laboratory technology*, *employed in medical laboratory technology but on leave*, *employed outside of medical laboratory technology*, *retired*, *unemployed*, *not collected* and *unknown*. Each record was assigned one of the values when data was provided. Only the records that have been assigned *employed in medical laboratory technology* are included in the publication. Nevertheless, the data provider for Newfoundland and Labrador, Prince Edward Island, Saskatchewan, British Columbia and the territories (the Yukon, the Northwest Territories and Nunavut) was not able to distinguish Employment Status. Consequently, all records are included for the workforce. The number of records that are assigned other Employment Status values and that should be excluded from the publication is believed to be very small. The impact of their inclusion would be limited in any analysis involving the affected jurisdictions.

- According to CIHI's methodology for identifying primary/secondary registrations, records in the MLTDB with *unknown* or *not collected* values for Province/Territory of Residence and Province/Territory of Primary Employment are classified as primary registrations. If these records are true secondary registrations, over-coverage would occur.

## Missing Values

Missing values are values attributed in instances where a data provider is unable to provide information for a registrant for a specific data element. This involves three potential situations:

- *Not collected*—when the information is not collected by the data provider on the registration form or a data provider cannot submit the information;
- *Unknown*—when the information was not provided by the registrant; and
- *Not applicable*—when the data element is not relevant to the situation of the registrant. (For example, when a medical laboratory technologist resides in the United States, the Canadian Province/Territory of Residence is *not applicable*.)

For the missing values *unknown* and *not applicable*, CIHI implemented the following validation and correction methodology:

- When a registrant has provided data that does not correspond to any of the missing values provided for one or more data elements within the same education, certification or employment grouping and when other related elements are missing values, the value *unknown* (rather than *not applicable*) for these data elements is appropriate.
- When a registrant has not provided data for all data elements within the same education, certification or employment grouping, it is likely that the data element does not apply to the registrant and therefore the value *not applicable* (rather than *unknown*) is appropriate.
- Records for medical laboratory technologists who are not currently employed in medical laboratory technology or who are retired or unemployed are excluded from the publication, regardless of whether employment data in the MLTDB was provided.

Some of the results with a large percentage of missing values were not included in this publication because their questionable accuracy limits their usability and opens the door to erroneous interpretation. In other cases, the number of missing values is clearly identified in the analysis and footnoted for explanation when necessary. As a criterion for publishing the information in this report, a basic quality standard of less than 15% missing values was implemented to maintain a balance between accuracy and offering a variety of information.

### Not Collected and Non-Response

In the MLTDB, *not collected* for a data element refers to information that is not collected or submitted by the data provider; *non-response* refers to the percentage of *unknown* responses for each data element. See Appendix E for *not collected* and *non-response* rates by data element.

## Data Limitations

### Data for the Provinces and Territories Submitted by CSMLS (2008)

Data in the MLTDB for Newfoundland and Labrador, Prince Edward Island, British Columbia and the territories (the Yukon, the Northwest Territories and Nunavut) is received from the CSMLS and captures only those medical laboratory technologists who voluntarily registered with the CSMLS. The workforce data is filtered from the records and included in the publication. Due to this voluntary registration, statistics for Newfoundland and Labrador, Prince Edward Island, British Columbia and the territories do not represent the full population of the profession or workforce in these jurisdictions. In addition, only the registered medical laboratory technologists who reside and work in the territories are included in the territorial data in the database.

### Certification Areas for Ontario

For the College of Medical Laboratory Technologists of Ontario (CMLTO), a number of certification areas are mapped to the category *other* for the data element Certification Area 1. These areas include bacteriology, mycology, parasitology, virology, phlebotomy, immunoassay, immunology and electron microscopy. As a result, the certification area *other* is much higher for Ontario than for other jurisdictions.

## Privacy and Confidentiality

The Privacy and Legal Services Secretariat at CIHI has developed a set of guidelines to safeguard the privacy and confidentiality of data received by CIHI. These policies govern the release of data in publications and media releases, on the CIHI website and through ad hoc requests and special studies. The documents entitled *Privacy and Confidentiality of Health Information at CIHI: Principles and Policies for the Protection of Personal Health Information* and *Medical Laboratory Technologist Database Privacy Impact Assessment* can be found on the CIHI website ([www.cihi.ca](http://www.cihi.ca)).

## MLTDB Workforce Products and Services

The following publications relevant to this publication may be downloaded in electronic (PDF) format, free of charge, at [www.cihi.ca](http://www.cihi.ca):

- *Medical Laboratory Technologist Database Data Dictionary—Version 1.0* (for data elements and definitions); and
- *Medical Laboratory Technologist Database Data Submission Specifications Manual—Version 1.1* (for file specifications for the data elements).

### **Request for Services**

CIHI completes ad hoc requests and special analytical projects on a cost-recovery basis using data from the MLTDB. Requests that are short queries can generally be handled through standard reports and do not require major programming resources, while special analytical projects require project planning and the commitment of extra resources.

For further information on CIHI's data request procedure associated with these products and services, including process and pricing, please visit our website at [www.cihi.ca/requestdata](http://www.cihi.ca/requestdata).

## Methodological Notes: Part 2 of Report

### Comprehensiveness of the Data in This Report

In this CIHI publication, the MIS data that is included represents the fiscal year 2007–2008. Additionally, the data includes only the financial and statistical data from submitting hospitals whose data is housed in the CMDB. Data from Quebec and Nunavut has been excluded, as has data from all private/community laboratories. At this time, these latter organizations do not submit data to the CMDB. Additionally, public health laboratories' data may or may not be included, depending on whether the services are performed in the hospital or offsite at a stand-alone laboratory.

### Coverage

#### Canadian MIS Database Frame

“Frame” refers to a list of entities that should supply data to a database. The CMDB contains financial and statistical data from hospitals across the country. CIHI maintains a list of Canadian hospitals reporting to the CMDB, referred to as the CMDB list of hospitals. The CMDB does not yet request data from long-term care facilities, community health centres or home care agencies. Most regionalized provinces, however, do submit non-hospital data.

### Data Adjustments

The analysis prepared in this report uses hospital-level indicator values as its foundation. Calculating comparative indicators at the hospital level for hospitals in Canadian jurisdictions can be difficult due to differences in the way health care is administered across Canada. One such difference is the presence of regional health authorities. Regional health authorities are typically responsible for centralized services for the health service organizations in their purview. When reporting MIS data to the CMDB, jurisdictions are asked to distribute expenses, revenues and statistics of regional health authorities to their facilities so as to allow for full-cost comparisons with organizations from non-regionalized jurisdictions.

Not all jurisdictions distribute their regional health authority data in this manner. Accordingly, CIHI distributes each regional health authority's data to its facilities using a set methodology. By doing so, comparisons between health service organizations in regionalized and non-regionalized jurisdictions can be made. However, CIHI continues to encourage jurisdictions to make these distributions prior to submitting their data to CIHI.

## Definitions

**Analytical**—Refers to activities that pertain to the testing or analysis of a specimen, verification of results and reflexive testing for the purposes of diagnosis, monitoring or treatment of health status, disease or disorder, including any interpretative activities and the associated documentation.

**Benefit Contribution Expense**—The health service organization's contribution to the cost of the various fringe benefits provided to its employees, such as provincial/territorial health insurance, Employment Insurance, Canada Pension Plan premiums and other benefit plans. Includes the fair market value of perquisites such as room and board, after deducting any charge, which may be recovered from the employee by the health service organization.

**Benefit Hours**—Hours of absence for which compensation is paid, including vacation, statutory holiday, sick leave, education leave and the percentage of gross pay in lieu of benefits, which may be paid to part-time staff.

**Benefit Salaries**—The expense pertaining to employee benefit hours, such as vacation, sick leave, statutory holiday pay and education leave.

**Casual**—Casual employment status applies to persons who are employed on a flexible basis and who do not have a guaranteed fixed number of hours of work per pay period, usually not equalling or exceeding full-time hours. Employment Status is based on the hiring practices of the employer and/or union contract.

**Compensation Expense**—The sum of gross salaries expense, benefit contribution expense, purchased compensation expense and fee-for-service expense related to the remuneration of management and operational support personnel, unit-producing personnel and medical personnel employed by or under contract to the health service organization.

**Earned Hours**—Statistics for management and operational support, unit-producing and medical personnel of the functional centre who receive remuneration for their worked, benefit and purchased hours.

**Full Time**—The Employment Status of persons who are employed on a regular full-time basis and who have a guaranteed fixed number of hours of work per pay period; applies also to personnel whose employment may be time limited. Employment Status is based on the hiring practices of the employer and/or union contract.

**Functional Centre**—A subdivision of an organization used in a functional accounting system to record the budget and actual direct expenses, statistics and/or revenues, if any, that pertain to the function or activity being carried out.

**Management and Operational Support Personnel (MOS)**—Personnel whose primary function is to manage and/or support the operation of a functional centre. Examples include directors, managers, supervisors, medical personnel fulfilling a management role and secretaries. Excluded are practising physicians, medical residents and interns and all types of students.

**Medical Personnel**—Those physicians who are compensated by the health service organization for their professional medical services on either a fee-for-service or salary basis. Examples include pathologists, psychiatrists, radiologists, respirologists, cardiologists, hospitalists, medical residents, interns and students. Also those personnel compensated by the health service organization for their medical-type services on a fee-for-service, sessional or salary basis. Includes dentists and podiatrists.

**Part Time**—The Employment Status of persons who are employed on a regular part-time basis and who have a guaranteed fixed number of hours of work per pay period not usually equalling or exceeding full-time hours. Includes personnel whose employment may be time limited. Employment Status is based on the hiring practices of the employer and/or union contract.

**Post-Analytical**—Refers to activities that pertain to the collation, release and communication of results of an analysis, including authorization and the associated documentation.

**Pre-Analytical**—Refers to activities that pertain to service-recipient preparation and instructions, test ordering and the collection, labelling, transportation, reception and preparation of a specimen prior to analysis and the associated documentation.

**Purchased Hours**—The hours spent carrying out the mandate of the functional centre by personnel hired from a purchased third-party provider for which the external agency will receive remuneration for services provided.

**Purchased Salaries**—The compensation expense pertaining to services delivered by a purchased third-party provider. May include a mark-up to cover expenses of the third party, such as administrative and support services and employee benefits; excludes remuneration paid to the health service organization's employees or contracted-out third-party providers.

**Service Activity**—Statistics that describe and identify the volume of activities provided to or on behalf of service recipients. Service activity statistics supplement workload data in providing valuable management information on the resources required in the provision of specific services. Service activity statistics are intended to be used with the corresponding workload data to measure functional centre productivity and the resource consumption of specific service activities. They can also be used with functional centre statistics to cost service-recipient activities. The same category of service recipient should be used for service activity statistics as for workload units so as to identify the resource consumption of specific categories of service recipients.

**Service Recipient**—The consumer of service activities offered by one or more functional centres of the health service organization. Service recipients include individuals (such as inpatients, residents and clients) and their significant others, and others as defined by the health service organization

**Technologist**—Personnel who have completed the postsecondary college educational requirements for a technologist working in a diagnostic/therapeutic functional centre; may be required to undertake continuing education to remain current; may be licensed with the province/territory in which they are employed; scope of practice is usually regulated by the province/territory of employment; may be a member of the provincial and national professional organization (such as the Canadian Society for Medical Laboratory Science); and personnel who function independently within the bounds of their profession. Includes, but is not limited to, medical laboratory technologists, medical radiation technologists, medical diagnostic sonographers, EEG/ENG/EMG/registered evoked potential/neurophysiology/polysomnography technologists and cardiopulmonary technologists. Note: Includes those personnel who have been grandfathered as a member of this defined occupational class group.

**Unit-Producing Personnel (UPP)**—Personnel whose primary function is to carry out activities that directly contribute to the fulfillment of the service mandate. Examples include RNs, RNAs, laboratory technologists, accounts payable clerks, pharmacists, housekeepers, home care workers and public health officers. Excluded are practising physicians, medical residents, interns and students and, in most cases, diagnostic, therapeutic, nursing and support services students.



**Weighted Average**—An average in which each observation to be averaged is assigned a weight. These weightings determine the relative importance of each observation. In this report, weighted averages typically use the size of health service organizations whose observations are being averaged as the basis of weighting. The organization's size can be represented by metrics that represent inputs (such as expenses) or outputs (such as hours worked or workload). The weighted average of a set of indicator values is calculated by summing the indicator numerators of all observations and dividing it by the sum of the indicator denominators of all observations. The result is a weighted average for that indicator.

**Worked Hours**—Hours spent carrying out the mandate of the functional centre, including regular scheduled hours, overtime, call-back, coffee breaks and worked statutory holiday hours. Worked hours do not include the lunch hour and standby hours.

**Worked Salaries**—The salary expense pertaining to worked hours, plus the salary expense for items excluded from the hours count, such as shift premium and standby.

**Workload Units (In-House, Clinical Laboratory)**—The workload of the clinical laboratory services 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 service-recipient care.

## 2007–2008 Indicator Methodology

### Methodology for the Identification of Outliers

An outlier is an indicator value that is greater than or less than a pre-determined range of acceptable indicator values. Indicator values identified as outliers are carefully reviewed. Unless there is a compelling reason for retaining the value, they are removed or “trimmed” from further analysis.

The general process for identifying outliers in this report was as follows:

1. Calculate the indicator at the hospital level.
2. Remove hospitals with nonsensical results (<0% or >100%) except where 0% or 100% is reasonable.
3. Of the remaining data, calculate trim points based on the following rules:
  - **Lower Trim:** 25th percentile minus 1.5x the interquartile range
  - **Upper Trim:** 75th percentile plus 1.5x the interquartile range
  - Where the interquartile range is defined as the difference between the 75th percentile and the 25th percentile. Hospitals with indicator values lower than the lower trim point and greater than the upper trim point are excluded from any further analysis.
4. Apply indicator-specific business rules to the remaining values, if such rules exist.
5. Calculate the weighted average for the jurisdiction.

## Business Rules

### Indicator 1

#### Clinical Laboratory Compensation as a Percentage of Total Clinical

**Laboratory Expenses**—Excludes hospitals that do not report amortization from the indicator calculation.

#### Clinical Laboratory Compensation as a Percentage of Total Clinical

**Laboratory Expenses**—An indicator that measures the percentage of hospital clinical laboratory expenses related to compensation. It includes the compensation component for management and operational support personnel and unit-producing personnel but excludes medical personnel.

$$\frac{\text{Clinical Laboratory Compensation} \times 100}{\text{Total Clinical Laboratory Expenses}}$$

Included are all hospitals that report MIS secondary financial account 7 50 \* (Amortization on Major Equipment—Distributed) in functional centre account 7 1 4 10 \*. Hospitals that do not report this account have been excluded because MIS secondary financial account 7 50 \* is a major component of the denominator.

MIS account code used in the numerator includes the secondary financial account 3\* excluding 3 90\*.

MIS account codes used in the denominator include the secondary financial accounts 3\*, 4\*, 5\*, 6\*, 7\*, 8\* and 9\*.

### Indicator 2

#### Clinical Laboratory Worked/Benefit/Benefit Contribution Compensation as a Percentage of Total Clinical Laboratory Compensation

—Total compensation (denominator) comprises three components: worked compensation, benefit compensation and benefit contribution compensation (the three numerators). Within a single organization, the sum of the three indicators should equal 100%. If an organization is removed for one indicator, it must be trimmed from the other two indicators.

#### Clinical Laboratory Worked Compensation as a Percentage of Total Clinical

**Laboratory Compensation**—An indicator that measures the percentage of hospital clinical laboratory's compensation related to worked compensation. Includes the benefit compensation component for management and operational support personnel and unit-producing personnel, but excludes medical personnel.

$$\frac{\text{Clinical Laboratory Worked Compensation} \times 100}{\text{Total Clinical Laboratory Compensation}}$$

Included are all hospitals that report data in MIS functional centre account 7 1 4 10 \*.

MIS account codes used in the numerator include the secondary financial accounts 3 10 10, 3 50 10, 3 10 90 and 3 50 90.

MIS account codes used in the denominator include the secondary financial account 3\*, excluding 3 90\* and 3 05 99.

**Clinical Laboratory Benefit Compensation as a Percentage of Total Clinical Laboratory Compensation**—An indicator that measures the percentage of hospital clinical laboratory's compensation related to benefit compensation. Includes the compensation benefit contribution component for management and operational support personnel and unit-producing personnel but excludes medical personnel.

$$\frac{\text{Clinical Laboratory Benefit Compensation} \times 100}{\text{Total Clinical Laboratory Compensation}}$$

Included are all hospitals that report data in MIS functional centre account 7 1 4 10 \*.

MIS account codes used in the numerator include the secondary financial accounts 3 10 30 and 3 50 30.

MIS account codes used in the denominator include the secondary financial account 3\*, excluding 3 90\* and 3 05 99.

**Clinical Laboratory Benefit Contribution Compensation as a Percentage of Total Clinical Laboratory Compensation**—An indicator that measures the percentage of hospital clinical laboratory's compensation related to benefit contribution compensation. Includes the compensation benefit contribution component for management and operational support personnel and unit-producing personnel but excludes medical personnel.

$$\frac{\text{Clinical Laboratory Benefit Contribution Compensation} \times 100}{\text{Total Clinical Laboratory Compensation}}$$

Included are all hospitals that report data in MIS functional centre account 7 1 4 10 \*.

MIS account codes used in the numerator include the secondary financial accounts 3 10 40 to 3 10 85 and 3 50 40 to 3 50 85.

MIS account codes used in the denominator include the secondary financial account 3\*, excluding 3 90\* and 3 05 99.

### Indicator 3

**Clinical Laboratory Percentage of Unit-Producing Personnel (UPP) Earned Hours (Technologist) by Full-Time/Part-Time/Casual Personnel**—An organization may report 100% in one or two indicators, or may report 0%, which are acceptable results. The sum of the three indicators should be 100%. If an organization is trimmed out for one indicator, it has been trimmed from the other indicators.

**Clinical Laboratory Percentage of Unit-Producing Personnel (UPP) Earned Hours (Technologist) by Full-Time Personnel**—An indicator that measures the percentage of hospital clinical laboratories' earned hours related to full-time technologists.

$$\frac{\text{Clinical Laboratory UPP Earned Hours – Technologist (Full Time)} \times 100}{\text{Total Clinical Laboratory UPP – Technologist Earned Hours}}$$

Included are all hospitals that report MIS secondary statistical account 7 50 \* in primary functional centre account 7 1 4 10 \*.

MIS account code used in the numerator includes the secondary statistical account 7 50 14 10.

MIS account code used in the denominator includes the secondary statistical account 7 50 14\*.

**Clinical Laboratory Percentage of Unit-Producing Personnel (UPP) Earned Hours (Technologist) by Part-Time Personnel**—An indicator that measures the percentage of hospital clinical laboratories' earned hours related to part-time technologists.

$$\frac{\text{Clinical Laboratory UPP Earned Hours – Technologist (Part Time)} \times 100}{\text{Total Clinical Laboratory UPP – Technologist Earned Hours}}$$

Included are all hospitals that report MIS secondary statistical account 7 50 \* in primary functional centre account 7 1 4 10 \*.

MIS account code used in the numerator includes the secondary statistical account 7 50 14 20.

MIS account code used in the denominator includes the secondary statistical account 7 50 14\*.

**Clinical Laboratory Percentage of Unit-Producing Personnel (UPP) Earned Hours (Technologist) by Casual Personnel**—An indicator that measures the percentage of hospital clinical laboratories' earned hours related to casual technologists.

$$\frac{\text{Clinical Laboratory UPP Earned Hours – Technologist (Casual)} \times 100}{\text{Total Clinical Laboratory UPP – Technologist Earned Hours}}$$

Included are all hospitals that report MIS secondary statistical account 7 50 \* in primary functional centre account 7 1 4 10 \*.

MIS account code used in the numerator includes the secondary statistical account 7 50 14 30.

MIS account code used in the denominator includes the secondary statistical account 7 50 14\*.

Though this indicator includes only technologists (7 50 14 \*\*), a data quality analysis was performed to ensure that the UPP earned hours reported in 3 50 \*\* \*\* matched those reported for all UPP in 7 50 \*\* \*\*.

Because there is no central tendency for these indicators, trim points were not applied. Only nonsensical data (<0% or sum of the three indicators >100%) was excluded from the remaining data.

#### Indicator 4

**Clinical Laboratory Inpatient In-House Workload as a Percentage of Total Clinical Laboratory In-House Workload**—There are no business rules applicable for this indicator. There is no business reason for there to be a central tendency. One should expect to observe variation across organizations.

**Clinical Laboratory Inpatient In-House Workload as a Percentage of Total Clinical Laboratory In-House Workload**—An indicator that measures the percentage of hospital clinical laboratories' in-house workload that is attributed to inpatients.

$$\frac{\text{Clinical Laboratory Inpatient In-House Workload} \times 100}{\text{Total Clinical Laboratory In-House Workload}}$$

Included are all hospitals that report service-recipient workload in clinical laboratory in MIS secondary statistical account 1 15 \* in functional centre account 7 1 4 10 \*.

MIS account code used in the numerator includes the secondary statistical account 1 15 10\*.

MIS account code used in the denominator includes the secondary statistical account 1 15\*\*.

Though some hospitals in Alberta report workload, Alberta is not included in the graph because the workload is associated with approximately only 6% of the clinical laboratory expenses.

## Appendix A—Regulation Status of Provinces and Territories, 2008

Regulated Provinces	Year of Regulation
Nova Scotia	2004
New Brunswick	1992
Quebec	1973
Ontario	1994
Manitoba	2007
Saskatchewan	1996
Alberta	2002
Non-Regulated Provinces and Territories	
Newfoundland and Labrador	N/A
Prince Edward Island	N/A
British Columbia	N/A
Yukon	N/A
Northwest Territories	N/A
Nunavut	N/A

### Note

N/A: not applicable.

### Sources

*Canada's Health Care Providers, 1997 to 2006, A Reference Guide* and Medical Laboratory Technologist Database, Canadian Institute for Health Information.

## Appendix B—Data Providers for the MLTDB

Data Source	Corresponding Province/Territory of Data Submission	Province/Territory Abbreviation
Nova Scotia College of Medical Laboratory Technologists	Nova Scotia	N.S.
New Brunswick Society of Medical Laboratory Technologists	New Brunswick	N.B.
Ordre professionnel des technologistes médicaux du Québec	Quebec	Que.
College of Medical Laboratory Technologists of Ontario	Ontario	Ont.
College of Medical Laboratory Technologists of Manitoba	Manitoba	Man.
Saskatchewan Society of Medical Laboratory Technologists	Saskatchewan	Sask.
Alberta College of Medical Laboratory Technologists	Alberta	Alta.
Canadian Society for Medical Laboratory Science	Newfoundland and Labrador Prince Edward Island British Columbia Northwest Territories Yukon Nunavut	N.L. P.E.I. B.C. N.W.T. Y.T. Nun.

### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.

## Appendix C—Twelve-Month Registration Periods, by Province or the Territories, 2008–2009

Registration Period by Jurisdiction		2008												2009			
		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April
Jan. 1– Dec. 31	N.L.	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx				
Jan. 1– Dec. 31	P.E.I.	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx				
Jan. 1– Dec. 31	N.S.	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx				
Jan. 1– Dec. 31	N.B.	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx				
Apr. 1– Mar. 31	Que.				xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	
Jan. 1– Dec. 31	Ont.	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx				
Jan. 1– Dec. 31	Man.	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx				
Apr. 1– Mar. 31	Sask.				xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	
Jan. 1– Dec. 31	Alta.	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx				
May 1– Apr. 30	B.C.					xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx
Jan. 1– Dec. 31	Territories	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx	xxx				

### Notes

xxx Denotes that the month is included as part of the jurisdiction's 12-month registration period.

Territories include the Yukon, the Northwest Territories and Nunavut.

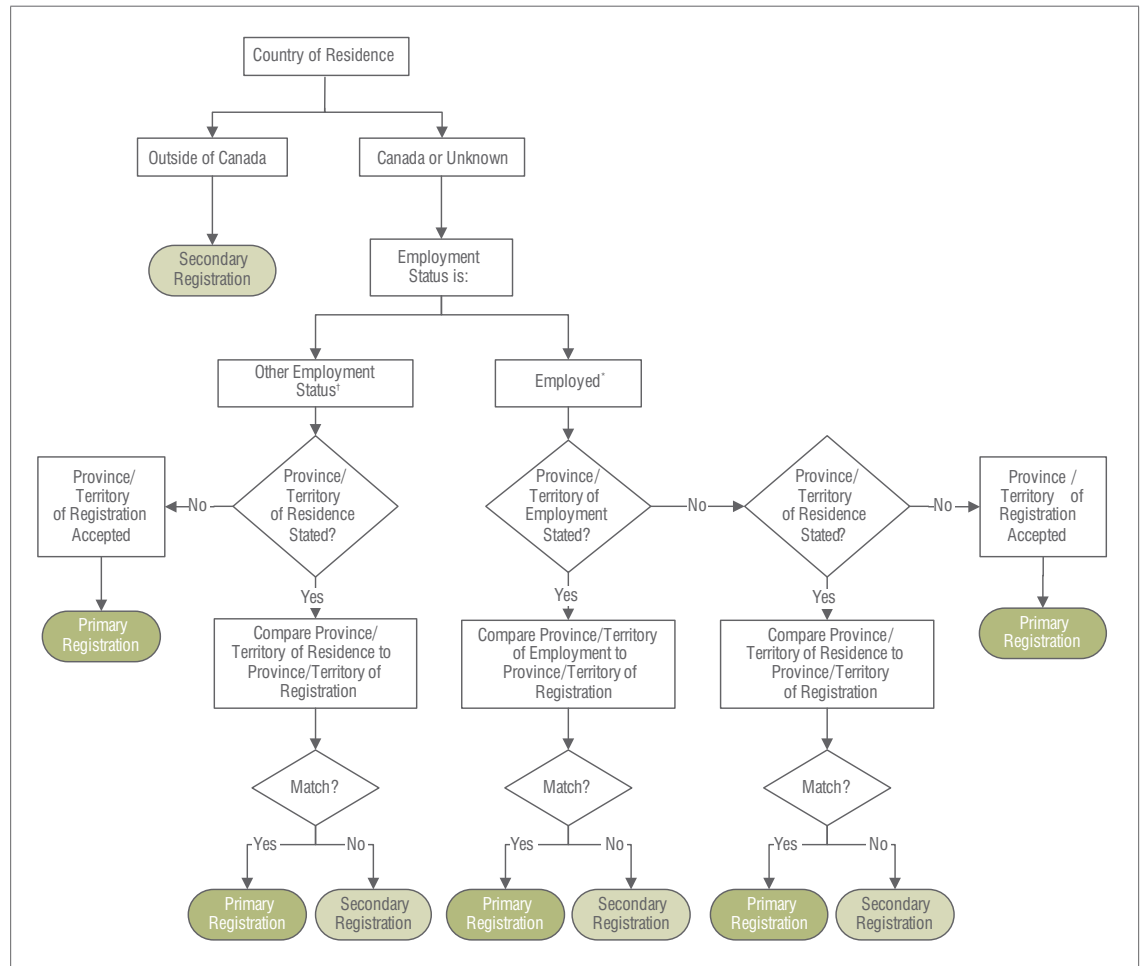
Registration periods for medical laboratory technologists in Newfoundland and Labrador, Prince Edward Island, British Columbia and the territories (the Yukon, the Northwest Territories and Nunavut) are represented by voluntary registrations with the Canadian Society for Medical Laboratory Science.

### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.



## Appendix D—Identification of Primary/Secondary Registrations



### Notes

- \* Employed in profession  
Employed in profession either working or on leave
- † Other employment statuses  
Employed outside of the profession  
Retired  
Unemployed  
Unknown

### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.

## Appendix E—Medical Laboratory Technologist Records Where Data Is Not Collected and Percentage of Records With Unknown Responses, by Data Element and Province or Territory of Registration, Canada, 2008

Data Element	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nun.
Provincial/Territorial Unique Identification/Registration Number													
Gender	74%	63%					0.2%			71%	50%	50%	57%
Year of Birth	75%	63%		0.5%	0.05%	0.03%	0.8%		0.04%	72%	50%	50%	57%
Province/Territory of Residence					0.1%				0.1%				
Country of Residence					0.02%	0.01%		x					
Province/Territory of Registration													
Year of Initial Registration With Submitting Jurisdiction	75%	63%	x	x	0.1%	8%	x			72%	55%	50%	57%
Level of Basic Education in Medical Laboratory Technology	74%	63%	x	0.2%	5%	90%	10%	x	14%	71%	50%	50%	57%
Year of Graduation for Basic Education in Medical Laboratory Technology	74%	63%		0.9%	0.1%	90%	7%		62%	71%	50%	50%	57%
Institution of Graduation for Basic Education in Medical Laboratory Technology	74%	63%		11%	x	91%	6%		62%	71%	50%	50%	57%
Province/Territory of Graduation for Basic Education in Medical Laboratory Technology	74%	63%		12%	100%	90%	6%		62%	71%	50%	50%	57%
Country of Graduation for Basic Education in Medical Laboratory Technology	74%	63%		12%	100%	x	6%		62%	71%	50%	50%	57%
Level of Other Education 1	94%	85%	x		5%	x	x	x	92%	89%	80%	83%	71%
Field of Study for Other Education 1	94%	85%	x	5%	x	x	x	x	99%	89%	80%	83%	71%
Year of Graduation for Other Education 1	94%	85%	x		x	x	x	x	92%	89%	80%	83%	71%

Data Element	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nun.
Province/Territory of Graduation for Other Education 1	94%	85%	x	x	x	x	x	x	92%	89%	80%	83%	71%
Country of Graduation for Other Education 1	94%	85%	x	x	x	x	x	x	92%	89%	80%	83%	71%
Level of Other Education 2	99%	97%	x		x	x	x	x	99.7%	98%	100%	90%	83%
Field of Study for Other Education 2	99%	97%	x	5%	x	x	x	x	x	98%	100%	90%	83%
Year of Graduation for Other Education 2	99%	97%	x		x	x	x	x	99.7%	98%	100%	90%	83%
Province/Territory of Graduation for Other Education 2	99%	97%	x	x	x	x	x	x	99.7%	98%	100%	90%	83%
Country of Graduation for Other Education 2	99%	97%	x	x	x	x	x	x	99.7%	98%	100%	90%	83%
Level of Other Education 3	99.8%	x	x		x	x	x	x	100%	99.9%	x	x	x
Field of Study for Other Education 3	99.8%	x	x	2%	x	x	x	x	x	99.9%	x	x	x
Year of Graduation for Other Education 3	99.8%	x	x		x	x	x	x	100%	99.9%	x	x	x
Province/Territory of Graduation for Other Education 3	99.8%	x	x	x	x	x	x	x	x	99.9%	x	x	x
Country of Graduation for Other Education 3	99.8%	x	x	x	x	x	x	x	x	99.9%	x	x	x
Bridging/Re-Entry Education	x	x	x	x	x	x	x	x	x	99%	x	x	x
Year of Completion of Bridging/Re-Entry Education	x	x	x	x		x	x	x	100%	99%	x	x	x
Province/Territory of Completion Bridging/Re-Entry Education	x	x	x	x	x	x	x	x	100%	99%	x	x	x
Certification Area 1	0.2%		1%		x		9%	x	2%	0.04%	5%		
Certification Level 1	0.2%		1%		x		x	x			5%		
Certification Year 1	0.2%		x		x	x	9%	x	13%		5%		
Certification Area 2	98%	99%	x	7%	x	x	9%	x	99.9%	92%	100%	100%	100%
Certification Level 2	98%	99%	x	7%	x	x	x	x	99.9%	92%	100%	100%	100%
Certification Year 2	98%	99%	x	7%	x	x	96%	x	99.9%	92%	100%	100%	100%
Initial Province/Territory of Canadian Employment in Medical Laboratory Technology	74%	63%	x	x	x	6%	x	x	x	71%	50%	50%	57%
Year of Initial Canadian Employment in Medical Laboratory Technology	74%	63%	x	x	0.02%	6%	x	x	x	71%	50%	50%	57%
Employment Status	3%	3%	4%			3%			12%	4%	15%		14%
Activity Status if Not Employed in the Occupation	3%	3%		0.8%				8%	13%	6%	15%		14%

Data Element	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nun.
Total Usual Weekly Hours of Work	76%	67%	x	3%	x		10%	x	7%	74%	50%	54%	57%
Employment Category (for Primary Employment)	74%	63%	x	0.6%	100%	3%	0.7%	x	7%	69%	50%	50%	57%
Full-Time/Part-Time Status (for Primary Employment)	75%	63%	x		4%	7%	5%	x	14%	70%	50%	50%	57%
Province/Territory of Primary Employment	74%	63%	4%		0.5%		4%	x	4%	69%	50%	50%	57%
Country of Primary Employment	74%	63%	x	5%	0.5%		4%	x	69%	69%	50%	50%	57%
Postal Code of Employment (for Primary Employment)	84%	75%	x		3%	0.01%	x	100%	8%	80%	55%	58%	57%
Place of Employment (for Primary Employment)	74%	63%	x		0.5%	2%	x	x	4%	68%	50%	50%	57%
Multiple Primary Employment Sites	74%	63%	x	x	x	5%			4%	68%	50%	50%	57%
Position (for Primary Employment)	74%	63%	x		0.5%	2%	x	x	4%	68%	50%	50%	57%
Clinical Education/Preceptor Activity Indicator (for Primary Employment)	74%	63%	x	x		x	x	x	5%	69%	50%	50%	57%
Major Function (for Primary Employment)	74%	63%	x		x	3%	4%	x	6%	69%	50%	50%	57%
Area of Practice for Primary Employment—Clinical Chemistry	74%	63%	x				4%	x	4%	68%	50%	50%	57%
Area of Practice for Primary Employment—Clinical Genetics	74%	63%	x				4%	x	4%	68%	50%	50%	57%
Area of Practice for Primary Employment—Diagnostic Cytology	74%	63%	x				4%	x	4%	68%	50%	50%	57%
Area of Practice for Primary Employment—Hematology	74%	63%	x				4%	x	4%	68%	50%	50%	57%
Area of Practice for Primary Employment—Histology	74%	63%	x				4%	x	4%	68%	50%	50%	57%
Area of Practice for Primary Employment—Immunology	74%	63%	x				4%	x	4%	68%	50%	50%	57%
Area of Practice for Primary Employment—Microbiology	74%	63%	x				4%	x	4%	68%	50%	50%	57%

Data Element	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nun.
Area of Practice for Primary Employment—Specimen Procurement, Receipt and Dispatch	74%	63%	x				4%	x	4%	68%	50%	50%	57%
Area of Practice for Primary Employment—Transfusion Medicine/ Science	74%	63%	x				4%	x	4%	68%	50%	50%	57%
Area of Practice for Primary Employment—Point of Care Testing	74%	63%	x				x	x	4%	68%	50%	50%	57%
Area of Practice for Primary Employment—Other	74%	63%	x		x		4%	x	4%	68%	50%	50%	57%
Main Area of Practice for Primary Employment	74%	63%	x			12%	100%	x	57%	69%	50%	54%	57%
Employment Category (for Secondary Employment)	99%	97%	x		x	20%	x	x	99%	94%	x	x	x
Full-Time/Part-Time Status (for Secondary Employment)	99%	97%	x		91%	20%	x	x	99.6%	95%	x	x	x
Province/Territory of Secondary Employment	99%	97%	x		91%	0.01%	x	x	99%	94%	x	x	x
Country of Secondary Employment	99%	97%	x		91%		x	x	99%	94%	x	x	x
Postal Code of Employment (for Secondary Employment)	99%	98%	x	x	91%	0.04%	x	x	99%	96%	x	x	x
Place of Employment (for Secondary Employment)	99%	97%	x		91%	19%	x	x	99%	94%	x	x	x
Position (for Secondary Employment)	99%	97%	x		91%	19%	x	x	99%	94%	x	x	x
Multiple Employment Sites (for Secondary Employment)	99%	97%	x		x	20%	x	x	99%	94%	x	x	x
Clinical Education/ Preceptor Activity Indicator (for Secondary Employment)	99%	97%	x			x	x	x	99%	94%	x	x	x
Major Function (for Secondary Employment)	99%	97%	x		x	20%	x	x	99%	94%	x	x	x
Area of Practice for Secondary Employment—Clinical Chemistry	99%	97%	x				x	x	99%	94%	x	x	x

Data Element	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Y.T.	N.W.T.	Nun.
Area of Practice for Secondary Employment—Clinical Genetics	99%	97%	x				x	x	99%	94%	x	x	x
Area of Practice for Secondary Employment—Diagnostic Cytology	99%	97%	x				x	x	99%	94%	x	x	x
Area of Practice for Secondary Employment—Hematology	99%	97%	x				x	x	99%	94%	x	x	x
Area of Practice for Secondary Employment—Histology	99%	97%	x				x	x	99%	94%	x	x	x
Area of Practice for Secondary Employment—Immunology	99%	97%	x				x	x	99%	94%	x	x	x
Area of Practice for Secondary Employment—Microbiology	99%	97%	x				x	x	99%	94%	x	x	x
Area of Practice for Secondary Employment—Specimen Procurement, Receipt and Dispatch	99%	97%	x				x	x	99%	94%	x	x	x
Area of Practice for Secondary Employment—Transfusion Medicine/ Science	99%	97%	x				x	x	99%	94%	x	x	x
Area of Practice for Secondary Employment—Point of Care Testing	99%	97%	x				x	x	99%	94%	x	x	x
Area of Practice for Secondary Employment—Other	99%	97%	x		x		x	x	99%	94%	x	x	x
Main Area of Practice for Secondary Employment	99%	97%	x			20%	x	x	99%	94%	x	x	x
Registration Type													

#### Notes

x Not collected/submitted. Marked items indicate the items that are not collected primarily according to form mapping of data elements in the Medical Laboratory Technologist Database. If additional information is collected beyond the registration form, the marks will be removed from the table.

Blank cells represent that non-response rates for the items are 0.

Percentages indicate the unknown rate in the Medical Laboratory Technologist Database.

#### Source

Medical Laboratory Technologist Database, Canadian Institute for Health Information.

## References

1. Canadian Society for Medical Laboratory Science, *Position Statements—Entry Level Requirements for Future General Medical Laboratory Technologists*, last updated April 28, 2008, accessed on September 23, 2008, from <<http://www.csmls.org/en/about-csmls/position-statements.html>>.
2. Canadian Society for Medical Laboratory Science, *Here's Your Path to Becoming a Medical Laboratory Technologist*, last updated 2009, accessed on June 30, 2009, from <<http://www.csmls.org/career-information/career-path.html>>.
3. Human Resources and Skills Development Canada, *3211 Medical Laboratory Technologists and Pathologists' Assistants*, last updated 2009, accessed on June 30, 2009, from <<http://www5.hrsdc.gc.ca/NOC/English/NOC/2006/QuickSearch.aspx?val65=3211>>.
4. Nova Scotia Community College, *Medical Laboratory Technology*, last updated 2009, accessed on June 30, 2009, from <[http://www.nscc.ca/Learning\\_Programs/Programs/PlanDescr.aspx?prg=MLTG&pln=MEDLABTECH](http://www.nscc.ca/Learning_Programs/Programs/PlanDescr.aspx?prg=MLTG&pln=MEDLABTECH)>.
5. The Michener Institute for Applied Health Sciences, *Medical Laboratory Science Advanced Diploma Program*, last updated 2009, accessed on June 30, 2009, from <<http://www.michener.ca/ft/medlab.php>>.
6. British Columbia Institute of Technology, *Medical Laboratory Science—Professional Qualifying Program*, last updated 2009, accessed on June 30, 2009, from <<http://www.bcit.ca/study/programs/6565certt>>.
7. Canadian Institute for Health Information, *Standards for Management Information Systems in Canadian Health Service Organizations* (CD), last updated 2008, accessed on June 30, 2009, from <[http://secure.cihi.ca/cihiweb/dispPage.jsp?cw\\_page=mis\\_e](http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=mis_e)>.
8. Job Futures, *Medical Laboratory Technologists and Pathologists' Assistants*, last updated 2009, accessed on June 30, 2009, from <<http://www.jobfutures.ca/noc/3211p2.shtml>>.
9. Canadian Medical Association, "Working Together for High-Quality Patient Care," *Accreditation*, last updated 2009, accessed on July 15, 2009, from <[http://www.cma.ca/index.cfm/ci\\_id/19316/la\\_id/1.htm](http://www.cma.ca/index.cfm/ci_id/19316/la_id/1.htm)>.
10. Canadian Society for Medical Laboratory Science, *Working in Medical Laboratory Science Is a Fascinating Career That Combines Science and Technology With the Opportunity to Help People*, last updated 2009, accessed on June 30, 2009, from <<http://www.csmls.org/en/career-information.html>>.
11. Canadian Society for Medical Laboratory Science, *Frequently Asked Questions*, last updated 2009, accessed on June 30, 2009, from <<http://www.csmls.org/en/faq.html>>.
12. Ordre professionnel des technologistes médicaux du Québec, "Émission d'un permis," *Admission/Cotisation*, last updated 2009, accessed on December 3, 2009, from <<http://www.optmq.org/Default.aspx?section=static&id=33>>.
13. Email exchange between Kathy Wilkie, Registrar and Executive Director, College of Medical Laboratory, and R. Youssef, CIHI, November 4, 2009.
14. Canadian Institute for Health Information, *Medical Laboratory Technologist Database Data Submission Specifications Manual—Version 1.1* (Ottawa, Ont.: CIHI, 2008), pp. 1–46, accessed on June 30, 2009, from <[http://secure.cihi.ca/cihiweb/en/downloads/MLT\\_dss\\_v11\\_e.pdf](http://secure.cihi.ca/cihiweb/en/downloads/MLT_dss_v11_e.pdf)>.

15. CMLTO, *College of Medical Laboratory Technologists of Ontario*, last updated 2009, accessed on October 1, 2009, from <<http://www.cmlto.com/>>.
16. Canadian Society for Medical Laboratory Science, *CSMLS Response to the Report of the Cameron Inquiry*, last updated March 3, 2009, cited October 1, 2009, from <[www.csmls.org/english/inquiry.htm](http://www.csmls.org/english/inquiry.htm)>.
17. Canadian Institute for Health Information, *National Health Expenditure Trends, 1975 to 2009* (Ottawa, Ont.: CIHI, 2009) accessed on December 3, 2009, from <[http://secure.cihi.ca/cihiweb/products/National\\_health\\_expenditure\\_trends\\_1975\\_to\\_2009\\_en.pdf](http://secure.cihi.ca/cihiweb/products/National_health_expenditure_trends_1975_to_2009_en.pdf)>.



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