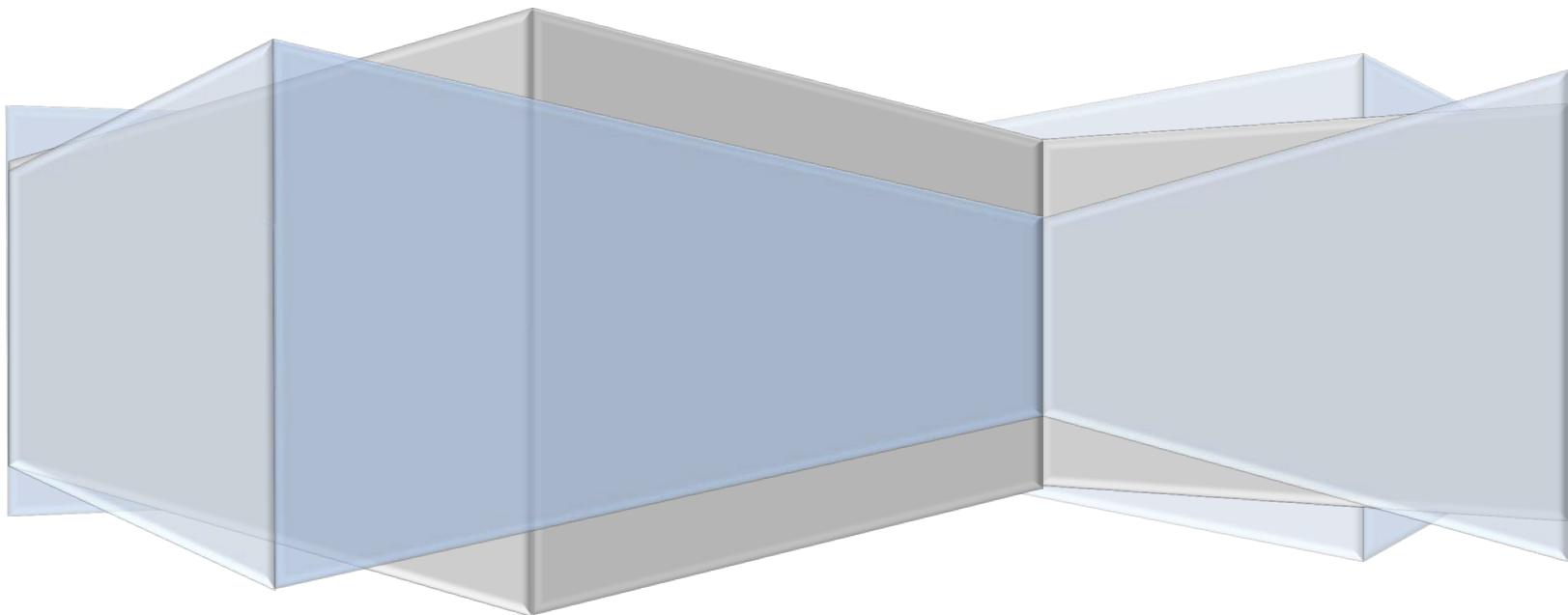


Canadian Society for Medical Laboratory Science (CSMLS)

**IDENTIFICATION OF  
ALTERNATE CAREERS AND  
RELATED FACT SHEETS FOR  
INTERNATIONALLY EDUCATED  
MEDICAL LAB TECHNOLOGIST (MLT)  
APPLICANTS**

February 2014  
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## ACKNOWLEDGEMENTS

Work on a project that has no recognized models to follow, and has a specific audience (in this case internationally educated medical lab technologists) requires the involvement and input of many stakeholders.

As contractors, we counted on and appreciated the involvement of the Canadian Society for Medical Laboratory Science (CSMLS) staff and Project Manager, and of the Project Advisory Committee. Their expertise and feedback was essential to our work. In addition, we found it very valuable to be able to consult and exchange ideas with Colette Peters who was researching best practices related to alternate careers for CSMLS at the same time as our initial work.

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## TABLE OF CONTENTS

<b>Acknowledgements .....</b>	<b>i</b>
<b>1. Project Background and Objectives.....</b>	<b>1</b>
<b>2. Assumptions and Implications.....</b>	<b>3</b>
<b>3. Identifying Possible Alternate Careers .....</b>	<b>5</b>
3.1 Considerations .....	5
3.2 Our starting point.....	6
3.3 Challenges .....	7
3.4 Our approach to developing a replicable process .....	8
3.5 Our process model.....	11
<b>4. Developing Alternate Career Fact Sheets.....</b>	<b>16</b>
4.1. Goals of fact sheets and future CSMLS information portal .....	16
4.2. Our approach to developing fact sheets.....	16
4.3. Steps in developing fact sheets.....	19
4.4. Fact sheet outline.....	20
<b>5. Recommendations for the Future .....</b>	<b>21</b>
<b>6. Alternate Career Fact Sheets .....</b>	<b>22</b>
Authors' notes.....	22
Fact Sheet Focus:	
1. Animal Health Technologists .....	1-1
2. Assayers .....	2-1
3. Technical Sales Specialists .....	3-1
4. Biological Technologists and Technicians.....	4-1
5. Biotechnology .....	5-1
6. Biotechnology Lab Workers.....	6-1
7. Chemical Technologists and Technicians.....	7-1
8. Food Science Technologists.....	8-1
9. Health Information Management Technicians.....	9-1
10. Medical Lab Assistants.....	10-1
11. Pathologists' Assistants .....	11-1
<b>7. Recommendations of items for 'Introductory Page' for fact sheets .....</b>	<b>23</b>
<b>Appendices</b>	
A. Glossary	
B. MLT Competency Model	
C. NOC structure example	
D. Master list – options for alternate careers for IEMLTs	
E. Selection criteria for alternate careers	
F. Competency and attribute comparisons	
G. Organization and format of fact sheets	
H. Bibliography	

## 1. PROJECT BACKGROUND AND OBJECTIVES

In the fall of 2013, CSMLS initiated a broad project focused on identifying some possible alternate careers and related information for internationally educated medical lab technologists (IEMLTs) who may be struggling with Canadian Medical Lab Technologist (MLT) certification, or who may not be in a position to complete this certification. In the fall of 2013, CSMLS circulated a Request for Proposal for the “Development of Alternate Career Information for CSMLS Internationally Educated Medical Laboratory Technologist Applicants.” The RFP provided the following background:

*“Approximately 200 internationally educated medical laboratory technologists (IEMLTs) apply to CSMLS each year to have their credentials assessed. In most cases (90% of all assessments), internationally educated practitioners do not meet Canadian standards immediately; that is to say ‘Prior Learning Assessors’ typically identify gaps in their education/experience which must be remediated before they become eligible to sit the certification exam. To this end, each of these applicants receives a customized ‘learning plan,’ detailing subject deficiencies and potential avenues of remediation. These individuals are given a period of time to remediate these gaps and become eligible to sit the CSMLS certification exam.*

*However, even after an internationally educated individual has remediated any and all identified gaps, anecdotal evidence and quantitative research suggests that they still experience difficulty passing the certification exam and becoming fully integrated into the workforce. A CSMLS study shows that only 34% of international candidates pass the certification exam on their first attempt compared with 86% of those educated in Canada.*

*Although many applicants successfully complete their learning plan and become certified/licensed there are a number who are “lost” in the system and never become employed as medical laboratory technologists. While there are likely a number of reasons for this occurrence, in some cases, it is possible that many come to the realization that the practice of laboratory science in Canada is considerably different than they experienced in their home country. As such, the job of a licensed/registered MLT may not be the most practical and fulfilling choice for these individuals. Directing applicants, early in the assessment process of potential, alternate careers that make better use of their skill sets may help to reduce the number of those who are lost in the system and decrease levels of unemployment and underemployment among applicants.”*

There is minimal research currently available related to ‘alternate careers’ for internationally educated professionals, how to approach communicating information about alternate careers, or what information is valuable to provide and when.

Within this context, CSMLS initiated a broad project which included the following primary objectives/deliverables<sup>1</sup>:

1. To undertake an environmental scan/literature review of best practices in the field of alternate career pathway development and communication;
2. To have an expert review laboratory science competency profiles and essential skills (and NOC codes/descriptions) and recommend a list of suitable, potential alternate careers essential skills (NOC) – not confined to the health sector;
3. To conduct focus groups and/or surveys with IEMLTs who are i) currently in the assessment process, ii) have become licensed, and iii) “dropped out” of the assessment process and gather their feedback on the type(s) and potential utility communication materials related to alternate careers;
4. Develop a list of alternate career pathways/communication materials for IEMLTs and associated protocols how and when this information should be provided to applicants;
5. Revise elements of the PLAR process as necessary (i.e. define appropriate intervention points and communication materials); and,
6. Based on the above, develop partnerships with referral sources (i.e. employers and/or placement agencies).

A number of individual projects were initiated by CSMLS to meet these objectives, including one to identify potential (non-regulated) alternate careers for IEMLTs to which they may be able to transfer some of their existing skills. The stated aim of this work was “to generate a list of alternate careers that are potential referral routes for IEMLTs that are unlikely to become licensed as such in Canada” and to develop up to 12 career fact sheets of applicable information (#2 above). That work is the focus of this report.

The report outlines the objectives, considerations, and possible approaches to providing such information, and the constantly evolving process used in this project to identify possible alternate careers and develop fact sheets. Our process and the content categories and approach to the fact sheets evolved over the period of the project as we compared and analyzed available information (or lack thereof), and through valuable feedback from the CSMLS staff and the project Advisory Committee. We tried to identify rationale for our decisions related to process and content, in order to assist future efforts in identifying and communicating alternate careers potential.

This project will improve the experience of a greater number of internationally educated medical laboratory technologists (IEMLTs) by making all applicants aware of some potential alternate careers at various times during the application process.

One thing that has become clear as we worked through the project is that the question of how to communicate is as important as what is communicated in relation to the whole topic of an internationally educated individual considering an alternate career. And, as with all communication, *perception is reality*; so we are pleased that CSMLS is initiating focus groups of IEMLTs in order to better identify their stated needs, as well as to gain feedback on some potential ‘messaging.’

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<sup>1</sup> CSMLS Request for Proposals “Development of Alternate Career Information for CSMLS Internationally Educated Medical Laboratory Technologist Applicants”. September 2013

## 2. ASSUMPTIONS AND IMPLICATIONS

The definition of ‘alternate career’ for this project identified by Collette Peter’s research into best practices<sup>2</sup> is “...a full, permanent career option in an unregulated profession that may or may not be in a health-related field. The Alternate Career options offered by this project are intended for IEMLT applicants who have skills, education and/or experience that are different from Canadian entry-to-practice standards. Although unregulated, some Alternate Careers may require further training before entry.” The scope of the term ‘alternate career’ that was used for this section of the project (in this report) went beyond that to include “...those who may for personal reasons, not wish to pursue certification as an MLT in Canada.” The definition excludes the notion of temporary or ‘interim’ work an applicant may take while trying to become a licensed MLT. What comes out of this definition is the requirement that the alternate careers being described have viable long-term career potential, either on their own or as part of a progressive career path (with or without additional education).

**Assumption 1.** Information on possible alternate careers or career areas might be of interest to IEMLTs who:

- are exploring options prior to immigrating to Canada.
- are interested in, or need to find (for various reason) immediate employment when they immigrate to Canada, and thus will not proceed with MLT certification in Canada.
- have used the CSMLS self-assessment tools to compare their knowledge and skills against the Canadian MLT Competency Profile, and have identified a large gap thereby realize the need for significant education in Canada to be eligible to apply for MLT certification.
- have significant gaps in qualifications or been unsuccessful at one or various stages of the MLT certification process (i.e. PLAR, or exam) and thereby realize the need for significant education and time to become an MLT in Canada.

*Implications/Approach:* The optional careers identified need to include some occupations which do not require additional education (although some industry specific training or Canadian training such as health and safety short courses may be necessary).

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<sup>2</sup> Researcher Report: Development of Alternate Career Information for CSMLS Internationally Educated Medical Laboratory Technologist Applicants. Colette Peters December 2013

**Assumption 2. All IEMLTs will have:**

- some post-secondary education (diploma or in some cases, a degree), and
- at least some of the competencies of a Canadian MLT.

*Implications/Approach:* We based our model on a range of educational requirements for alternate (unregulated) careers to provide options for those who wish to gain immediate employment as well as for those who are interested in completing more education or training before seeking employment.

- i. Occupations chosen as alternate careers will require a minimum of some post-secondary for education (for Canadians) in order to attempt to identify careers at similar starting levels (i.e. diploma rather than only secondary education requirements).
- ii. The maximum number of years of training or education required for alternate careers chosen was a diploma. This assumes that IEMLTs could use some existing skills in alternate careers, and that re-training would not be longer than it would take for re-training as an MLT in Canada.

**Assumption 3. Individuals typically select an alternate career based on their personal interests and needs, educational background, and work experience.**

*Implications/Approach:* The CSMLS alternate career fact sheets will serve as career exploration resources for internationally educated applicants, and will address main skills required in an occupation, personal traits/interests needed, and employment requirements including education. In addition, we attempted to provide some general information about the field to help readers decide if they had an interest in the area. This was followed up with links to additional resources where IEMLTs could research and find additional information.

**Assumption 4. Any information that is available about the common strengths and gaps of IE applicants should be considered when selecting the alternate occupations for medical laboratory technologists.**

*Implications/Approach:* Occupations that include common strengths will be sought and occupations that include common gaps will have lower priority.

**Assumption 5. The fact sheets will be made available to internationally educated individuals early in the certification application process (or even previous to that), and on an ongoing basis from there. The assumption is, therefore, that IEMLTs may know nothing of working in Canada, nor of some of the occupations and fields including in the suggested alternate careers.**

*Implications/Approach:* Plain language needs to be a major objective in these fact sheets with the underlying awareness that readers may not have previous knowledge of Canadian careers nor high levels in English reading comprehension.



**Assumption 6. The fact sheets need to provide initial information about occupations and fields in an objective manner.**

*Implications/Approach:* Through the literature available on the subject, additional research done by Collette Peters for CSMLS, and informal feedback from internationally educated professionals and Canadians who interact with internationally educated, it became imperative that information be provided as just that – information – and not be perceived as recommendations of other occupations to pursue. The decision to explore – and apply for – a job other than MLT must be one that is researched and ‘owned’ by the internationally educated individual. As well, individual counselling (not a role of the CSMLS) is a key component for successful employment/career direction for the internationally educated, so resources to help IEMLTs find appropriate counselling services are important.

### **3. IDENTIFYING POSSIBLE ALTERNATE CAREERS**

#### **3.1 Considerations:**

##### **3.1.1 What should we use as the main research source for our Master List?**

Our decision to use the National Occupational Classification (NOC) was based on it being:

- a) Nationally developed and maintained by a responsible source (Government of Canada).
- b) A large database including over 40,000 classified occupational titles in 500 unit or occupational groupings.
- c) The national classification system for describing occupations in the Canadian market. It is used by Statistics Canada, provincial labour departments, professional associations, career advisors, and educators to describe the workforce and career opportunities.
- d) Accessible to IEMLTs and counsellors for further details, with a tutorial available.
- e) Used by the Government of Canada for information for potential immigrants and new arrivals to Canada (particularly in the *Working in Canada* website).
- f) Referenced by many other career-related websites (private, professional organizations and industry associations).
- g) A system with a structure that provided the primary criteria for selection of optional occupations: skill type (type of work) and skill level (type and amount of education).

### **3.1.2 What additional criteria should we use to analyze occupations on the Master List to reduce the listing to the best options for the limited number being required for this project?**

Secondary selection criteria were identified based on reviews of career websites, feedback from CSMLS Management Committee and Advisory Committee, and informal feedback from IEMLTs through our subject matter experts (SMEs) and CSMLS. There was a need for criteria that provided the most efficient processes (in a very labour intensive process), and developed the basic list which would provide the *best options for the most IEMLTs*. The list of Secondary Selection Criteria (Appendix E) was discussed and agreed to by CSMLS Management and the SME Advisory Committee.

### **3.1.3 What are the key strengths and transferable skills of most IEMLTs who come to Canada?**

There is currently no aggregate data archived from certification testing of IEMLTs to identify the competencies of the majority of IEMLTs, nor the major gaps or weaknesses of IEMLTs – **based on the competency profile of Canadian MLTs**. With this information, the process of competency matching as part of our identification of good alternate careers could be more focused on skill groupings of most IEMLTs that may be transferable to alternate careers.

### **3.1.4 What research pieces should we archive to serve future efforts?**

Throughout the project we maintained archival listings of occupations/clusters and notations as to rationale for deletion of each as we progressed with the reduction of titles on the Master List (Appendix D), in order that some of the eliminated occupations could be revisited in the future if different criteria were to be used. As well, comparisons of key duties/skills between MLT and possible alternate occupations have been maintained (Appendix F), and a list of resources used (Appendix H).

## **3.2 Our starting point:**

The key resources made available to us at the beginning of the project were:

- The CSMLS Competency Profile for Medical Lab Technologist (and Medical Lab Technician);
- Exam blueprints for MLT certification;
- CSMLS staff members and their expertise and experience with IEMLTs in the certification process; and,
- Experience and expertise of the Advisory Committee (SMEs), and resources of the associations they represented.

From there, we looked at what external resources were available that would help our work. A list of resources we referenced for background, possible process and content are included as a bibliography in Appendix H.

We set the parameters of using research resources that are Canadian and widely recognized, particularly in relation to job duties and labour market information. This resulted in use of government sites (national and provincial), and career exploration and job search sites used by educational institutions and immigrant-serving agencies. We did not use U.S. sites, as we wanted to ensure we stayed within Canadian context.

### **3.3 Challenges**

#### **3.3.1 Lack of research and best practices regarding providing ‘alternate career’ information to internationally educated professionals**

The key research available prior to this project was the LIM report<sup>3</sup>, which included some reported best practices based on interviews with immigrant serving agencies and regulatory bodies. This resulted in some suggestions, but no significantly researched approaches or practices. Colette Peters’ research<sup>4</sup> was helpful, particularly as we were able to have a number of discussions with her as we progressed. However, as noted, most processes currently used to identify alternate careers are informal, or based on group suggestions.

#### **3.3.2 Competency profiles**

- Competency profiles are not available for all occupations one is researching
- Available profiles are not developed in consistent format or depth, and therefore are difficult to compare or map
- No ‘competency dictionary’ exists for profiles nationally (and no complexity/difficulty levels are identified – Bloom’s taxonomy is the only common resource), so competencies may be described in a range of manners. In some cases, the description of the same competency in two different occupations (from different sources) is not at all the same.

#### **3.3.3 Terminology**

- Terms such as competency, skill, aptitude, trait, alternate career, essential skills, qualifications and others are not used in a consistent manner or with the same intent by different career sites or job sites. This makes it more difficult for developers and sponsors of career and occupational information (such as CSMLS), as well as for the reader.
- We have defined key terms as we have used them (See Appendix A), but recognize that readers do not often go to a glossary if they feel they know the general meaning of a term.

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<sup>3</sup> Foreign Qualifications Recognition and Alternative Careers. LIM Consulting and Associates 2013

<sup>4</sup> Researcher Report: Development of Alternate Career Information for CSMLS Internationally Educated Medical Laboratory Technologist Applicants. Colette Peters December 2013

### **3.3.4 Concerns regarding use of MLT Competency Profile**

We were using identified competencies of MLTs<sup>5</sup> as part of our selection criteria of alternate careers with the knowledge that many IEMLTs do not possess some of these competencies, but we did not have data to identify the common competency gaps. This is true of data related to the core competencies and the MLT common occupational competencies and attributes (traits).

### **3.3.5 Limitations of NOC system**

The NOC system is useful for initial selection of occupations or groupings, but the database has limited search abilities for identifying related occupations and comparing them to the occupation of MLT by skill/duties and attributes/traits.

### **3.3.6 Use of duties rather than competencies**

Most career exploration sites do not describe competencies, but instead use duties, interests, abilities, skills, work preferences, salary, among other approaches.

## **3.4 Our approach to developing a replicable process**

Components of our approach included the following:

#### **a) Create a Master List.**

Once we identified the NOC as a starting point, we needed to design the process we would use to assemble an initial Master List, and then decide how to reduce that listing to result in a list of up to 12 occupations or occupational groupings that would provide a good fit to a maximum number of IEMLTs.

#### **b) Identify criteria for eliminating and prioritizing.**

We developed a list of secondary selection criteria to use when qualifying occupations to remain on our Master List. This list (see Appendix D) was reviewed and validated by CSMLS Management Group and the Advisory Committee.

#### **c) Compile a list of MLT competencies or duties/skills.**

CSMLS has a detailed Competency Profile of a Canadian MLT, which forms the basis of their assessments for certification, for bridging programs and for accredited training programs. The detail of this competency profile, however, required us to distill it for purposes of matching key competencies/skills against other job profiles. Most job profiles on general career sites include only the key duties and attributes, and then may link to more detailed documents if they are available.

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<sup>5</sup> Competency Profile: General Medical Laboratory Technologist. Canadian Society for Medical Laboratory Science. May 2005

To stay true to the MLT Competency Profile, but identify key *job duties* we reviewed the CSMLS Competency Profile plus some of the job profiles on other professional or government sites, such as ALIS (Alberta Learning Information Service) and WorkBC/WelcomeBC which also reference NOCs. In this manner we developed a listing of key job skills and traits in a format more aligned with job profiles on career site data bases.

We took the MLT Competency Profile along with the additional MLT career information and developed a Model of MLT competencies (see Appendix B). The model includes three levels of competencies: 1. core competencies (Essential Skills/employability skills), 2. MLT common occupational competencies and attributes (traits), and 3. MLT specialty competencies.

**d) Identify focus on competency comparisons.**

As a key part of the process, we emphasized matches to MLT competencies in levels 1 and 2 of the Competency Model, as it was felt these were likely the most common competencies held by most IEMLTs, rather than the more specialized technical competencies in Level 3. Although we had informal feedback that skills gaps were often in the area of quality assurance and communication skills within the Canadian context, we did not eliminate these competencies from our matches as there is no statistical data on IEMLT skills. We have highlighted the communication skills requirements in the fact sheets to increase readers' awareness of employers' expectations in this area.

**e) Select career sites.**

Most career exploration sites used for occupational profiles, LMI and secondary criteria information were government sponsored sites (at both national and provincial levels). We have used some restricted access career exploration sites for identification of possible alternate occupation lists and factual information. However, for occupational matching, we have focused on public sites through federal and provincial governments that are easily accessed, free, and which include some or all of our selection criteria. Thus we can direct IEMLTs (in the fact sheet Introductory Page) to these sites for more specific individual matching and exploration. (See Section 7 for Introductory Page suggestions).

**f) Consider messaging.**

The method and timing of communication and how messages are perceived are as important as the content when communicating with internationally educated individuals about an alternate career. Some individuals may see it as a 'step down' to move to a different career than what they were trained for. In some countries, people don't change careers many times during their working life as we do in Canada. We attempted to provide information as objectively as possible, avoiding any perception that the fact sheets are *recommending* an alternate career. It is a delicate balance. As well, the content should create interest for the individual to explore further. We recognize that communication consultants will take the materials and re-work them with readers' perceptions and the fact sheets' visual appeal in mind.

**g) Develop a glossary.**

A glossary of key terms has been developed, using definitions based on their use for this project. See Appendix A for Glossary.

**h) Use SME expertise.**

SMEs, represented by the Advisory Committee, are needed to bring their personal experience and expertise to a project such as this. Their informal (non-documented) contact with IEMLTs and other professionals make their input valuable, and brings a real-life perspective to complement the formal research. Their knowledge and input on alternate career options can make the process much more efficient and productive. Our contact with Advisory Committee members through meetings, teleconferences and individual interviews was key to our process.

**i) Research best practices.**

Limited research has been done on alternate careers in Canada. Professional associations and bodies are just beginning to provide support and resources in this field; in part due to the insistence of provincial Fairness Commissioners, but also simply to provide greater quality service to their constituents. The LIM report<sup>6</sup> is the first major study on alternate careers, and it was used for suggestions on alternate careers and good practice. As well, CSMLS contracted Colette Peters to do a study on best practices<sup>7</sup>, the study running consecutively with the initial period of our project. It was very useful to be able to consult with Colette and exchange ideas as we progressed through our work.

**j) Identify overall goals.**

Based on the research and information we were able to gather, our goal was to provide new directions and occupational information that offered the 'best options for most IEMLTs.' We recognize that there are many additional occupations that some IEMLTs would be able to transfer different skills and knowledge to, but have attempted to focus on the broadest reach.

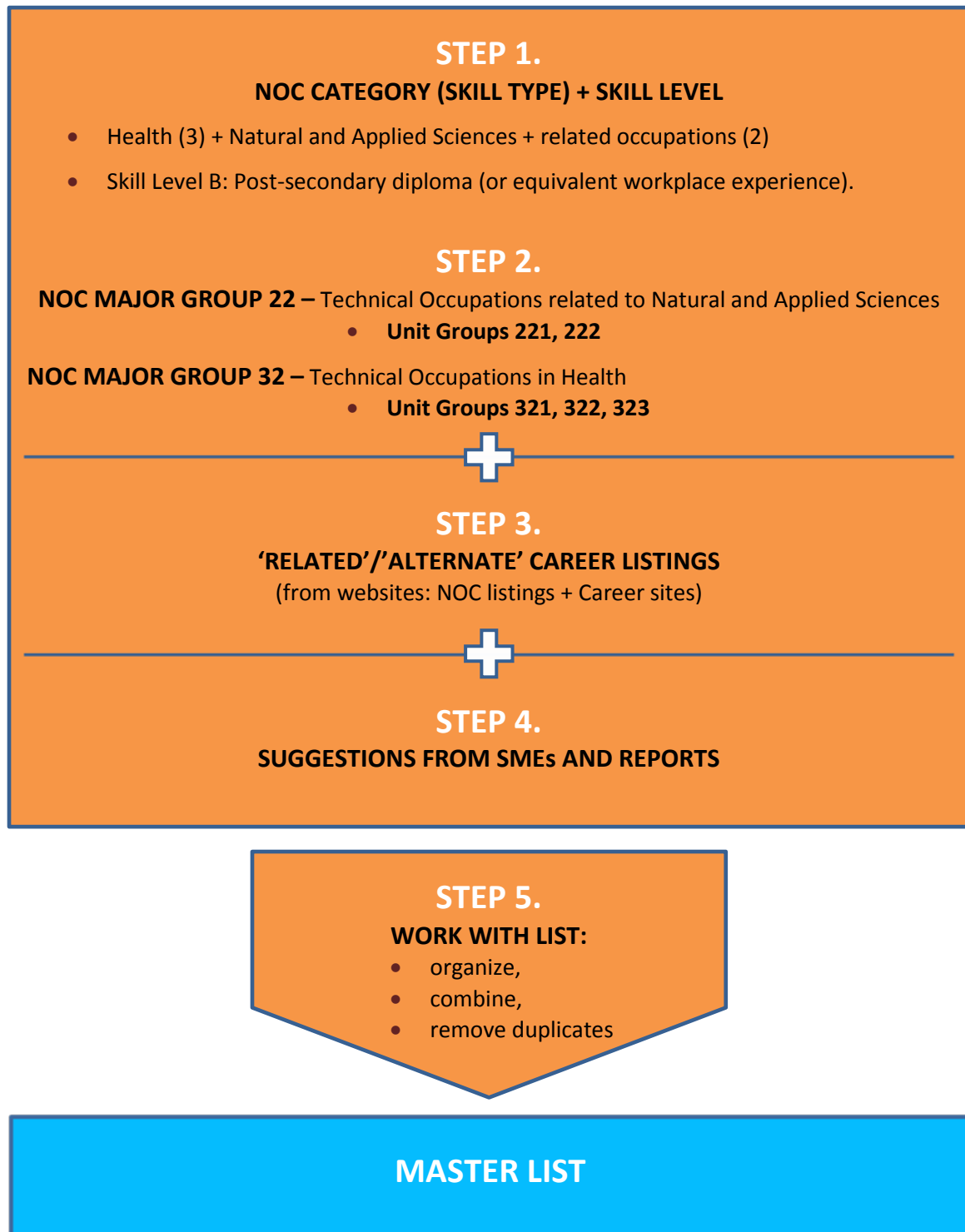
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<sup>6</sup> Foreign Qualifications Recognition and Alternative Careers. LIM Consulting and Associates 2013

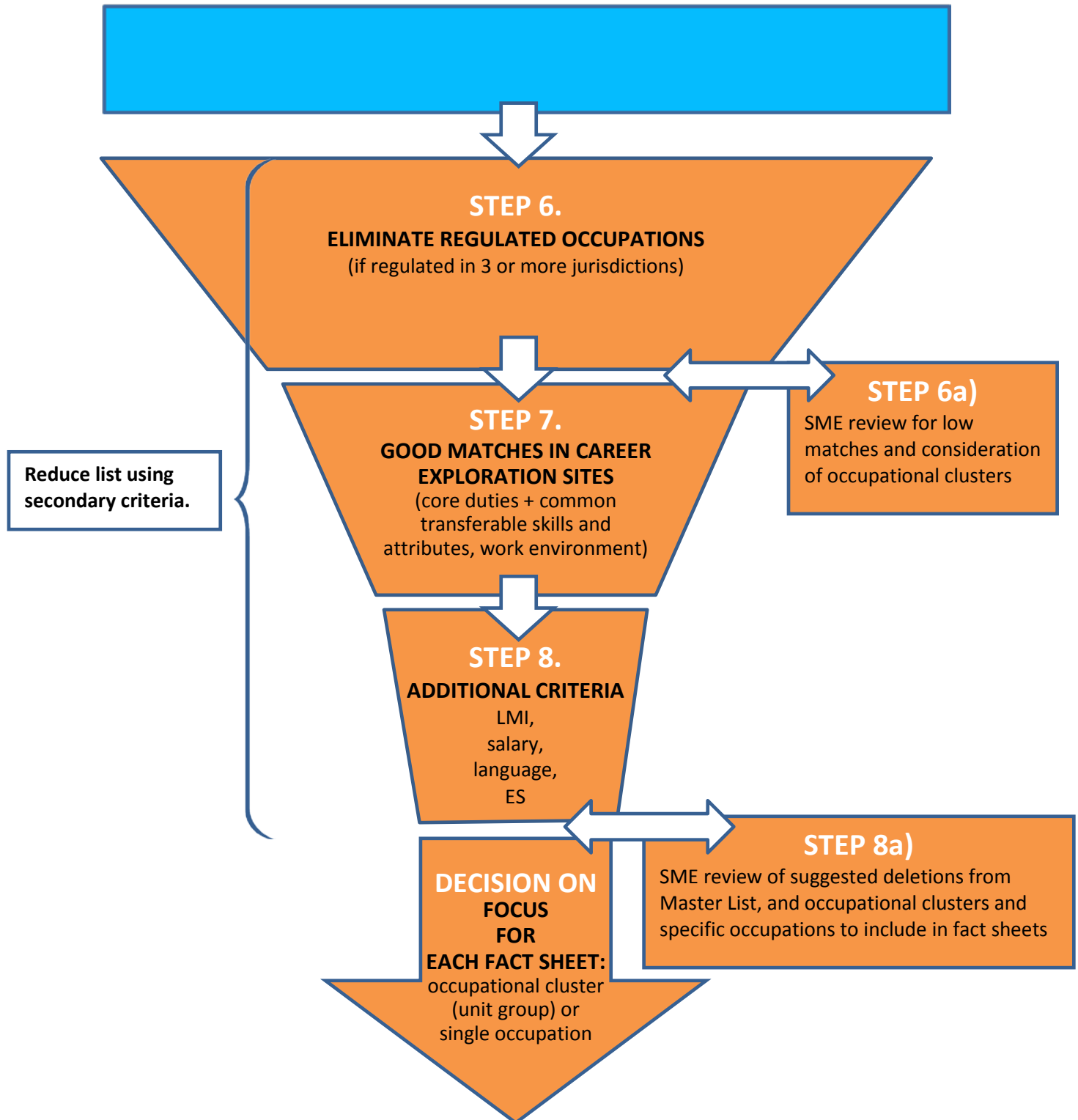
<sup>7</sup> Researcher Report: Development of Alternate Career Information for CSMLS Internationally Educated Medical Laboratory Technologist Applicants. Colette Peters December 2013

### 3.5 Our Process Model

#### A. Development of Master List



## B. Selection of Occupations/Fact Sheets from Master List





## Explanation of Steps in the Process Model

### A. Development of Master

#### Step 1: Selected NOC Categories and Skill Level (Major Groups)

Created a list of potential alternate careers using 'Skill Types' Categories 3 (health occupations) and 2 (natural and applied science and related occupations) of the National Occupational Classification (NOC), and 'Skill Level' B (represented by second digit "2" in NOC code) which are technical occupations that usually require college or vocational education or apprenticeship training, or three to four years of secondary school and more than two years of on-the-job training, specialized training courses or specific work experience. So we used NOC 32, and 22.

#### Step 2: Selected Suitable NOC Minor and Unit Groups

Included occupations listed in NOC minor groups 221 (physical sciences), 222 (life sciences), 321 (medical technologists and technicians), 322 (dental health care) and 323 (other technical occupations in health care). Within these five minor groups there were 24 unit groups with specific occupational titles or occupational cluster titles. The list captured most occupations that appeared to have key competencies or personal traits (e.g. sample analysis, attention to detail) in common with MLTs. This was a large list of over 200 alternate careers made up of occupations and occupational groupings.

See Appendix C for a process chart demonstrating the steps for listing NOC Category 3 Health Occupations at progressively more detailed levels.

#### Step 3: Identified Careers Described as "Related to" Medical Lab Technologists

Identify 'related careers' as noted on MLT career fact sheets in NOC, career exploration sites, and 'related fields' (industry's) websites.

Identified the unit groups listed under "Classified Elsewhere" section in the occupational description for the unit group "medical laboratory technologists" (NOC 3211). We used the "Classified Elsewhere" section to identify the initial and largest list of alternate occupations as this section of the NOC occupational descriptions was designed to help clarify the boundaries of the unit group by identifying similar or related occupations that are separately classified (Tutorial NOC 2011, p. 13).

The unit groups listed under MLT's "Classified Elsewhere" section in the NOC include:

- a) Life science technologists in non-medical laboratories (in 2221 Biological technologists and technicians)
- b) Medical laboratory technicians and pathologists' assistants (3212)
- c) Physical science technologists in non-medical laboratories (in 2211 Chemical technologists and technicians)

The above groups, which will be referred to as the “key unit groups” below, include the original three alternate careers identified by CSMLS: medical laboratory assistant/technician, pathologists’ assistants, and biotechnology (see NOC 2221).

We began to compile the occupational titles listed in the link “View all titles” of the key unit groups, but this would have resulted in a list of over 295 occupational titles. Therefore we decided to use the “Example Titles” for each unit group which the NOC indicates are the most commonly used titles. Some are duplicates that we deleted before proceeding to the next step in the process.

‘Related careers’ listed on career exploration sites under MLT were researched and included in our Master List.

#### **Step 4: Consulted SMEs and Research Reports**

List SME recommendations (including those beyond the health field). The recommendations are based on jobs that IEMLTs have moved into in the past or ones that the SMEs think would be good options based on research or their knowledge of MLT competencies.

Also possible alternate careers that were raised in research reports such as the LIM report were added to the list. Collette Peter’s research for the Alternate Careers Project being done simultaneously to our work also resulted in a few occupations being suggested to us.

**NOTE:** Steps 3 and 4 provided a check on the use of major groups 22 and 32 in NOC for identifying alternate careers. These steps allowed us to confirm the appropriate selection of NOC major, minor and unit groups for the master list. When the occupations added during these steps were compared to those selected through the NOC, there was only one occupation that had not been identified by the NOC step and that was health records professional.

#### **Step 5: Organized Master List**

Reviewed list, organizing by unit group (e.g. chemical technologists and technicians), and eliminated duplicates coming from different Major Groups.

This resulted in a large Master List of over 100 alternate careers made up of occupations and occupational groupings. See Master List in Appendix D to view initial listing by category/unit group prior to any further deletions (deletions are crossed off on the list in the Appendix, providing rationale for deletion).

## **B. Selection of Occupations/Fact Sheets from Master List**

### **Step 6: Eliminated Regulated Occupations**

Delete any occupational groupings or occupations which are regulated (this did not include occupations for which voluntary regulation is available). An occupation regulated in three or more jurisdictions was considered regulated for this project.

### **Step 6a: SME Reviewed List for Weak Matches**

Review by Advisory Committee of SMEs. The committee was led through a review process to eliminate any occupational groupings or specific occupations which they believed were a low match to MLT competencies, and to note any high priority occupational clusters or occupations.

### **Step 7: Compared Remaining Occupations to MLT Duties and Attributes**

We mapped duties and attributes of MLTs to key duties and attributes of the remaining alternate careers to determine the best matches. In addition, we looked for similar work environments such as laboratory work, sampling and analysis. See Duties/Attributes match table in Appendix F.

### **Step 8: Considered Additional Criteria**

Confirmed suitability of occupational groupings or occupations according to the remaining secondary criteria:

- a) Minimum salary (\$35,000 per year)
- b) Career mobility and progression opportunities

**NOTE 1:** Good job availability was one of the original criteria we were to use for selection. However, it is extremely difficult to identify on a national basis. Instead we refer readers to the Working in Canada website and other employment sites to research job availability in the region in which they are looking to work.

**NOTE 2:** Earlier secondary criteria included language level requirements and complexity level requirements of essential skills (HRSDC). These were not available for several alternate careers, so we identified language requirements where possible, and included examples of Essential Skill tasks from the HRSDC Literacy and Essential Skills listings where available.

### **Step 8a) SMEs Validated Final Selections and Content of Fact Sheets.**

SMEs reviewed the suggested deletions from the Master List (due to research findings not meeting criteria, or limited information available), and occupational clusters and specific occupations to be included in fact sheets. In addition, the SMEs validated the outline for the fact sheets to confirm the type of information that should be provided to IEMLTs.

As a result of this process, 10 fact sheets were developed to describe possible alternate career possibilities. The Advisory Committee reviewed the drafts of all fact sheets and provided valuable feedback.

## 4. DEVELOPING ALTERNATE CAREER FACT SHEETS

### 4.1 Goals of fact sheets and future CSMLS information portal

1. Provide information to illustrate that an alternate career can be a viable option for IEMLTs.
2. Increase IEMLTs awareness of some of the variety of occupations and industries available in Canada to which they might transfer skills.
3. Help IEMLTs consider some options for alternate careers to which they could possibly transfer some of their existing competencies, aptitudes, education and work experience
4. Provide information that will help IEMLTs identify their transferable skills, knowledge and aptitudes.
5. Provide online access to resources where people can learn about career options and potential jobs before or after arriving in Canada.
6. Clarify expectations of possible alternate careers.

And as a result, in the future:

- Fewer IEMLTs will experience frustration and lose hope for a rewarding career if they are not able to – or willing to – complete the process to be certified as an MLT in Canada
- More IEMLTs will be doing meaningful work with opportunities for advancement and good compensation that reflect their education, personal attributes and past experience.

### 4.2 Our approach to developing fact sheets

There are many different ways to approach the development and content of the alternate careers fact sheets. Over the span of the project, we revised the outline many times, taking into consideration:

- The goals for fact sheets;
- The Advisory Committee's concern over providing a 'list of suggested occupations' looking like recommendations of specific occupations for IEMLTs (thus being a recommended list as opposed to information available to IEMLTs to assist them to reflect on possibilities, do their own additional research, and 'own' their possible choices); and,
- The balance between providing information about fields or industries that IEMLTs may not have considered (or not be familiar with – particularly in the Canadian context) with more specific information about a limited number of 'best fit' occupations.

Our approach was an attempt to merge the provision of broad information about a field or cluster of occupations, with enough information about specific possible alternate occupations.

To organize the wealth of information available for the fact sheets, we considered the following alternative approaches:

1. By occupational clusters (usually in same field and within the same NOC unit group – e.g. NOC 2211 - chemical technologists and technicians)
2. By individual occupations within a unit group, e.g. Food Science technologist (within the NOC 2211 unit group of chemical technologists and technicians)
3. By industry (e.g. agriculture, health, environment, mining, biotechnology)
4. By fields of study (e.g. chemistry, geology, genetics, sales, sustainability, health care, waste management, quality assurance, information management, and food services)
5. By skills (e.g. lab testing and analysis, quality assurance, working with equipment, interpersonal skills, writing reports, sales)
6. By interests/traits (e.g. take charge, explore in depth – problem-solve, likes clear rules, work with tools/equipment, dealing with people)

Our approach was an attempt to merge many of the above alternatives, and provide different emphasis/focus with different fact sheets; some emphasizing industry or fields of study along with notation and short descriptors of some possible occupations, others providing more focus on an individual occupation and less detail about the field. Our working document identifying the occupational clusters considered and our listing of possible fact sheets can be found in Appendix G.

Some considerations and decisions on how to develop the fact sheets included:

- *Currency of job demand and salary information and other labour market information provided on the fact sheets.*  
Where possible, we used links to external sources, so that CSMLS would not have to maintain information.
- *Accuracy and validity of information and resources provided.*  
We used recognized sponsors, i.e. federal and/or provincial governments, where possible when providing links to resources and information. This ensures information is consistent with what can be found in additional research by IEMLTs, and is also found where IEMLTs are more likely to search prior to immigration to Canada. The non-government websites/resources we used were ones used by post-secondary institutions and recognized immigrant-serving agencies.

- *Current labour market information (employment forecasts, job availability, salary) was considered important by us and the Advisory Committee, but very difficult to obtain on a national or regional basis.*

The original desire was to provide information on a national basis (and broken down by region/province if available) on the assumption that many IEMLTs would not know what region of Canada they were going to immigrate to, or would be willing to re-locate for job availability. However, we found with all the government of Canada websites which held the main LMI information (Working in Canada, StatsCanada), and in job search sites, one had to include a city in order to search for job statistics or information. Another aspect of the LMI information provided by the federal government is that is often done by industry, not occupation.

- *Salary information. Salary information about an occupation is often only available at the unit group level (e.g. chemical technicians and technologists), not at the specific occupational level.*

We had to ensure we noted the larger group that was being referenced in occupational fact sheets, and to note the varying criteria that salaries are based on (such as qualifications, experience, geographic location, type of organization).

As our work on the fact sheets progressed, we discovered some topics and resources were duplicated on each sheet, so we recommended the addition of an Introductory Page with common information and resources. This page will provide information about such things as transferable skills and how to identify them, how to do self-assessment, where to find counselling assistance, resources for research on careers, educational requirements, possible jobs and salary ranges in various regions in Canada. A listing of our suggestions for inclusion in the Introductory Page can be found in Section 7.

We also found areas that were applicable to more than one fact sheet and suggested links between fact sheets. This is important to demonstrate how interconnected many of the employment fields are, and how skills might be transferred between them (with or without additional education or training).

### 4.3 Steps in developing the fact sheets

The steps used in development of the fact sheets were:

1. Identified government sites with content that matched our outline. The sites used for most fact sheets include:
  - ALIS OCCinfo
  - WorkBC and WelcomeBC
  - Ontario's Job Futures
  - CareerCruising.ca
  - Workingincanada.ca—for salaries and Essential Skills
  - Industry-specific sites that varied by occupation or cluster, e.g. Health Canada, ECO Canada, BioTalent
2. Identified relevant information in the source sites for sections of fact sheet research template.
3. Transferred information to fact sheet draft template. Combined and adapted the content as appropriate.
4. Sought information from additional resources to fill in gaps and confirm content, e.g. if no Essential Skills Profile was available, looked for information about communication requirements in other sources.
5. Reviewed the wording to achieve clarity and adherence to other plain language guidelines.
6. Eliminated questions/headings for which no content was found.
7. Submitted to the Advisory Committee for review and validation.
8. Revised fact sheets to produce final draft.

## 4.4 Fact sheet outline

There was a desire to be as consistent as possible with the information categories and format provided for each fact sheet. This supports future work in alternate careers through a replicable outline. In addition, it makes it simpler for IEMLTs to compare industries/ occupational clusters or specific occupations. There is one fact sheet that does not follow the complete outline: biotechnology. Originally, this fact sheet was part of the one about biotechnology lab workers but the content was separated due to its length.

**Fact Sheet Focus:** (name of occupation or cluster featured)

**Part of NOC** (number and title of unit group)

(Name of occupation) **are also called:**

*Other commonly used occupational or job titles for career exploration and job searches*

**What is the role of** (name of occupation) **in Canada?**

*A summary description of the occupation*

**What are the main duties of** (name of occupation) **in Canada?**

*A list of common tasks this occupation performs*

**What are the desired traits of** (name of occupation) **in Canada?**

*A list of attributes that help people succeed in this occupation*

**Where do** (name of occupation) **work?**

*A list of different types of organizations that employ people in this occupation*

**What is the work environment like?**

*The work conditions such as typical hours and work schedules, whether job tasks are typically performed indoors or outdoors, and types of hazards that workers are likely to encounter*

**What qualifications are Canadian employers looking for?**

*Education and other qualifications that employers expect people in this occupation to possess*

**What are employers' expectations in relation to communication skills?**

*A description of how communication is important to this occupation, often with examples*

**What is the wage for this occupation?**

*National average (low, median and high) hourly wages and annual salaries are provided, when available*

**What opportunities for advancement are available to** (name of occupation)?

*Information about career paths that individuals could follow within or beyond this occupation*

**Where can I find out more about** (name of occupation) **and the** (name of field or industry) **in Canada?**

*Readers are directed to the Introductory Page for links to general employment and career resources; career resources specific to this occupation, and the industry if applicable, are listed here*



## 5. RECOMMENDATIONS FOR THE FUTURE

Some suggestions for continued improvement and expansion of possible fact sheets in the future include:

### 1. Seek IEMLT feedback

We recognize the inherent challenges, but it would be valuable to gain feedback from IEMLTs in the future to find out if they read the fact sheets, and if so, whether they were of value to them, as well as recommendations for change or addition. It would also be valuable to gain feedback from other audiences including immigrant serving agencies and CSMLS partner organizations.

### 2. Expanded educational requirements

Our selection criteria for possible alternate careers included a maximum education requirement of a diploma. This was partly to restrict the initial numbers of possible occupations, but also to allow greatest transferability of existing skills and education. Even with occupations at the diploma level, many internationally educated MLTs would need to take some additional training in the specific field (beyond their diploma/degree from another country). In the future, to broaden the scope, some of the identified alternate career cluster areas or industry areas could be used to search for work based on university degree qualification (as some IEMLTs have degrees, or may wish to complete degrees once in Canada). This could result in options in a single career path at different levels of requirements, or completely new occupational clusters.

### 3. Data collection of IEMLT competencies

After each exam attempt, unsuccessful exam candidates are provided with a bar chart of their exam performance broken down into categories. They are also provided with a document, “How to Interpret the CSMLS Certification Examination Performance Analysis Report (Bar Chart)”, to assist them in identifying their areas of weakness on this bar chart.

However if data from all IEMLT certification exams were compiled and consolidated it would allow data mining to identify common IEMLT strengths and weaknesses. If the data were compiled in relation to the competency profile, it would be another resource to ensure the alternate occupations being listed are the best fit for the most IEMLTs.

### 4. Labour market information, including employment potential

In this project we have tried to identify the potential for employment and salary on a national basis, as this is a national project. This type of information, however, is not readily available on a national basis. Websites often require not only the province to be listed, but often a specific city prior to searching for employment and/or salary information. One thought for the future is to add applicable/available LMI information from the two provinces where the greatest number of IEMLTs who are applying for MLT certification reside.

## **6. ALTERNATE CAREER FACT SHEETS**

### **Authors' Notes:**

The Fact Sheets as presented here are the final deliverables of content. These versions will proceed to a plain language review and then to the communications experts for formatting and design.

We have added recommendations for 'introductory information' following these fact sheets. These suggestions are for the consideration of CSMLS as possible introductory information necessary when setting up the web access to the alternative careers site. CSMLS will need to develop their site and decide how much information and resources regarding alternate careers in general will be included.

Our suggestions relate to all occupations, and as such would be duplicative if included on each fact sheet. The fact sheets all reference and link to an 'introductory page' with suggested resources for further research and exploration by readers.

# FACT SHEET FOCUS

1. Animal Health Technologists
2. Assayers
3. Technical Sales Specialists
4. Biological Technologists and Technicians
5. Biotechnology
6. Biotechnology Lab Workers
7. Chemical Technologists and Technicians
8. Food Science Technologists
9. Health Information Management Technicians
10. Medical Lab Assistants
11. Pathologist Assistants

## **Fact Sheet Focus: 1. Animal Health Technologists**

### **Part of NOC 3213 Animal health technologists and veterinary technicians**

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#### **Animal health technologists are also called:**

- Animal health technicians/techs
- Laboratory animal technicians
- Laboratory technologists/techs
- Registered veterinary technicians (RVTs)
- Veterinary technicians/technologists
- Veterinarian assistants

#### **What is the role of animal health technologists in Canada?**

Animal health technologists provide technical support to veterinarians and research scientists. In research facilities and laboratories, animal health technologists provide care for a variety of animals (both large and small) involved in various research studies. They also administer medication and vaccines, and record observations about the animals' behaviours and health.

In veterinary clinics, they care for animals and assist in the diagnosis and treatment of animal health disorders. They may also collect and prepare specimens for testing, conduct tests, and set up and maintain medical laboratory equipment.

Check out this [video](#) about an animal health technologists working at a veterinary clinic in British Columbia.

#### **What are the main duties of animal health technologists in Canada?**

- collect and prepare laboratory specimens for testing
- perform blood, urine, fecal and other routine laboratory tests
- fill and dispense prescriptions
- administer prescribed medications and treatments
- receive and prepare animals for examination or surgery
- monitor and evaluate clinical symptoms
- assist veterinarians in procedures and surgical operations
- administer and monitor anesthetic
- produce and develop radiographs
- administer emergency first aid
- perform dental cleaning
- restrain animals for examination and treatments
- implement radiation safety and quality control procedures
- provide animal health care education to owners (for example, regarding behaviour problems in pets, animal nutrition)
- assist in the euthanasia of animals
- do laboratory research

## **Fact Sheet Focus: 1. Animal Health Technologists**

### **Part of NOC 3213 Animal health technologists and veterinary technicians**

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- clean, maintain and sterilize surgical and medical instruments and equipment
- manage pharmaceutical and product inventory
- ensure facility sanitation to control the spread of disease
- assist in food animal monitoring programs to promote food safety and public health
- maintain medical records and log books

They also may:

- write reports
- recommend and sell non-prescription products according to clinic standards
- provide support services such as grief counselling, choosing a new pet, house sitting and pet weight
- maintain research information
- provide customer service, accounting and invoicing duties

#### **What are the desired traits of animal health technologists in Canada?**

- confidence in working with animals
- a strong interest in medicine
- enjoy performing laboratory and diagnostic procedures
- the ability to work quickly and decisively under pressure
- good manual dexterity
- aptitude for math and record keeping
- good organization skills
- good physical health and strength
- a high degree of integrity
- excellent communication and interpersonal skills
- the ability to work well in a team environment
- enjoy having clear rules and guidelines for their work

#### **Where do animal health technologists work?**

- private veterinary practices and animal hospitals
- research laboratories, e.g. biomedical, agri-biotech, pharmaceutical
- kennels, animal shelters and humane societies
- zoos, wildlife parks and rehabilitation centres
- the Canadian Forces
- government departments and food inspection agencies
- pet store companies that sell animal care or pharmaceutical supplies
- farms and feedlots
- post-secondary institutions

## **Fact Sheet Focus: 1. Animal Health Technologists**

### **Part of NOC 3213 Animal health technologists and veterinary technicians**

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#### **What is the work environment like?**

The work of animal health technologists can be physically and emotionally demanding. Stress is often associated with treating abused animals or putting down animals. The work can also be physically demanding since animal health technologists need to lift, hold or restrain animals risking bites or scratches. Safety precautions reduce risk of injury.

Animal health technologists can work in noisy environments and around strong, unpleasant odours. Occupational hazards include potential exposure to radiation, biohazardous substances and waste, anesthetics (gases), and diseases that can transmit to human beings.

Hours of work vary and may include evenings, weekends, nights, emergency on-call rotations or overtime to assist in emergencies.

#### **What qualifications are Canadian employers looking for?**

Employers seek individuals who have completed a two- or three-year animal health or veterinary technology college program. For a list of accredited programs across Canada, click [here](#).

Successful completion of a national registration examination may be required in some employment settings. Registration with provincial animal health technologists' or veterinary technicians' associations is available, and is mandatory in some provinces.

For more information about what is required to work in different provinces as an animal health technologist, see the [list of provincial associations](#) on the website for the Canadian Association of Animal Health Technologists and Technicians.

#### **What are employers' expectations in relation to communication skills?**

Although there is no formal English language prerequisite for animal health technologists, they need to have a good grasp of industry terminology, as well as be able to interact with colleagues and clients in English. Their chances of success will be enhanced if their communication and language comprehension skills are at a high school or equivalent level.

Below are examples of tasks where animal health technologists use communication skills on the job:

- Review veterinary procedures in textbooks and veterinary references. They need to understand the medical terminology used in these textbooks to follow treatment procedures and to assist veterinarians with diagnoses and treatments.
- Enter quantities, product names and prices on purchase order forms to order supplies from pharmaceutical and pet food companies.
- Review consent forms with clients to ensure they understand the veterinary procedures and associated costs which the form authorizes.
- Fill out numerous medical and regulatory forms such as intake forms, examination records, surgical logs, hospitalization records, health certificates and euthanasia forms. On these forms, they record animal identifiers, health statistics, observations and medications administered. Some forms such as dental charts contain sketches of animals on which they can mark affected areas.
- Interact with pharmaceutical and nutritional distributors to order supplies, learn about new products on the market and resolve problems with payments and deliveries.

## Fact Sheet Focus: 1. Animal Health Technologists

### Part of NOC 3213 Animal health technologists and veterinary technicians

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To review examples of how other essential skills are used by chemical techs in the workplace go to [Explore Careers by Essential Skills](#) on the Working in Canada website.

In a diverse workforce, the ability to communicate in multiple languages is an asset.

#### What is the wage for this occupation?

Factors affecting wages include workers' level of education, amount and nature of work experience, and job responsibilities, plus the job location, work conditions and whether the workforce is unionized or not. The figures provided below reflect a national average for low, median (mid-point), and high wages (before taxes).

Low	Median	High
\$12/hour	\$17/hour	\$25/hour
\$24,960/year	\$35,360/year	\$52,000/year

For wage information in specific regions or cities in Canada, see Working in Canada's [Explore Careers by Wages](#).

#### What opportunities for advancement are available to animal health technologists?

To effectively contribute in their role and advance in their career, animal health technologists should be committed to continuous learning and self-improvement. This can be done through on-the-job training, seminars, and ongoing education. For example, organizations such as the Canadian Association for Laboratory Animal Science (CALAS) offer courses. With additional experience and training, and a good work record, animal health technologists may progress to supervisory and management positions.

For a typical career path for animal health technicians in the biotechnology industry, refer to BioTalent Canada's [BioCareer Pathway](#) for Animal Care Attendant.

#### Where can I find out more about animal health technologists in Canada?

Refer to the Introductory Page [**Layout suggestion:** Insert link to Introductory Page.] for general career information and job search ideas.

More details about animal health technologists are available at:

[Canadian Association of Animal Health Technologists and Technicians](#). This organization provides the provincial associations with a venue for discussion issues of a national focus and plays an important role in international issues.

[Canadian Council on Animal Care](#) (CCAC). The CCAC acts as a quasi-regulatory body and sets standards on animal care and use in science that apply across Canada.

## **Fact Sheet Focus: 1. Animal Health Technologists**

### **Part of NOC 3213 Animal health technologists and veterinary technicians**

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[CALAS](#) (Canadian Association for Laboratory Animal Science) is a national association dedicated to providing high quality training and educational resources to animal care professionals across Canada. It encourages animal research, when it is necessary, to be conducted professionally, ethically and compassionately. Their training and certification programs are voluntary, and are recommended by the Canadian Council on Animal Care (CCAC).

[BioTalent Canada](#) focuses on building partnerships and skills for Canada's bio-economy to ensure the industry has access to job-ready people. BioTalent Canada connects employers with job seekers, delivers human resource information, and provides skills development tools so the industry can focus on strengthening Canada's biotech business. Visit the BioCareer Pathways and the Bio-economy Skills Profiles for animal care attendant, technician and manager in the [career tools](#) section of its site.

[Canadian Veterinary Medical Association](#) (CVMA) is the national voice for the veterinary profession and is committed to excellence within the profession and to the well-being of animals.



## Fact Sheet Focus: 2. Assayers

### Part of NOC 2212 Geological and mineral technologists and technicians

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Assayers are also called:

- Assay laboratory (lab) technicians
- Chemical lab technicians
- Fire assayers
- Gold assayers
- Laboratory technicians
- Mine analysts
- Mineral analysts
- Mineralogy assayers
- Precious metal assayers

#### What is the role of assayers in Canada?

Assayers test and analyze ores and minerals to determine their composition and value. Some assayers focus on analyzing samples for the purpose of finding specific types of ores or precious metals, such as gold, silver or platinum. Some assayers work with process materials, analyzing substances such as metals, non-metallic materials, concentrates, and waste and air samples. The quality of assayers' work can have a large impact on the financial success of their employer.

Assayers are part of the occupational group called geological and mineral technologists and technicians. Geology involves the study of the origin and evolution of our planet; the structure of the earth's crust; the history of life; human adaptation to earthquakes, volcanoes, landslides and floods; and the chemical and physical properties of minerals, rocks, and fluids.

Geology determines where metal and mineral deposits occur. Where they are mined, however, depends on production costs, access to power and transportation, and environmental issues. Metals, minerals, and aggregates (sand, rock, and gravel) may be mined from large pits dug into the Earth or from underground workings. Geological scientists and technologists are involved in the exploration, development, and production of these resources, as well as environmental work throughout reclamation to return sites to the land.

A relatively new term related to geology is "geoscience." Geoscience is a collective term for the traditional disciplines of geology, geophysics, geochemistry and hydrology. The range of geoscience disciplines has expanded to capture many new areas of practice in the earth sciences such as environmental geology and geostatistics. For more information about careers in this area, check out [Geoscientists Canada](#) and [EarthSciencesCanada](#).

## **Fact Sheet Focus: 2. Assayers**

### **Part of NOC 2212 Geological and mineral technologists and technicians**

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#### **What are the main duties of assayers in Canada?**

- Use specialized laboratory equipment and chemical solutions to test ores and minerals
- Use liquid and dry processes to separate metals or other components
- Weigh residue samples on scale to determine the proportion of pure gold, silver, platinum or other metals
- Use various processes to refine elements that are present within a sample
- Select, specify and perform qualitative and quantitative analysis
- Develop and evaluate analysis methods
- Perform statistical analysis
- Troubleshoot to achieve analytical excellence
- Prepare reports and submit to management
- Liaise with skilled tradespeople, engineers, management and clients
- Purchase supplies and equipment

#### **What are the desired traits of assayers in Canada?**

- Have patience
- Show commitment and determination
- Able to work under pressure and organize workload
- Take accountability for their work
- Are keen observers with an analytical mind
- Have an aptitude for scientific inquiry
- Are responsible
- Are systematic, consistent and neat
- Follow methods and procedures, including strict safety protocols
- Able to build and maintain good interpersonal relationships and work as part of a team
- Have excellent written and verbal communications skills
- Able to share opinions and findings with others, even when they are unfavourable
- Have a natural interest in the environment and geology

#### **Where do assayers work?**

Assayers typically work in laboratories but may also do fieldwork. The main employers of assayers are mining companies and commercial laboratories. Assayers are also employed by:

- petroleum companies
- consulting geology and engineering firms
- government and university/college laboratories
- manufacturing, construction, and utilities companies

## Fact Sheet Focus: 2. Assayers

### Part of NOC 2212 Geological and mineral technologists and technicians

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#### What is the work environment like?

Assayers working in labs must adhere to strict safety regulations because of hazardous materials they sometimes use. Depending on where they work, they could also be exposed to heat, dust, noise and fumes. While performing fieldwork, assayers often need to remain standing or crouching for long periods of time. They must also carry, assemble and use equipment, which involves light duty lifting and frequent movement.

Assayers can work regular Monday to Friday hours with some jobs requiring evening or weekend work to do fieldwork or meet with clients. Assayers can work varying shifts, e.g. 7 am to 3 pm, 3 pm to 11 pm, or 11 pm to 7 am. For work sites in remote locations such as mines, assayers often work one-week-in/one-week-out or two-weeks-in/two-weeks-out shifts.

#### What qualifications are Canadian employers looking for?

Employers seek assayers with the minimum of a college diploma with relevant courses such as chemistry, geology, and assaying.

To work as an assayer in British Columbia you must be certified through [British Columbia's Assayers Certification Program](#). British Columbia is the only mining jurisdiction in Canada where assayers must be certified.

#### What are employers' expectations in relation to communication skills?

Employers may screen for language ability because it is important for workers to understand instructions and share information to complete tasks properly and work safely. Assayers need to have a good grasp of industry terminology and be able to interact in English with their employer, co-workers and clients.

Below are examples of tasks where assayers use communication skills on the job:

- Read instructions and precautions on labels of chemical products they use for laboratory work
- Record observations, comments, notes about locations, unusual findings, sampling protocols and problems encountered when conducting field research or when performing laboratory tests. They use these field or lab notes as reminders when they compile reports.
- Write progress reports for clients, detailing work completed and recommendations when necessary. They describe, highlight and explain the data contained in the reports. The reports are written in plain language so they can be understood by managers, clients and the general public.
- Write reports about failed metallurgical analyses. They document their research objectives, processes, findings and conclusions. In these reports they present lab results, root causes of poor quality, identify defects and suggest corrective actions.

To review examples of how other essential skills are used by assayers and other types of geological techs go to [Explore Careers by Essential Skills](#) on the Working in Canada website.

In a diverse workforce, the ability to communicate in multiple languages is an asset.

## Fact Sheet Focus: 2. Assayers

### Part of NOC 2212 Geological and mineral technologists and technicians

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#### What is the hourly wage for geological and mineral technologists and technicians?

National salary data is not available for assayers. The wages presented below are for the occupational group of geological and mineral technologists and technicians, to which assayers belong.

Factors affecting wages include level of education, types of responsibilities and job requirements, work conditions, employer, location, and experience. Wages also depend on whether it is a union or non-union environment. The figures provided below reflect a national average for low, median (mid-point), and high hourly wages (before taxes).

Low	Median	High
\$14/hour	\$21/hour	\$38/hour
\$29,120/year	\$43,680/year	\$79,040/year

For wage information in specific regions of Canada, see Working in Canada's [Explore Careers by Wages](#).

#### What opportunities for advancement are available to assayers?

Advancement opportunities for assayers are very good. Most start in an entry-level position such as laboratory technician but with work experience, a good record of performance, on-the-job training, and formal education, they can move into a variety of jobs in mining, metallurgical services, sales, and environmental services. Sample jobs that assayers can progress into include:

- Senior assayer
- Chief assayer
- Production manager
- Vice-president of operations
- Quality control and assurance manager
- Technical support specialist
- Consultant
- Environmental audit manager

A senior assayer working in a remote location can earn \$75,000 to \$85,000/year.

A chief assayer can earn \$90,000/year, plus a performance bonus.

## Fact Sheet Focus: 2. Assayers

### Part of NOC 2212 Geological and mineral technologists and technicians

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#### Where can I find out more about this career and the mining industry in Canada?

Links to general career information and job posting resources are provided on the Introductory Page.

[MiHR](#) (The Mining Industry Human Resource Council) – provides career information at [Explore for More](#), the [names of Canadian mining companies](#), and [job bank links](#). In addition, there is a career profile about an [assay lab technician](#).

WorkBC's Career Profile for Geological and Mineral Technologists and Technicians (NOC 2211) <http://www.workbc.ca/Job-Seekers/Career-Profiles/2212>

[British Columbia's Assayers Certification Program](#)

[British Columbia Institute of Technology's Assayer Training Program](#)

[Certified Assayers Foundation of British Columbia](#)

HRSDC's Essential Skills Profile for [Geological and Mineral Technologists and Technicians](#)

[Earth Sciences Canada](#)

[Geoscientists Canada](#)

## **Fact Sheet Focus: 3. Technical Sales Specialists**

### **Part of NOC 6221 Technical Sales Specialists – Wholesale Trade**

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#### **Technical sales specialists are also called:**

- Customer support representatives – wholesale
- Manufacturer's sales representatives
- Sales persons
- Sales representatives
- Technical sales representatives
- Technical support specialists

The following titles are used for technical sales specialists dealing with laboratory and/or medical supplies and equipment:

- Diagnostic instrument sales representatives
- Hospital equipment sales reps
- Medical equipment and supplies salespersons
- Medical instruments sales agents
- Pharmaceutical sales representatives

#### **What is the role of technical sales specialists in Canada?**

Technical sales specialists usually specialize in a particular line of goods or services such as laboratory supplies and equipment.

Working as a technical sales representative requires knowledge of:

- their employer's business strategy and product lines
- their clients' needs
- how the products can be used and need to be maintained
- competitors' products and strategies

#### **What are the main duties of technical sales specialists in Canada?**

- promote sales to existing clients
- identify and solicit potential clients
- assess clients' needs and resources and show how the products or services that the sales specialists represent can satisfy those needs
- develop reports and proposals as a part of sales presentations to illustrate benefits from use of goods or services
- negotiate and close sales deals
- provide input into product design where goods or services must be tailored to suit clients' needs
- estimate costs of installing and maintaining equipment or service
- prepare and administer sales contracts
- talk to clients after sale to solve problems and to provide ongoing support
- troubleshoot technical problems related to equipment
- maintain and update data about their territories and accounts
- may train clients' staff in the operation and maintenance of equipment
- Medical equipment and supplies sales specialists use their knowledge about medical and laboratory terms, processes and equipment to sell products and assist customers.

## **Fact Sheet Focus: 3. Technical Sales Specialists**

### **Part of NOC 6221 Technical Sales Specialists – Wholesale Trade**

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#### **What are the desired traits of technical sales specialists in Canada?**

- self-confidence, persistence, initiative and enthusiasm
- good communication and negotiating skills
- the ability to build rapport and gain trust
- the organizational skills and self-discipline required to manage their time effectively
- the ability to work independently and as part of a team
- the ability to cope with uncertainty, stress and long hours
- enjoy dealing with people
- enjoy analyzing information to identify and win new clients

#### **Where do technical sales specialists work?**

They work for establishments that produce or provide technical goods and services. Examples include computer services firms, communications companies, engineering firms, pharmaceutical companies, and medical equipment manufacturing companies.

#### **What is the work environment like?**

Many technical sales specialists work long hours. They spend much of their time visiting prospective buyers and generating sales. Technical sales specialists are assigned specific territories which may be defined geographically (Greater Toronto Area, Atlantic Canada), by market segment (e.g., medical), or by type of organization (e.g., government hospitals, private clinics). Some technical sales specialists have large geographic territories and travel frequently. They may be away from home for several days or weeks at a time.

Because their incomes often depend on commissions, technical sales specialists are under constant pressure to maintain and expand their client base.

#### **What qualifications are Canadian employers looking for?**

Most employers prefer to hire technical sales specialists who have a college diploma or university degree from a program related to the products and services they will be selling, plus several years of related work experience. For example, medical and lab equipment companies will seek job applicants with background in equipment operation or laboratory work.

## Fact Sheet Focus: 3. Technical Sales Specialists

### Part of NOC 6221 Technical Sales Specialists – Wholesale Trade

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#### What are employers' expectations in relation to communication skills?

Good communication skills play an important role in the success of sales specialists. The duties of this occupation have been inserted below and those duties requiring reading, writing, speaking and/or listening skills were underlined. As it turns out, that includes all of them!

- promote sales to existing clients
- identify and solicit potential clients
- assess clients' needs and resources and show how the products or services that the sales specialists represent can satisfy those needs
- develop reports and proposals as a part of sales presentations to illustrate benefits from use of goods or services
- negotiate and close sales deals
- provide input into product design where goods or services must be tailored to suit clients' needs
- estimate costs of installing and maintaining equipment or service
- prepare and administer sales contracts
- talk to clients after sale to solve problems and to provide ongoing support
- troubleshoot technical problems related to equipment
- maintain and update data about their territories and accounts
- may train clients' staff in the operation and maintenance of equipment

Fluency in a specific foreign language, and/or foreign work or travel experience may be required for technical sales specialists seeking employment with companies that import or export technical goods or services. When dealing with a diverse workforce or client base, the ability to communicate in multiple languages is an asset.

#### What is the wage for this occupation?

Factors affecting wages include workers' level of education, amount and nature of work experience, and job responsibilities, plus the job location, work conditions and whether the workforce is unionized or not. The figures provided below reflect a national average for low, median (mid-point), and high wages (before taxes).

Low	Median	High
\$12/hour	\$23/hour	\$42/hour
\$24,960/year	\$47,840/year	\$87,360/year

For wage information in specific regions or cities in Canada, see Working in Canada's [Explore Careers by Wages](#).



## Fact Sheet Focus: 3. Technical Sales Specialists

### Part of NOC 6221 Technical Sales Specialists – Wholesale Trade

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#### What opportunities for advancement are available to technical sales specialists?

Employers often offer extensive training programs for technical sales specialists that may range in length from a few weeks to several months. Sales specialists must keep up to date with technological changes affecting their customers' companies.

Advancement opportunities depend on the size and nature of the company, and the individual's sales abilities and interpersonal skills. Many companies require front line sales experience for advancement to senior level positions.

See the career advancement and change opportunities for sales representatives as described in BioTalent Canada's [BioCareer Pathway](#).

#### Where can I find out more about technical sales specialists and the medical/laboratory industry in Canada?

For general career information and job search ideas, refer to the Introductory Page.

[Layout suggestion: Insert link to Introductory Page.]

More details about technical sales specialists are available at:

[Canadian Professional Sales Association](#) (CPSA). The CPSA is dedicated to enhancing the professionalism, effectiveness and efficiency of the sales community. The CPSA administers the Certified Sales Professional (CSP) designation as a way for competent sales people to differentiate themselves. It also provides training and a job board.

Humber College offers an online [Canadian Medical Device Industry](#) certificate. This training program is designed by MEDEC.

[MEDEC](#) is the national association created by and for the Canadian medical technology industry. MEDEC is the primary source for advocacy, information and education on the medical technology industry for members, the greater healthcare community, industry partners and the general public.

The [Canadian Generic Pharmaceutical Association](#) (CGPA) represents manufacturers and distributors of finished generic pharmaceutical products, manufacturers and distributors of active pharmaceutical chemicals, and suppliers of other goods and services to the generic pharmaceutical industry. Check out its [Resources](#) page.

See BioTalent Canada's [Skills at-a-Glance](#) for sales representative.

## Fact Sheet Focus: 4. Biological Technologists and Technicians

### NOC 2221 Biological Technologists and Technicians

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#### Biological technologists and technicians are also called:

- biological techs
- bio technologists or technicians

The following alternate titles reflect the various areas in which biological technologists and technicians can specialize:

- agricultural technicians or technologists
- agrology technicians
- aquaculture technicians •••••
- bacteriological technicians
- biological laboratory technologists
- biotechnology technicians
- botanical technicians
- fish hatchery technicians
- fisheries technicians
- food bacteriological technicians
- life sciences research technicians
- microbiology quality control technologists
- microbiology technologists
- nanobiotechnology technicians
- natural resources technicians
- plant breeding technicians
- seed technologists
- wildlife biology technicians

Other human resource organizations related to the occupational group of biological technologists and technicians include:

- [BioTalent](#) that provides information about careers in biotechnology.
- [ECO Canada](#) that provides information about environmental careers and certification.

Scroll over Student Services and click on Occupational Profiles to discover environmental career options.

#### Aquaculture technicians

Aquaculture includes the farming or growing of many species of finfish (like salmon or trout), crustaceans (like shrimp), molluscs (like mussels and clams), as well as aquatic plants like kelp. Aquaculture began about 3000 years ago in Asia and now produces millions of tonnes of food and feed products each year throughout the world.

There are many types of careers and occupations in the aquaculture industry from the farm to the suppliers, to academia and even government. Many of the occupations are highly skilled and require both formal training and on-the-job upgrading. The occupations are typically year-round, well paying and include numerous benefits.

The Canadian Agriculture Human Resource Council provides information about occupations in aquaculture, including farm technician, a type of aquaculture technician.

#### Farm technicians (Mussels/Salmon)

Activities include feed sampling, basic lab analysis, oxygen and water quality testing, feeding, animal husbandry, checking for health issues and mortality, and assisting with production, e.g. grading, harvesting, and on-site transfers. Specialized knowledge and skills required are lab technology and biology or other sciences. A Bachelor's degree or college diploma is desired. On-the-job training is provided.

#### What is the role of biological technologists and technicians in Canada?

Biological techs do laboratory and fieldwork in a wide range of industries, settings, and work environments. It is their job to help scientists, doctors, engineers, and other professionals find the scientific answers they need to get their work done. Although this is a diverse field, the central role of most biological techs is to observe things closely, and analyze and report their findings.

## Fact Sheet Focus: 4. Biological Technologists and Technicians

### NOC 2221 Biological Technologists and Technicians

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#### What are the main duties of biological technologists and technicians in Canada?

Generally, their work involves collecting and analyzing samples of things like seeds, water, food, and drugs. Once the samples are analyzed, techs write reports on their findings. Biological techs are also responsible for operating and maintaining laboratory and field equipment including microscopes and sample kits. Below are descriptions that describe the duties of technologists and technicians.

**Biological technologists** perform some or all of the following duties:

- Set up and conduct biological, microbiological and biochemical tests and laboratory analyses in support of research and quality control in food production, sanitation, pharmaceutical production, biotechnology and other fields
- Perform experimental procedures in agriculture, plant breeding, animal husbandry, biology and biomedical research
- Conduct field research and surveys to collect data and samples of water, soil, and plant and animal populations
- Conduct environmental monitoring and compliance activities for the protection of fisheries stock, wildlife and other natural resources
- Analyze data and prepare reports
- Conduct or supervise operational programs such as fish hatchery, greenhouse and livestock production programs.

**Biological technicians** perform some or all of the following duties:

- Assist in conducting biological, microbiological and biochemical tests and laboratory analyses
- Perform a limited range of technical functions in support of agriculture, plant breeding, animal husbandry, biology, biomedical research and environmental protection
- Assist in conducting field research and surveys to collect data and samples of water, soil, and plant and animal populations
- Assist in analysis of data and preparation of reports.

The specific duties of biological techs depend on the area they work in. Biological techs in pharmacology, for example, may test the effects of different medicines on bacteria. Techs in natural resources may measure the quality of soil or water. Some techs test new food additives for food manufacturers. Others work in cosmetics, crime investigation, pharmaceuticals, and biotechnology.

## **Fact Sheet Focus: 4. Biological Technologists and Technicians**

### **NOC 2221 Biological Technologists and Technicians**

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#### **What are the desired traits of biological technologists and technicians in Canada?**

Biological techs should:

- be analytical
- be able to keep detailed, accurate records
- be able to work independently and in a team environment
- enjoy clear guidelines and organized methods for work
- enjoy working with laboratory equipment to complete precision tasks
- enjoy gathering data in the field
- have finger dexterity required to adjust microscopes and other fine instruments
- have good communication and interpersonal skills
- have good health and physical stamina

#### **Where do biological technologists and technicians work?**

They work for federal and provincial governments, universities, and private companies in the following areas:

- agriculture
- aquaculture
- biotechnology
- environment and resource management
- food processing and manufacturing
- forensics
- health
- oil and chemicals
- pharmaceuticals
- research and development
- utilities

#### **What is the work environment like?**

Biological techs work indoors in laboratories and offices and/or outdoors in all weather conditions. Those who work outdoors may be required to travel to remote locations or operate transport equipment such as boats, quads or trucks. Travel, apart from any field trips that may be necessary, is not usually required.

Most biological techs work 7 to 9 hours a day, 40 to 50 hours a week. Part-time work may also be available. Weekend work and overtime are quite common. Some jobs are seasonal.

Lifting requirements generally range up to 10 kilograms but some types of work are more physically demanding.

They must follow safety procedures and use safety equipment to minimize the risk of working with dangerous substances such as infectious bacteria, radioactive agents, hazardous chemicals.

## Fact Sheet Focus: 4. Biological Technologists and Technicians

### NOC 2221 Biological Technologists and Technicians

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#### What qualifications are Canadian employers looking for?

Employers are looking for individuals with a diploma or certificate in a related college program such as:

- Agriculture
- Biology
- Biotechnology
- Food Science or Food Technology
- Laboratory Technology
- Marine Resource Management
- Medical Laboratory Technology
- Natural Resources and Conservation

A **technician** program takes 1 to 2 years. Some larger employers require technicians to have a diploma, so it's a good idea to complete a program that lasts at least 2 years. A **technologist** program takes 2 to 3 years.

Certification is available, but voluntary. It is available through the provincial chapters of the Canadian Council of Technicians and Technologists (CCTT). A period of supervised work experience, usually 2 years, is required before certification is granted. For biological techs working in the environmental field, certification is also available through [ECO Canada](#). Certification proves that you have attained a level of expertise and may be required for some positions.

Employers may also require applicants to have:

- first aid training
- Workplace Hazardous Materials Information System (WHMIS) training
- Transportation of Dangerous Goods (TDG) training
- a valid driver's license (preferably with no demerits)
- no criminal record

Computer-based competencies such as bioinformatics and molecular modelling are becoming more important as companies and researchers deal with the integration of traditional and information sciences.

In the aquaculture field, there are fewer than 12 specialized training facilities in Canada offering one form of aquaculture training or another, ranging from technical short courses to technology diplomas, degrees and post-graduate studies.

## Fact Sheet Focus: 4. Biological Technologists and Technicians

### NOC 2221 Biological Technologists and Technicians

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#### What are employers' expectations in relation to communication skills?

Employers may screen for language ability because it is important for workers to understand instructions and share information to complete tasks properly and work safely. Strong written and verbal communication skills are important, as are computer skills. Biological techs must be able to present the results of their work in an organized manner.

Below are examples of tasks where biological technologists and technicians use communication skills on the job:

- They read equipment manuals to understand how to operate equipment, perform routine maintenance and identify possible causes of failure. For example, pump manuals provide operational, maintenance and troubleshooting instructions for fish technologists in aquaculture.
- They write short daily summaries or reports which describe daily activities, tasks completed, observations and problems encountered.
- They write reports that describe the methodology used and the results obtained during biological research studies. They supplement the text with tables, photographs and graphs to present the research clearly and concisely.
- They persuade equipment manufacturers to expedite the shipment of parts required to repair equipment.

To review examples of how other essential skills are used by biological techs in the workplace go to [Explore Careers by Essential Skills](#) on the Working in Canada website.

In a diverse workforce, the ability to communicate in multiple languages is an asset.

#### What is the wage for biological technologists and technicians?

Factors affecting wages include workers' level of education, amount and nature of work experience, and job responsibilities, plus the job location, work conditions and whether the workforce is unionized or not. The figures provided below reflect a national average for low, median (mid-point), and high wages (before taxes).

Low	Median	High
\$14/hour	\$21/hour	\$38/hour
\$29,120/year	\$43,680/year	\$79,040/year

For wage information in specific regions or cities in Canada, see Working in Canada's [Explore Careers by Wages](#).

## Fact Sheet Focus: 4. Biological Technologists and Technicians

### NOC 2221 Biological Technologists and Technicians

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#### What opportunities for advancement are available to biological technologists and technicians?

There is limited mobility among occupations in this group.

The amount of responsibility biological techs have in laboratory programs and field work is related to their education and experience. People who work in these occupations require ongoing training and professional development to keep up with new information and changing technology. Individuals with degrees have more opportunity for advancement than those with diplomas. Candidates with strong interpersonal, business and project management skills will have the best job prospects in a tight labour market.

#### Where can I find out more about biological technologists and technicians in Canada?

For general career information and job search ideas, refer to the Introductory Page.

[Layout suggestion: Insert link to Introductory Page.]

More details about biological technologists and technicians and related industries are available at the following sites:

[BioTalent Canada](#)

[BIOTECCanada](#)

[ECO Canada](#) (Environmental Careers Organization)

[Canadian Council of Technicians and Technologists \(CCTT\)](#)

[Technology Registrations Canada](#)

[Fisheries and Oceans Canada](#)

[Canadian Agricultural Human Resource Council](#)

[Aquaculture Association of Canada](#) and [Aquaculturejobs.com](#)

[Canadian Aquaculture Industry Alliance](#)

Essential Skills Profile for [Biological Technologists and Technicians](#)

## Fact Sheet Focus: 5. Biotechnology

### Part of NOC 2221 Biological technologists and technicians

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#### Biotechnology is also called:

- Bio-economy

#### What is the biotechnology industry?

The biotechnology industry involves the invention, development, production, and use of products and processes that use biological resources. The bio-economy is made up of four sub-sectors: bio-health, bio-energy, bio-industrial, and agri-biotech. In 2013, 47% of biotechnology companies in Canada were in bio-health.

#### What types of jobs are there in the bio-economy?

Biotechnology companies have people working in the areas of preclinical research, clinical research, research and development, manufacturing, quality control and assurance, plus others. Careers in the bio-economy that share some duties and traits with the occupation of medical lab technologist are described below.

- Bio-economy **lab workers** are employed in variety of types of labs including research, quality control, and quality assurance. They perform bench work and laboratory procedures under the supervision of laboratory technologists, laboratory researchers, research scientists and other senior staff. They comply with good laboratory and manufacturing practices, and may participate in the development of processes related to biotechnology. You can find more details about this occupation in the CSMLS Fact Sheet about bio-economy lab workers [**Layout suggestion:** Provide link to Biotechnology Lab Workers Fact Sheet.] and BioTalent Canada's Skills Profiles in its [Career Tools section](#).
- Bio-economy **research assistants** help conduct studies in a laboratory setting. They perform a wide range of duties that include researching past and current research projects and results, setting up studies (including identifying financial, human and material resources), conducting and documenting experiments, recording detailed observations, analyzing data, and interpreting and communicating results. They are also responsible for preparing samples, testing equipment, and developing protocols and standard operating procedures (SOPs). They must handle samples with care and record notes that are organized, clear and accurate. Once experiments are completed, the research assistant stores samples in appropriate locations and cleans the laboratory. You can find more details about this occupation in BioTalent Canada's Skills Profiles in its [Career Tools section](#).



## Fact Sheet Focus: 5. Biotechnology

### Part of NOC 2221 Biological technologists and technicians

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- Bio-economy **animal care attendants** provide care, observation, and research support for laboratory animals, in keeping with regulatory requirements of the Canadian Council on Animal Care. They provide care for a variety of land and water species involved in research studies. Animal care attendants clean animal housing, empty waste matter, fill cages with fresh bedding, groom animals and feed them according to policies and procedures and research protocols. They may also provide routine postoperative care, administer medication orally or topically, or prepare samples for laboratory examination under the supervision of veterinarians or scientists. You can find more details about this occupation in the CSMLS Fact Sheet about animal health technologist and veterinary techs [Layout suggestion: Provide link to fact sheet.] and the Skills Profiles in its [Career Tools section](#).
- Bio-economy **animal care technicians** also provide care, observation, and research support for laboratory animals, in keeping with regulatory requirements of the Canadian Council on Animal Care. The focus of their work is to provide clinical expertise such as pre- and post-operative care, give medication orally or topically, and prepare samples for laboratory examination under the supervision of veterinarians or scientists. They obtain and test laboratory samples, provide surgical and anaesthesia support, order animals, and administer drugs under the direction of a veterinarian. You can find more details about this occupation in the CSMLS Fact Sheet about animal health technologist and veterinary techs [Layout suggestion: Provide link to fact sheet.] and BioTalent Canada's Skills Profiles in the [Career Tools section](#).

These four occupations described above are part of the occupational groups of **biological technician and technologists (NOC 2221)** and **chemical technicians and technologists (NOC 2221)**. You can find more information about these occupational groups in the CSMLS Fact Sheets [Layout suggestion: Provide link to fact sheets.]

#### Where can I find more information about the bio-economy in Canada?

More details about the bio-economy are available at [BIOTEC Canada](#) and [BioTalent Canada](#). BioTalent Canada provides [guidelines](#) about how readers can use their Career Tools to identify skills that they could transfer to alternate careers in the bio-economy.

## **Fact Sheet Focus: 6. Biotechnology Lab Workers**

### **Part of NOC 2221 Biological technologists and technicians**

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#### **Biotechnology lab workers are also called:**

- laboratory (or lab) assistants
- laboratory support workers
- laboratory technicians (or techs)
- laboratory technologists (or techs)
- biochemistry laboratory technicians

#### **What is the role of biotechnology lab workers?**

Biotechnology lab workers perform bench work and laboratory procedures under the supervision of laboratory technologists, laboratory researchers, research scientists and other senior staff in the industry of biotechnology.

#### **What are the main duties of lab workers in the Canadian bio-economy?**

- follow protocols and safety guidelines
- verify data and ensure that samples are obtained according to established protocols
- analyze samples and validate results
- interpret, communicate and document data, using scientific knowledge
- practice quality management and the efficient use of resources
- apply critical thinking skills to solve problems
- address workplace challenges by managing time, materials, information and change
- use oral communication, reading, and writing skills
- meet legal and ethical requirements

#### **What are the desired traits of lab workers in the Canadian bio-economy?**

Biotechnology lab workers should possess:

- the ability to adapt to changes in priorities
- a strong work ethic to meet deadlines
- good observation skills and attention to detail
- the ability to work in a fast-paced environment
- the ability to identify the priority among multiple work tasks
- appreciation for the importance of their supportive role
- the ability work well in teams and have an approachable and friendly attitude

They should also be:

- self-motivated and directed
- honest, e.g. when providing research results
- willing to continuously learn new skills and knowledge

## Fact Sheet Focus: 6. Biotechnology Lab Workers

### Part of NOC 2221 Biological technologists and technicians

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#### Where are bio-economy lab workers employed?

The types of organizations where bio-economy lab workers are employed are listed below:

- companies in:
  - agri-biotech, e.g. functional foods (foods that have a positive effect on health beyond nutrition), animal nutrition supplements, livestock vaccines, plant genetics, animal genetics
  - bio-energy, e.g. biodiesel, ethanol, methane, bio-oil
  - bio-health, e.g. medical devices, biopharmaceuticals, nutraceuticals, natural-compound bioactives
  - bio-industrial, e.g. bioadhesives, biocatalysts, biocoatings, biosolvents, bioplastics
- university and government research labs
- hospitals

#### What is the work environment like?

Because the types of organizations in the bio-economy vary greatly, the nature of the work environments also vary greatly. Look for information about the specific types of organizations, such as those developing medical devices or animal nutrition supplements, to learn about work environments.

#### What qualifications are Canadian employers looking for?

Employers in the bio-economy seek lab workers with the minimum of a college or technical school diploma from a laboratory technician or technologist program. Some lab workers may have a bachelor's degree in chemistry or biology. Employers also seek individuals with on-the-job experience in biotechnology or a related industry.

#### What are employers' expectations in relation to communication skills?

Language skills are very important to employers. Formal and informal communication drives the daily routine in most workplaces. There is a requirement for clear documentation and discussion with other staff. Documentation is very important, as success in regulated activities such as pharmaceuticals depends on being accurate and concise. From the standpoint of productivity, miscommunications can be costly and time-consuming to correct.

#### What is the wage for this occupation?

National averages are not available for this occupation. To get an idea of what lab workers earn, review job postings for this occupation on job search websites. For suggestions of websites to try, see the Introductory Page [**Layout suggestion:** Insert link to Introductory Page.] and the list of resources provided at the end of this fact sheet. [**Layout suggestion:** Insert link to last question, "Where can I find ...?"]

## Fact Sheet Focus: 6. Biotechnology Lab Workers

### Part of NOC 2221 Biological technologists and technicians

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#### What opportunities for advancement are available to lab workers?

For information about career opportunities, refer to BioTalent Canada's [Career Pathways](#) for laboratory workers.

#### What are some hiring practices in biotechnology that job seekers should consider?

- Although a technical field, the skill rated most important by bio-economy employers in 2013 was interpersonal skills, e.g. cooperation, teamwork, communication.  
[Layout suggestion: Insert in pop-up box, "Highlight your interpersonal skills in your résumé and job interviews. Remember the importance of interpersonal skills when on the job."]
- Outsourcing is a common solution used by bio-economy companies to fill job vacancies and skills shortage. Sometimes outsourced workers are local or from another location in Canada, and sometimes they are outside of Canada, e.g. US, Europe, China, South-East Asia, India.
- In 2013, 52% of bio-economy companies employed internationally educated professionals.
- Bio-economy employers use the following recruitment methods. The percentage indicates the amount of employers who used each method in 2013.
  - Personal contacts and employee referrals = 81%
  - Job banks and the Internet = 72%
  - Company website = 62%
  - Social media = 50%
  - [BioTalent's PetriDish](#)™ job board = 34%

#### Where can I find more information about this occupation in Canada?

More details about the bio-economy and career tools are available at [BIOTEC Canada](#) and [BioTalent Canada](#).

**Note:** BioTalent Canada is a non-profit, national organization devoted to human resources information, skills development, and job opportunities in Canada's bio-economy. Their website offers resources and tools on career planning, training and job postings.

Specific resources for job searching include:

- [The PetriDish](#) – a job board
- [Scotiabank StartRight BioTech Résumé Builder](#) – an online résumé tool
- [BioSkills Recognition Program](#) – for a fee, applicants complete a BioSkills Transfer Tool and Portfolio which is reviewed by a board. When a portfolio is approved, the individual receives a BioReady designation. Applicants must be legally approved to work in Canada and be fluent in English.

## Fact Sheet Focus: 7. Chemical Technologists and Technicians

### NOC 2211 Chemical Technologists and Technicians

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#### Chemical technologists and technicians are also called:

- chemical laboratory technicians or technologists
- chemical research technicians or technologists
- chemical techs
- physical sciences technicians or technologists

The following alternate titles reflect the various areas in which chemical technologists and technicians can specialize:

- biochemistry technologists
- chemical analysts
- chemical engineering technicians/technologists
- chemical processing quality control technicians
- environmental technicians/technologists [Layout suggestion: Insert link or pop-up box to relevant piece in highlighted description below.]
- food processing quality control technicians [Layout suggestion: Insert link to CSMLS food tech fact sheet.]
- food technologists [Layout suggestion: Insert link to CSMLS fact sheet.]
- geochemical technicians [Layout suggestion: Insert link to Assayer fact sheet with comment such as, "For related occupation, see Assayer fact sheet."]
- industrial hygiene technologists
- mass spectrometer technicians
- nanotechnologists [Layout suggestion: Insert link or pop-up box to relevant piece in highlighted description below.]
- process technicians
- water and wastewater laboratory technologists [Layout suggestion: Insert link or pop-up box to relevant piece in highlighted description below.]
- water quality technicians [Layout suggestion: Insert pop-up box to relevant piece in highlighted description below.]

#### Environmental technicians/technologists

Environmental technicians/technologists work on projects to assess, clean up, and protect the environment. They require broad scientific knowledge and technical skills and can be involved in a variety of projects. For example, environmental technicians/technologists can be responsible for collecting and analyzing air, water, and soil samples; conducting field inspections and investigations of contamination; operating and monitoring pollution control or treatment equipment; monitoring compliance with federal and provincial regulations; or participating in environmental assessments and cleanup efforts. Environmental technicians/technologists often work as part of a team of professionals and play a key role in conservation and protection efforts. For more information, go to [ECO Canada's Occupational Profile](#).

## Fact Sheet Focus: 7. Chemical Technologists and Technicians

### NOC 2211 Chemical Technologists and Technicians

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#### Nanotechnologists

Nanotechnologists study and manipulate atoms, molecules, proteins and cells that range in size from one to 100 nanometres (nm). Nanotechnology may be used when developing systems within the areas of energy, pharmaceuticals, textiles, cosmetics, foods, telecommunications and automobiles. Nanotechnologists' duties therefore vary greatly from one employer to another." For details about this emerging occupation, [click here](#). For a description of the one diploma level program in Canada, [click here](#).

#### Water and wastewater laboratory technologists

Water and wastewater laboratory technologists manage the technical processes used for water purification and wastewater disposal. They also ensure that these processes are environmentally safe and are compliant with industry standards and methods. For more information go to [ECO Canada's Occupational Profile](#).

#### Water quality technicians/technologists

Water quality technicians/technologists are responsible for testing and monitoring water supplies and making certain water is safe. They perform a variety of technical duties, for example inspecting, sampling, monitoring, and testing, and work with both groundwater and surface water sources. Water quality technicians/technologists also routinely monitor compliance with federally and provincially mandated water quality requirements. For more information, go to [ECO Canada's Occupational Profile](#).

#### What is the role of chemical technologists and technicians in Canada?

Chemical technologists and technicians provide technical support to teams of chemists, chemical engineers, and related professionals. Chemical technologists and technicians generally specialize in an area such as analytical chemistry, production of industrial chemicals, materials science, food technology, mineral processing, pulp and paper technology, recycling technology, industrial chemistry, or environmental monitoring and protection.

#### What are the main duties of chemical technologists and technicians in Canada?

**Chemical technologists** perform some or all of the following duties:

- set up and conduct chemical experiments, tests and analyses using techniques such as chromatography, spectroscopy, physical and chemical separation techniques and microscopy
- operate and maintain laboratory instruments and equipment
- prepare solutions of gas or liquid, reagents, and sample formulations
- compile records and interpret results of experiments or analyses
- develop and conduct programs of sampling and analysis to maintain quality standards of raw materials, chemical intermediates and products
- assist in the development of chemical engineering processes, studies of chemical engineering construction, inspection and maintenance, plus the development of standards, procedures and health and safety measures

## Fact Sheet Focus: 7. Chemical Technologists and Technicians

### NOC 2211 Chemical Technologists and Technicians

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- operate experimental chemical or petrochemical pilot plants
- conduct or assist in air and water quality testing and assessments, environmental monitoring and protection activities, and development of and compliance with standards
- assist in synthesis of small molecules for the purpose of creating drug candidates
- assist in the design and fabrication of experimental instruments and equipment

**Chemical technicians** perform some or all of the following duties:

- assist in setting up and conducting chemical experiments, tests and analyses
- operate and maintain laboratory instruments and equipment
- prepare solutions of gas and liquid, reagents and sample formulations
- compile records for analytical studies
- assist in developing and conducting programs of sampling and analysis to maintain quality standards
- carry out a limited range of other technical functions in support of chemical research, tests and analyses, and environmental air and water quality monitoring and protection
- assist in the design and fabrication of experimental instruments and equipment

**What are the desired traits of chemical technologists and technicians in Canada?**

- strong analytical skills
- an aptitude for science and mathematics
- good manual dexterity
- strong oral and written communication skills
- the ability to pay close attention to details
- enjoy using instruments and equipment

**Where do chemical technologists and technicians work?**

- federal and provincial government departments and facilities, e.g., utilities, health, universities
- medical and research laboratories
- quality control laboratories
- chemical products manufacturers
- industrial chemicals manufacturers
- engineering companies
- environmental consulting companies
- food product companies
- pharmaceutical companies
- petrochemical companies
- water and wastewater treatment plants

## Fact Sheet Focus: 7. Chemical Technologists and Technicians

### NOC 2211 Chemical Technologists and Technicians

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#### What is the work environment like?

Most work is performed indoors in labs or processing plants, although outdoor work may be necessary to take environmental samples and conduct site inspections. Chemical techs are often required to stand for extended periods of time and may be exposed to odours, toxic fumes and other hazardous substances, so they must follow safety procedures in order to limit risks.

Chemical technologists and technicians generally work 35 to 40 hours per week, however, some jobs may require evening and weekend shifts to meet deadlines.

#### What qualifications are Canadian employers looking for?

Employers hire **chemical technicians** who have completed a one- or two-year college program in chemical, biochemical or chemical engineering technology. Employers hire **chemical technologists** who have completed a two- or three-year college program in chemical, biochemical or chemical engineering technology or a closely related discipline such as environmental technology. Some research positions may be awarded to individuals with university degrees.

Some employers will require certification. For example, most provincial governments across Canada require certification for workers in municipal water treatment, water distribution, wastewater collection and wastewater treatment facilities. Information about these certifications is available through the provincial government, usually the environment or health department, or a professional society.

Some employers will give preference to individuals who are certified. Certification as chemical technologists is available through the [Canadian Society for Chemical Technology](#).

A broader certification is also available for technicians or technologists working in applied science technology fields such as bio-medical engineering, environmental, information, mechanical and other disciplines related to the built and natural environment. Each Canadian province has an association responsible for certifying and registering technology professionals within that province. For a listing of these associations, go to [Technology Registrations Canada](#). [ECO Canada](#) also offers certifications for occupations that employers in the environmental field may prefer or require.



## Fact Sheet Focus: 7. Chemical Technologists and Technicians

### NOC 2211 Chemical Technologists and Technicians

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#### What are employers' expectations in relation to communication skills?

Employers may screen for language ability because it is important for workers to understand instructions and share information to complete tasks properly and work safely.

Below are examples of tasks where chemical technicians and technologists use communication skills on the job:

- Read comments and instructions in work orders and work request forms. For example, chemical process quality control technicians may read comments in work orders to determine the reasons for analytical tests and brief instructions for conducting assays.
- Write activity summaries, literature reviews and reports. For example, research technologists may summarize reviews of literature and make recommendations for new equipment and software purchases. Water quality technicians write non-conformance reports when test and analysis results fail to meet specifications and standards. They describe the non-conformance encountered and outline corrective actions. They may justify the acceptance of test results and outline the reasons for variations. Environmental laboratory technicians write validation reports to describe deviations from protocol methods, changes to procedures and details of difficulties encountered during the analysis of samples.
- Discuss technical and scientific matters with co-workers, colleagues and clients. For example, technologists discuss procedures for calibrating flow meters with technicians and verify that analysis and validation procedures were followed and analyses were conducted according to standard operating procedures. They discuss methods and protocols for new analysis procedures, test anomalies and next steps with their supervisors. They may discuss potential causes of nonconforming laboratory results with colleagues. They may review analysis results and validation procedures with clients and explain deficiencies and the solutions required to address them.

To review examples of how other essential skills are used by chemical techs in the workplace, go to [Explore Careers by Essential Skills](#) on the Working in Canada website.

In a diverse workforce, the ability to communicate in multiple languages is an asset.

#### What is the wage for chemical technologists and technicians?

Factors affecting wages include workers' level of education, amount and nature of work experience, and job responsibilities, plus the job location, work conditions and whether the workforce is unionized or not. The figures provided below reflect a national average for low, median (mid-point), and high wages (before taxes).

Low	Median	High
\$15/hour	\$24/hour	\$39/hour
\$31,200/year	\$49,920/year	\$81,120/year

For wage information in specific regions or cities in Canada, see Working in Canada's [Explore Careers by Wages](#).

## Fact Sheet Focus: 7. Chemical Technologists and Technicians

### NOC 2211 Chemical Technologists and Technicians

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#### What opportunities for advancement are available to chemical technologists and technicians?

Considerable mobility is possible among jobs within this occupational group.

Advancement opportunities vary depending on the size and nature of the organization and the individual's qualifications. Experienced chemical technologists may move into management positions, sales, or own and operate their own laboratories.

Chemical technicians and technologists can also advance in their career by pursuing additional education and other career development opportunities such as participating on special work projects and industry committees. For information about education programs, go to the list of Canadian universities and colleges offering programs in chemical sciences and engineering at the website of the [Chemical Institute of Canada](#).

#### Where can I find out more about chemical technologists and technicians in Canada?

Links to general career information and job posting resources are provided on the Introductory Page. [Layout suggestion: Insert link to Introductory Page.]

For more information about biological technologists and technicians go to:

- Chemical Institute of Canada (CIC) [career resources](#) and [job site](#).
- [Technology Registrations Canada](#)
- ECO Canada (Environmental Careers Organization) [career resources](#) and [job board](#)
- Essential Skills Profile for [Chemical Technologists and Technicians](#)

## Fact Sheet Focus: 8. Food Science Technologists

### Part of NOC 2211 Chemical Technologists and Technicians

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#### Food science technologists are also called:

- food science technicians
- food technologists

Food science technologists are part of the broader occupational groups of:

- biological sciences technologists and technicians
- chemical technologists and technicians [Layout suggestion: Insert link to CSMLS Fact Sheet.]
- laboratory technologists, technicians and workers [Layout suggestion: Link to CSMLS Lab Worker Fact Sheet.]

#### What is the role of a food science technologist in Canada?

Food science technologists work independently or provide technical support in laboratory analysis, food product development, processing, food microbiology, research or quality assurance or regulatory positions. They usually work in a laboratory, conducting food experiments, cleaning up, and assisting food scientists.

Food science is the study of the physical, biological, and chemical makeup of food and the concepts underlying food processing. Food technology is the application of food science to the selection, preservation, processing, packaging, distribution, and use of safe food.

#### What are the main duties of food science technologists in Canada?

Food science technologists may work in one of four areas:

- **applied research and development** - assisting in the development of new processing methods and new or improved foods to meet customer requests for healthier and safer foods. In general, food science technologists conduct tests to see that products meet government and industry standards and satisfy consumer needs (for example, have an adequate shelf life).
- **quality control or assurance** - checking raw ingredients for freshness, maturity or stability for processing, and checking finished products for safety, quality and nutritional value. They also may develop scientifically-based quality assurance programs, inspect processing line operations, or develop and improve packaging and storage methods.
- **processing plants** - developing production specifications, scheduling processing operations, and evaluating processing and storage operations. They may also be employed in supervisory or management positions.
- **regulatory agencies** - inspecting food processing operations.

They may have duties such as:

- develop and test new food products, and search for new food sources
- ensure quality and flavour remain consistent
- determine the fat, sugar, vitamin, or mineral content of products
- research ways to improve testing, preservation, packaging, and manufacturing methods
- enforce health and safety regulations
- ensure food safety through hazard analysis and critical control point (HACCP) programs, taking corrective action when necessary

## **Fact Sheet Focus: 8. Food Science Technologists**

### **Part of NOC 2211 Chemical Technologists and Technicians**

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#### **What are the desired traits of food science technologists in Canada?**

Food science technologists need the following characteristics:

- good organizational skills
- a high degree of intellectual curiosity
- the ability to work well as part of a team
- creative problem solving skills
- good interpersonal skills
- enjoy using instruments and equipment to perform tasks requiring precision
- enjoy analyzing data and conducting sampling and analysis programs

#### **Where do food science technologists work?**

Food science technologists work for the following types of organizations:

- food and beverage processing and manufacturing companies
- universities and colleges
- government-run research agencies
- private companies and consulting firms

These organizations are involved in:

- meat and poultry slaughter and processing
- dairy processing
- cereal grains and their products including flour, cereal, pasta and snack foods
- bakery and confectionery goods
- vegetable oil refining and product manufacturing
- soft drink manufacturing
- brewing, winemaking and distilling
- vegetable processing
- sugar manufacturing
- specialty foods manufacturing

The majority of jobs in the food processing industry are in Ontario, Manitoba and Saskatchewan.

#### **What is the work environment like?**

Food science technologists work in laboratories and processing plants. In some working environments, they may be required to work shifts.

Food technologists generally work a standard 35 to 40 hours per week. However in some jobs, evening and weekend shifts may be required in order to meet deadlines. Most work on a full-time basis.

## Fact Sheet Focus: 8. Food Science Technologists

### Part of NOC 2211 Chemical Technologists and Technicians

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#### What qualifications are Canadian employers looking for?

Food science technologists need post-secondary education in a related field such as chemical technology, chemistry, biochemistry or microbiology. There are many post-secondary programs specific to food science in Canada.

The Canadian Institute for Food Technology provides the following information about food science programs:

- Degree programs: most institutions offer a 4-year program beginning with two semesters of general science, before learning about food composition, processing technologies, and food safety. Possible elective courses are dairy technology, food packaging and research projects. Co-op options and international exchange opportunities may also be available.
- Diploma studies: diploma and/or certificate programs in one or more aspects of food science and technology are offered at colleges across Canada. Diploma programs typically emphasize one or more aspects of food such as food and nutrition, food analysis, and food processing.

For a listing of food science programs in Canada, [click here](#).

A requirement of many employers is HACCP (Hazard Analysis Critical Control Point) training and/or certification. HACCP is a food safety system that is a scientific approach to controlling microbiological, chemical or physical hazards geared towards preventing contamination. It is implemented world-wide to support the needs of a standardized food safety and quality system in a global economy. This training and certification can be taken from many institutions and private training organizations.

There are also short courses available on various topics within food science that may help in learning specializations to prepare for work in the field. For one example, see the public training available at the Guelph Food Technology Centre, an independent technology centre specializing in food, at <http://www.gftc.ca/courses-and-training/public-training.aspx>. Topic areas include food safety and quality, research and development, food microbiology and food safety training.

#### What are employers' expectations in relation to communication skills?

Employers may screen for language ability because it is important for workers to understand instructions and share information to complete tasks properly and work safely.

Below are examples of tasks where food science technologists use communication skills on the job:

- Read research and analysis reports and journal articles. For example, chemical technologists in the food processing industry may read articles in the Journal of Food Microbiology to learn about new developments in food science and new analysis and testing methods for detecting salmonella in food products.
- Enter data into tables. For example, food processing technologists may record retention times, concentration levels and types of diluting solvents in summary tables for pesticide residues identified in animal and plant products.

## Fact Sheet Focus: 8. Food Science Technologists

### Part of NOC 2211 Chemical Technologists and Technicians

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- Write short text entries for logbooks and entry forms. For example, they record their observations of samples, unusual analysis results, stages of extraction, task completion times, notes on malfunctioning equipment and items requiring follow up in personal logbooks. They write comments in laboratory logbooks indicating the status of tests, instruments and sample preparations. They enter brief notes on analysis and test summary forms to explain unusual results and report their observations.
- Discuss job assignments and other matters with supervisors and managers. For example, they receive information on their roles for upcoming projects from their supervisors. They offer suggestions for improvements to current work processes and provide input and feedback on workflow, procedural changes and modifications to testing and analysis methods.

To review examples of how other essential skills are used by food science technologists and other types of chemical techs in the workplace go to [Explore Careers by Essential Skills](#) on the Working in Canada website.

In a diverse workforce, the ability to communicate in multiple languages is an asset.

#### What is the wage for the occupational grouping of chemical technologists and technicians?

Factors affecting wages include workers' level of education, amount and nature of work experience, and job responsibilities, plus the job location, work conditions and whether the workforce is unionized or not. The figures provided below reflect a national average for low, median (mid-point), and high wages (before taxes).

**Note:** The following figures are for the occupational group of chemical technologists and technicians (2211), which food science technologists are part of.

Low	Median	High
\$15/hour	\$24/hour	\$39/hour
\$31,200/year	\$49,920/year	\$81,120/year

For wage information in specific regions or cities in Canada, see Working in Canada's [Explore Careers by Wages](#).

## Fact Sheet Focus: 8. Food Science Technologists

### Part of NOC 2211 Chemical Technologists and Technicians

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#### What opportunities for advancement are available to food science technologists?

Jobs are available at the diploma level of study, at the undergraduate (degree) level, and at post-graduate levels in this field, so there is good opportunity for continued learning and career advancement.

Most new graduates start as technicians, often in junior positions. Experienced food science technologists can move into:

- supervisory or administrative positions in quality assurance, inspection or regulation
- production management trainee positions leading to plant supervisory positions
- marketing and sales
- new product development, and process research and development
- regulatory positions with federal and provincial government agencies

Because of the global issues with food and food production, there are opportunities with international food agencies such as the [United Nations' World Health Organization \(WHO\)](#), the [Canadian International Development Agency \(CIDA\)](#), the [Food and Agriculture Organization \(FAO\)](#) or [PLENTY Canada](#).

#### Where can I find out more about this occupation and the food production industry in Canada?

For general career information and job search ideas, refer to the Introductory Page.

[Layout suggestion: Insert link to Introductory Page.]

More details about Food Science Technologists are available at:

**Canadian Institute of Food Science and Technology (CIFST)** [www.cifst.ca](http://www.cifst.ca).

A national professional association for food scientists and technologists. It provides information on food science and technology, links to Canadian Food Science institutions, descriptions of awards and financial aid, career opportunities and other resources.

(Note: Position/job postings are only available to members.) Scroll over “Sections & Students” and click on “Students” to find information about pursuing studies in this field.

**Manitoba Food Processors Association** at [www.mfpa.mb.ca](http://www.mfpa.mb.ca) has information including training and education, worker recruitment, and job openings. For job postings, go to [Looking for Work](#).

**British Columbia's skilled immigrant infocentre**

at [http://skilledimmigrants.vpl.ca/index.php/guides/industry/food\\_technologists\\_technicians](http://skilledimmigrants.vpl.ca/index.php/guides/industry/food_technologists_technicians)

[BioTalent Canada](#) [Layout suggestion: Insert link to Biotechnology Fact Sheet.]

## Fact Sheet Focus: 9. Health Information Management Professionals

### Part of NOC 1252 Health Information Management Occupations

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#### Health information management professionals are also called:

- health information management practitioners or technicians
- health records technicians or technologists
- medical records technicians

#### Emerging specializations:

Health organizations are currently changing from paper to electronic health records. As a result, new career specializations are emerging in a variety of areas related to health information, including the following:

- business analysts
- clinical data analysts
- compliance officer
- data quality analysts
- data mapping specialists
- health information technology specialist [Layout suggestion: Insert link or pop-up box to description of “Health Info Technology Specialists,” below.]
- health records coders or medical coding specialists [Layout suggestion: Insert link or pop-up box to description of “Health Record Coders,” below.]
- release of information specialist
- risk management analysts
- utilization specialists

#### Health Information Technology Specialists

In general, health information technology specialists plan, develop, test and implement software designed to capture, manage and display healthcare-related records and databases and conduct analysis of healthcare data.

Health information technology specialists (HIT specialists) work with healthcare-related software and information technology (IT) which is designed to capture, manage and display health-related records, databases and information. Health information applications not only have the potential to improve the level of care that hospitals and clinics can provide, but also may contribute to reducing administrative costs and providing documentation that is sometimes needed in legal cases.

#### Health Records Coders:

A health records coder uses a classification system to assign code numbers and letters to each symptom, diagnosis, disease, procedure, and operation that appears in patients’ charts. These codes are used for insurance reimbursement, research, health planning analysis, and to make clinical decisions.

As an example, these health information management professionals work at nursing units. They extract relevant information from the documentation on the chart and enter it into a database. This provides hospital administration with timely information for making decisions such as projected length of stay, use of human resources, and bed shortages.



## **Fact Sheet Focus: 9. Health Information Management Professionals**

### **Part of NOC 1252 Health Information Management Occupations**

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#### **What is the role of health information management professionals in Canada?**

Health information management professionals provide services in all aspects of clinical records management. This includes data collection, coding, use, integrity, access, disclosure, retention and disposal of health information.

They perform quantitative and qualitative analysis of information to facilitate health care delivery, patient safety and health, and decision making within and across organizations. For example, health statistics are used to inform complex decisions ranging from how to improve patient care to how to allocate resources.

#### **What are the main duties of health information management professionals in Canada?**

- translate information from paper documents to electronic records
- convert a patient's diagnostic and intervention information to a standardized format using a recognized classification system
- ensure that every patient's record is complete, accurate and secure yet readily accessible for appropriate release
- identify and perform appropriate data quality checks to ensure accuracy of records and databases
- safeguard and release patient information under the provisions of the provincial or territorial health information legislation
- collect additional information about patients to generate data about the patient population
- use computer applications to organize, compile, sort, group, retrieve, analyze and present health data in ways that are useful for planning, research and education.

#### **What are the desired traits of health information management professionals in Canada?**

Health information management professionals should:

- be mature and responsible
- be analytical
- be honest, trustworthy, and respectful of confidential information
- pay attention to detail, organization and accuracy
- have the ability to work well under pressure and meet deadlines
- have ability to exercise independent judgment
- have good interpersonal skills
- have the ability to work well independently and as part of a team
- enjoy taking a methodical approach to compiling and classifying information and participating in data quality initiatives
- enjoy operating information retrieval systems and responding to requests for information
- be committed to lifelong learning and professional development

## **Fact Sheet Focus: 9. Health Information Management Professionals**

### **Part of NOC 1252 Health Information Management Occupations**

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#### **Where do health information management professionals work?**

Typical employers include:

- hospitals, within the departments of:
  - admitting
  - health records/information services
  - information systems
  - quality management
  - research and statistics
  - risk management
  - utilization management
- community health centres
- health records consulting firms
- nursing homes and long-term care facilities
- pharmaceutical companies
- primary care givers, e.g. family physicians, mental health care providers
- educational institutions
- government agencies, e.g., ministries of health, research centres
- health agencies, e.g. Canadian Institute of Health Information, World Health Organization
- insurance companies
- law offices

Other employers include:

- Computer companies
- Correctional centres
- Veterinary hospitals
- Workplace health and safety boards

#### **What is the work environment like?**

Health information management professionals may work full-time or part-time hours or on a call-in (casual) basis. They can work in positions that are permanent, temporary or casual depending on department and facility needs. Shift schedules may include a combination of day, evening, night, weekend and holiday shifts, and sometimes on-call duty.

Health information management professionals work with a combination of paper and electronic health records, which requires them to use a computer and sit for long periods of time. This job can require individuals to perform repetitive tasks and motions like data entry and manually indexing health information.

## Fact Sheet Focus: 9. Health Information Management Professionals

### Part of NOC 1252 Health Information Management Occupations

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#### What qualifications are Canadian employers looking for?

Employers seek individuals with skills and knowledge related to:

- biomedical sciences (anatomy, physiology, pathophysiology)
- information sciences and technology
- the health care system in Canada
- legislation and regulations governing information security and access
- standardized classification systems and technologies
- clinical data integration and management
- information analysis and presentation
- ethics and practice

Individuals can gain the necessary skills and knowledge by taking a program accredited by the Canadian Health Information Management Association (CHIMA) at a post-secondary institution or by taking a [distance education program](#). Individuals with related education and work experience should ask about prior learning recognition.

These programs take two to four years to finish depending on the type selected. After completing their education, individuals are qualified to write the national certification examination to become certified by the [Canadian Health Information Management Association](#) (CHIMA). To maintain certification, health information management professionals must participate in ongoing professional development for continuing professional education credits.

#### What are employers' expectations in relation to communication skills?

Employers are looking for individuals with excellent oral and written communication skills including report writing and knowledge of medical terminology. Health information management professionals use their communication skills to collaborate with physicians, nurses, allied health care professionals, management and administrative staff to ensure the proper management of patient information. In a diverse workforce, the ability to communicate in multiple languages is an asset.

Employers also seek individuals with strong computer skills including:

- Word processing, internet, email, presentation programs, spreadsheet manipulation and database knowledge
- Custom health programs, system management, large client database, office management and statistical analysis software
- Research design and manipulation – using computer technologies to capture, manage and analyze data

## Fact Sheet Focus: 9. Health Information Management Professionals

### Part of NOC 1252 Health Information Management Occupations

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#### What is the wage for this occupation?

Factors affecting wages include workers' level of education, amount and nature of work experience, and job responsibilities, plus the job location, work conditions and whether the workforce is unionized or not.

Salary information is not available for this occupation at a national level, but average for low and high wages (before taxes) are available from two provinces:

Province	Low	High
Alberta	\$26/hour or \$54,000/year	\$32/hour or \$66,560/year
Ontario	\$20/hour or \$41,600/year	\$32/hour or \$66,560/year

#### What opportunities for advancement are available to health information management professionals?

Progression to supervisory positions is possible with experience. Progression to management positions and specializations is possible with additional training and experience.

The skills gained as a health information management professional can be applied in a variety of senior roles, including:

- chief information officer
- client service manager
- consultant
- data quality manager
- decision support analyst
- director of information services
- documentation coordinator
- patient advocate
- project manager
- research associate
- utilization manager

#### Where can I find out more about health information management professionals and the health industry in Canada?

For general career information and job search ideas, refer to the Introductory Page.

[Layout suggestion: Insert link to Introductory Page.]

More details about health information management professionals and the health industry are available at:

The [Canadian Institute for Health Information](#) (CIHI) collaborates with stakeholders across Canada to advance the health system's use of electronic health data in new ways. It works with the Canada Health Infoway and others to create the knowledge needed to improve patient experiences, support front-line care providers, and build a more effective and efficient health system.

## Fact Sheet Focus: 9. Health Information Management Professionals

### Part of NOC 1252 Health Information Management Occupations

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[Canada Health Infoway](#) has many documents and links which are useful in understanding the health data standards landscape. Infoway works as a strategic investor of funds (provided by the federal government) to collaborate with provinces and territories to improve health care through information technology.

[Canadian Health Information Management Association](#) (CHIMA) represents approximately 5,000 health information management professionals across Canada and is the certifying body and national association. Together with the Canadian College of Health Information Management (CCHIM), CHIMA sets standards whereby health information management education programs are evaluated for their suitability in preparing students to meet the national standards for becoming certified professionals. For a listing of recognized schools that deliver accredited health information management (HIM) programs, click [here](#).

Check out CHIMA's [Workforce Transformation project report](#) that maps the evolution of the profession into new roles resulting from the move to electronic health records. The report describes the clusters of competency profiles and the new role descriptions that were developed in collaboration with the Information and Communications Technology Council (ICTC) and Alberta Health Services (AHS).

[COACH: Canada's Health Informatics Association](#) provides access to a diverse community of accomplished, influential professionals who work passionately to make a difference in advancing healthcare through information technology. The field of health informatics (HI) is the intersection of clinical, IM/IT, and management practices and is helping to modernize healthcare.

Many health jobs in Canada are with provincial and territorial government health services. Some of the provincial organizations that post job openings or career opportunities are listed below:

- [Alberta Health Services Job Board](#)
- [British Columbia's Provincial Health Services Authority Career Opportunities](#)
- [Manitoba Government Job Opportunities](#)
- New Brunswick's Health Networks' [Career Centre](#)
- Newfoundland's Health and Community Services [career opportunities](#)
- Northwest Territories' [Health and Social Services Careers](#)
- [Nova Scotia's District Health Authorities](#) (note: information about career opportunities are available at the regional links provided on this page)
- Nunavut's [Employment Opportunities](#) in health
- [Ontario's Local Health Integration Networks](#) (note: information about career opportunities are available at the regional links provided on this page)
- Quebec's [Agences de la santé et des services sociaux](#) (note: information about career opportunities are available at the regional links provided on this page; some information is available in French only)
- Saskatchewan's [Health Careers](#) (**Note:** Information about career opportunities are available at the regional links provided on this page.)
- Yukon's Health and Social Services [Employment](#)

**Note:** These websites tend to change frequently.

## **Fact Sheet Focus: 10. Medical Laboratory Technicians (Assistants)**

### **Part of NOC 3212 Medical Laboratory Technicians and Pathologists' Assistants**

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#### **Medical laboratory technicians are also called:**

- medical lab assistants
- medical laboratory technical assistants
- laboratory workers
- laboratory assistants
- phlebotomists

#### **What is the role of medical laboratory technicians (assistants) in Canada?**

Medical lab assistants receive and collect samples and interact directly with patients. They sort, prepare and process samples that will be tested and analyzed by a medical laboratory technologist or other health professionals.

#### **What are the main duties of medical lab technicians (assistants) in Canada?**

- verify information on documents that accompany specimens
- enter data into computers
- collect, label and deliver specimens, e.g. blood samples
- set up, operate and maintain laboratory equipment
- perform pre-analytical procedures on specimens from a variety of sources, e.g. prepare slides of blood and other fluids for examination under a microscope
- follow lab safety protocols and procedures
- handle hazardous materials
- make chemical solutions and stocks of culture media
- plant specimens to culture bacteria
- maintain stock levels of laboratory supplies

For a complete listing of skills and duties required by a medical lab assistant and to identify what transferable skills you have gained through education or work experience, refer to the [CSMLS Personal Competency Rating Booklet](#) to complete a self-assessment.

#### **What are the desired traits of medical lab technicians (assistants) in Canada?**

Medical lab assistants should be able to:

- care for and comfort patients
- pay close attention to detail and take precise readings
- work quickly and accurately
- follow instructions
- take a methodical approach to their work
- work both independently and as part of a team
- be adaptable and able to work in a changing environment
- work well with co-workers and the public
- use scientific rules and methods to solve problems
- keep up-to-date technically and apply new knowledge

## Fact Sheet Focus: 10. Medical Laboratory Technicians (Assistants)

### Part of NOC 3212 Medical Laboratory Technicians and Pathologists' Assistants

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Medical lab assistants should possess:

- good finger and manual dexterity to handle specimens and small laboratory equipment
- normal colour vision
- good communication skills
- good organizational and time management skills

#### Where do medical lab technicians (assistants) work?

They work in the following types of organizations:

- private laboratories
- hospitals
- community health clinics
- public health facilities
- university research labs
- biotechnology companies
- specialty labs, e.g. in vitro fertilization labs

Their responsibilities vary depending on the type and size of organization they work for and where it is located, e.g. large city or small town.

#### What is the work environment like?

Medical lab assistants generally work in clean, bright and well-ventilated medical laboratories and facilities. During their shift, they may perform a variety of tasks or they may repeat the same tasks throughout the day. Medical lab assistants use solutions and reagents which may cause unpleasant odours. These workers may also have to work with infectious patients, samples or hazardous chemicals, and so must take safety precautions to avoid risks. The work requires spending a considerable amount of time standing or sitting.

The possible options for their work schedule include:

- ☒ full-time
- ☒ part-time
- ☐ seasonal
- ☒ year-round work
- ☒ regular hours (such as 8am-5pm, Monday to Friday)
- shift work
- ☒ on call

## Fact Sheet Focus: 10. Medical Laboratory Technicians (Assistants)

### Part of NOC 3212 Medical Laboratory Technicians and Pathologists' Assistants

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#### What qualifications are Canadian employers looking for?

Canadian employers seek individuals with a diploma from a CMA-accredited medical laboratory assistant program (or equivalent as determined by employer). The CMA or [Canadian Medical Association](#) provides a list of professional bodies and accredited, registered educational programs for medical lab assistants.

Although the occupation of medical laboratory assistant is not regulated, some employers give preference to job candidates who have been certified by the Canadian Society for Medical Laboratory Science (CSMLS). See [www.csmls.org](http://www.csmls.org) for more information about how to become certified.

#### What are employers' expectations in relation to communication skills?

Employers may screen for language ability because it is important for workers to understand instructions and share information to complete tasks properly and work safely.

Below are examples of tasks where medical lab assistants use communication skills on the job:

- They read procedure and equipment manuals. For example, they read health and safety procedures to be followed when collecting and processing specimens. They read their organizations' policies regarding patients' privacy and procedures to follow when requesting and releasing medical information. They read care and maintenance instructions and procedures in equipment manuals to make minor repairs.
- They write brief comments in patients' files and on collection lists. For example, in patient files they note difficulties in accessing patients' veins and recommend types and gauges of needles to use. They note reasons for the inability to collect specimens such as missed attempts to access veins and patients' refusals on collection lists.
- They give instructions and provide reassurance to patients before, during and after specimen collection. They explain each step of collection procedures and comfort and reassure nervous patients. Technicians in hospitals may provide instructions for proper use of home test sampling kits and special collection procedures. Technicians in blood donor clinics give post-donation instructions to blood donors.

To review examples of how other essential skills are used by chemical techs in the workplace, go to [Explore Careers by Essential Skills](#) on the Working in Canada website.

In a diverse workforce, the ability to communicate in multiple languages is an asset.



## Fact Sheet Focus: 10. Medical Laboratory Technicians (Assistants)

### Part of NOC 3212 Medical Laboratory Technicians and Pathologists' Assistants

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#### What is the wage for this occupation?

Factors affecting wages include workers' level of education, amount and nature of work experience, and job responsibilities, plus the job location, work conditions and whether the workforce is unionized or not. The figures provided below reflect a national average for low, median (mid-point), and high wages (before taxes).

Low	Median	High
\$15/hour	\$24/hour	\$37.50/hour
\$31,200/year	\$49,920/year	\$78,000/year

For wage information in specific regions or cities in Canada, see Working in Canada's [Explore Careers by Wages](#).

#### What opportunities for advancement are available to medical lab technicians (assistants)?

Medical laboratory assistants may specialize in working with medical laboratory technologists or other health professionals in these areas:

- biochemistry (studying chemical reactions in the body)
- cytology (studying the structure and function of cells)
- hematology (analysing diseases of the blood and blood forming tissues)
- histopathology (examining the structure of diseased tissue)
- immunology (examining how the immune system works)
- microbiology (studying bacteria and viruses).

Experienced medical laboratory assistants may move into related jobs in laboratories run by industrial or manufacturing companies, pharmaceutical companies, veterinary companies, or government.

Advancement opportunities depend on a medical lab assistant's abilities, experience and education. For example, with additional education and experience, individuals may progress to work as a supervisor or instructor of medical lab assistants.

## Fact Sheet Focus: 10. Medical Laboratory Technicians (Assistants)

### Part of NOC 3212 Medical Laboratory Technicians and Pathologists' Assistants

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#### Where can I find out more about this occupation and the health industry in Canada?

For general career information and job search ideas, refer to the Introductory Page.

[Layout suggestion: Insert link to Introductory Page.]

More details about medical lab assistants are available at the web sites described below:

The [Canadian Society for Medical Laboratory Science](#) (CSMLS) is the national certifying body for medical laboratory technologists and medical laboratory assistants and the national professional society for Canada's medical laboratory professionals.

The [Canadian Medical Association](#) provides a list of professional bodies and accredited, registered educational programs for medical lab assistants.

**Health Canada** is the country's federal department responsible for helping Canadians maintain and improve their health. For a description of the federal government's role and that of the provincial and territorial governments, see the [Health Care System Delivery](#).

Many health jobs in Canada are with provincial and territorial government health services. Some of the provincial organizations that post job openings or career opportunities are listed below:

- [Alberta Health Services Job Board](#)
- [British Columbia's Provincial Health Services Authority Career Opportunities](#)
- Manitoba's Diagnostic Services [Careers](#)
- New Brunswick's Health Networks' [Career Centre](#)
- Newfoundland's Health and Community Services [career opportunities](#)
- Northwest Territories' [Health and Social Services Careers](#)
- [Nova Scotia's District Health Authorities](#) (note: information about career opportunities are available at the regional links provided on this page)
- Nunavut's [Employment Opportunities](#) in health
- [Ontario's Local Health Integration Networks](#) (**Note:** Information about career opportunities are available at the regional links provided on this page.)
- Quebec's [Agences de la santé et des services sociaux](#) (**Note:** Information about career opportunities is available at the regional links provided on this page; some information is in French only.)
- Saskatchewan's [Health Careers](#) (**Note:** Information about career opportunities are available at the regional links provided on this page.)
- Yukon's Health and Social Services [Employment](#)

**Note:** These websites tend to change frequently.

## **Fact Sheet Focus: 11. Pathologists' Assistants**

### **Part of NOC 3212 Medical laboratory technicians and pathologists assistants**

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#### **Pathologists' assistants are also called:**

- Pathology assistants
- Pathology technologists
- PAs

#### **What is the role of pathologists' assistants in Canada?**

Pathologists' assistants help with autopsies and examinations of surgical specimens, or perform autopsies under a pathologist's supervision. They assist pathologists prepare and conduct medical laboratory tests, examinations and experiments, and perform analyses on medical data in order to diagnose, treat and prevent disease and illness.

#### **What are the main duties of pathologists' assistants in Canada?**

- prepare for autopsies by obtaining patients' medical records and arranging for radiographic examinations
- assist with autopsies and surgical specimen examinations or perform them under pathologists' supervision
- dissect, examine, weigh and photograph organs and specimens
- collect tissue samples for chemical analysis and record findings
- assist with analysis of medical samples
- study tissues for medical diagnosis, treatment and prevention purposes
- prepare bodies for release to funeral homes following completion of autopsies
- discard specimens according to established safety procedures
- clean and maintain instruments, equipment and supplies

#### **What are the desired traits of pathologists' assistants in Canada?**

- interpersonal skills, and the ability to work well with co-workers and the public
- ability to follow instructions
- precision and attention to detail
- ability to work quickly and accurately
- good manual dexterity
- normal colour vision
- communication and problem-solving skills
- organizational skills
- enjoy taking a methodical approach to their work
- enjoy working with laboratory equipment and assisting medical personnel

## **Fact Sheet Focus: 11. Pathologists' Assistants**

### **Part of NOC 3212 Medical laboratory technicians and pathologists assistants**

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#### **Where do pathologists' assistants work?**

Pathologists' assistants typically work in hospital laboratories, but may also be employed by:

- private medical laboratories
- public health laboratories
- forensic laboratories
- university research laboratories
- environmental laboratories
- veterinary laboratories
- industrial laboratories
- pharmaceutical companies
- biotechnology firms

#### **What is the work environment like?**

Hours of work vary in this occupation. Pathologists' assistants may work full-time, part-time or casual hours. In research laboratories, they often work standard weekday hours. In diagnostic clinical laboratories, pathologists' assistants often work rotating day, evening and night shifts (including weekends and holidays).

They work in laboratory environments where they may spend a lot of time standing or sitting, performing tasks that may be repetitive. Pathologists' assistants must observe safety precautions to reduce the risk of exposure to infectious body fluids, dangerous chemicals or hazardous radiation.

#### **What qualifications are Canadian employers looking for?**

Employers are looking for a Bachelor's or Master's of Science degree or an equivalent combination of training and experience as a registered nurse, licensed practical nurse, medical lab technologist, or histotechnologist. Employers' expectations of pathologists' assistants are increasing as the role of this occupation evolves and takes on increased responsibility.

Membership with a professional association such as the Canadian Association of Pathologists (pathologist's assistant section) or American Association of Pathologists' Assistants is often preferred. Certification through the American Society for Clinical Pathology may be required by some Canadian employers.

## Fact Sheet Focus: 11. Pathologists' Assistants

### Part of NOC 3212 Medical laboratory technicians and pathologists assistants

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#### What are employers' expectations in relation to communication skills?

Employers may screen for language ability because it is important for workers to understand instructions and share information to complete tasks properly and work safely.

Below are examples of tasks where pathologists' assistants use communication skills on the job:

- Refer to standards of practice, laboratory policies and procedures, health and safety guidelines and other regulations and standards to ensure processes, procedures and practices are compliant with industry standards and institutional requirements. For example, they may review the regulations governing the preservation of biological specimens, or procedures for disposing of files and other records that may contain confidential information about patients.
- Review specimen identification labels to ensure they contain accurate and complete data. They study labels to check that information such as the patients' names and identification numbers and the names of the referring physicians have been entered correctly.
- Complete test result forms. They use these forms to track the collection, preparation and analysis of specimens. They also fill in forms to record the quality of specimen preparation, the normality of testing procedures and the final test results.
- Refer to graphs contained in medical journals, textbooks, trade publications and web sites to learn about pathologies. They may have to locate and retrieve data from a number of graphs and accompanying texts to fully distinguish between health and disease.
- Meet with supervisors or directors to obtain guidance and approvals, to review quality control data and to discuss work performance, unique test results, laboratory schedules and other administrative issues. They may also meet with supervisors or directors to present their analyses and recommendations for new equipment.

To review examples of how other essential skills are used by pathologists' assistants in the workplace, go to [Explore Careers by Essential Skills](#) on the Working in Canada website.

In a diverse workforce, the ability to communicate in multiple languages is an asset.

#### What is the wage for this occupation?

Factors affecting wages include workers' level of education, amount and nature of work experience, and job responsibilities, plus the job location, work conditions and whether the workforce is unionized or not. The figures provided below reflect a national average for low, median (mid-point), and high wages (before taxes). These wages are for the occupational group 3112 Medical laboratory technicians and pathologists' assistants, not just for pathologists' assistants.

Low	Median	High
\$17.25/hour	\$29.88/hour	\$39/hour
\$35,880/year	\$62,150/year	\$81,120/year

For wage information in specific regions or cities in Canada, see Working in Canada's [Explore Careers by Wages](#).

## Fact Sheet Focus: 11. Pathologists' Assistants

### Part of NOC 3212 Medical laboratory technicians and pathologists assistants

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#### What opportunities for advancement are available to pathologists' assistants?

With education and experience, workers may progress to supervisory or senior management positions or they may choose to teach or work in private industry.

#### Where can I find out more about pathologists' assistants and the health industry in Canada?

**Canadian Association of Pathologists** promotes high quality standards for patient care by providing national leadership and promoting excellence in pathology and laboratory medicine practice, education and research. Check out the [pathologists' assistants section](#) of the site.

[American Association of Pathologists' Assistants](#) (AAPA) provides pathologists' assistants with specific education, networking, and professional support, as well as promoting public and professional awareness of the profession.

[American Society for Clinical Pathology](#) (ASCP) is the world's largest professional membership organization for pathologists and laboratory professionals. Their mission is to provide excellence in education, certification and advocacy on behalf of patients, pathologists and laboratory professionals across the globe.

**Health Canada** is the country's federal department responsible for helping Canadians maintain and improve their health. For a description of the federal government's role and that of the provincial and territorial governments, see the [Health Care System Delivery](#).

Many health jobs in Canada are with provincial and territorial government health services. Some of the provincial organizations that post job openings or career opportunities are listed below:

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- Saskatchewan's [Health Careers](#) (**Note:** Information about career opportunities are available at the regional links provided on this page.)
- Yukon's Health and Social Services [Employment](#)

**Note:** These websites tend to change frequently.

## 7. Recommendations of items for Introductory Page for Alternate Career Fact Sheets

The need for an introduction to the fact sheets became apparent during a discussion about messaging considerations at a Management Committee meeting. The need became even more apparent when we started developing the fact sheets and we realized that several pieces of information were common to them all. Rather than repeating information on each fact sheet, we suggest that they be included on the introductory page for the CSMLS' alternate careers information portal.

Content topic suggestions follow.

1. What is meant by “an alternate career”? (define, give examples)
2. Why consider an alternate career?  
As an IEMLT,
  - one may not wish to certify as an MLT in Canada, or may not have the required skills at the moment.
  - one may wish to gain employment immediately, without working through Certification as an MLT.
  - one may be looking for different employment opportunities, using their current interests, aptitudes and skills.

Describe the reality of Canadians and alternate careers, i.e. it is a common career move that is made for various reasons, e.g. dissatisfied in current job, want more or less challenge, moving to another region of Canada, changes in life situation.

Add statistics such as number of careers Canadians have, mobility of Canadians and IEs between provinces, why IEMLTs might want to move or check out different provinces, licensure being provincial responsibility

3. Why these occupations were selected as alternate careers for IEMLTs:
  - a. Not regulated
  - b. Share skills and knowledge with occupation of medical lab technologist (transferable skills)
  - c. Some post-secondary education required
  - d. Annual salary of \$35,000 or more (note: a few alternate careers have a low-end salary less than \$35,000 but they were included nonetheless as they provide opportunities for advancement)
4. The importance of self-assessment:
  - a. Of IEMLT's knowledge and skills (competencies) required for Canadian MLT
  - b. Of IEMLT's additional knowledge and skills (that may be transferable to other jobs)
5. What are transferable skills, and how do I use them for alternate career considerations?
  - a. Describe core competencies (transferable skills), and traits as required in the Canadian job market. Define and reinforce interpersonal skills.
  - b. May wish to reference HealthForceOntario's Alternate Career Toolkit, Module 1, which is an excellent document for personal reflection and optional career consideration.

6. Additional training/education needed for alternate careers:
  - a. Check with Working in Canada or provincial career sites as to education needed, and self-assess to existing education and skills.
  - b. Check with the Canadian Information Centre for International Credentials (CICIC) (<http://cicic.ca/431/about-the-centre.canada>) for information and referral services to individuals and organizations on the recognition of academic and occupational credentials for working and studying in Canada and abroad. Definitions for important career terms are found at this page, along with links to job search sites and Canadian Labour Market Information: <http://cicic.ca/403/occupational-profiles-for-selected-trades-and-professions.canada#JobSearch>
  - c. Check with counsellor or educational institution about possibility of credit/advanced standing through prior learning assessment and recognition (PLAR) for current education and on-the-job learning.
7. Key Career Exploration websites: (CSMLS may wish to provide a brief annotation about the key features of these sites.)

The organizations listed below provide valuable information about the occupation or industry, including education programs, occupational profiles, and job openings. Some also assist self-discovery to help identify your knowledge, skills and abilities, complemented by career matching services.

#### Government Sites

- a. **Working in Canada** [http://www.workingincanada.gc.ca/report\\_skillknowledge-eng.do?action=search\\_form](http://www.workingincanada.gc.ca/report_skillknowledge-eng.do?action=search_form)
- b. **Welcome BC** <http://www.welcomebc.ca/Work/work-in-bc.aspx>
- c. **WorkBC** <http://www.workbc.ca/Job-Seekers/Build-Your-Career/Planning-Your-Career/Starting-and-Planning-Your-Career.aspx>
- d. **Alberta Learning Information Services (ALIS)** <http://alis.alberta.ca/index.html>
- e. **CareerInsite** <http://careerinsite.alberta.ca/careerinsite.aspx>
- f. **Ontario Ministry of Training, Colleges and Universities** <http://www.tcu.gov.on.ca/eng/postsecondary/careerplanning/program/wizard.html>
- g. **Manitoba's WorkinfoNET** <http://mb.workinfo.net.ca/en/other-workinfo-nets/index.php>
- h. **Settlement.Org** <http://www.settlement.org/index.asp>
- i. **Job Bank** [www.jobbank.gc.ca](http://www.jobbank.gc.ca)
- j. **Ontario Career Skills Passport** <http://www.skills.edu.gov.on.ca/OSP2Web/TCU/Welcome.xhtml>

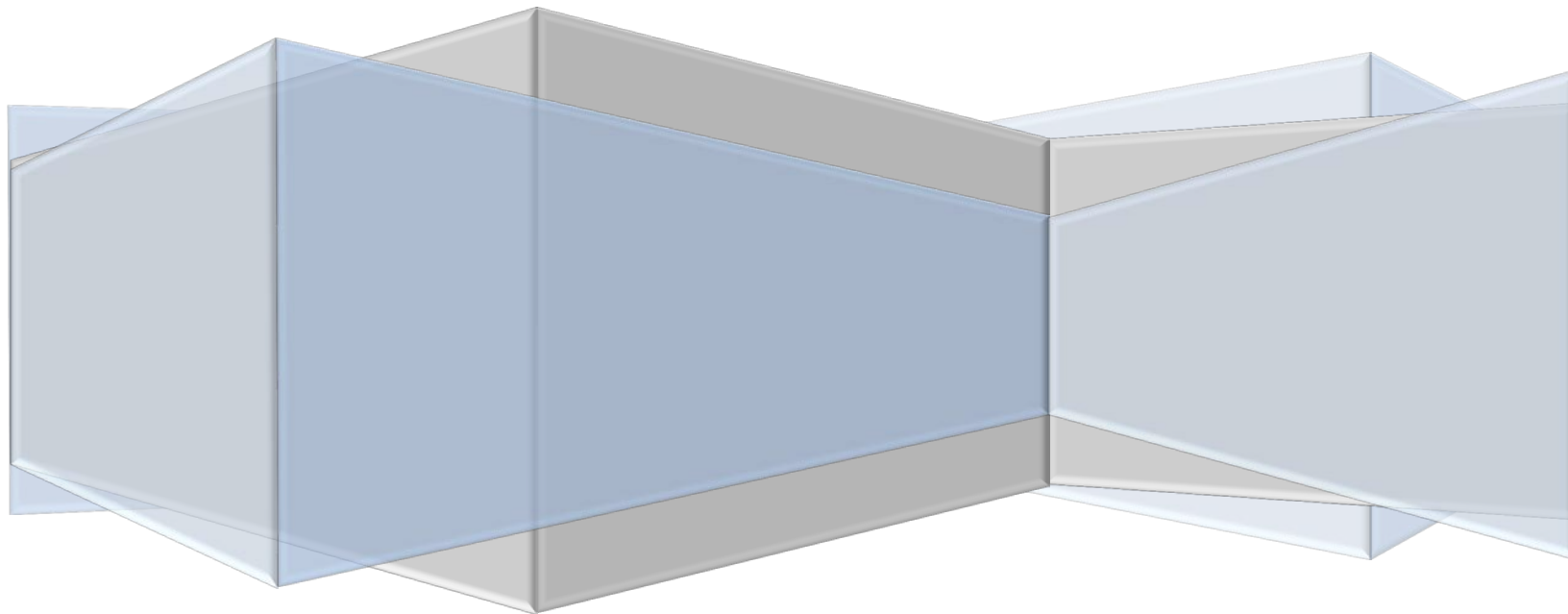


## Non-Government Sites

- k. **Riley Guide** <http://www.rileyguide.com/assess.html>  
and <http://www.rileyguide.com/careers.html>
  - l. **Career Cruising** <http://public.careercruising.com/ca/en>  
(Most of this site's services are not available to the public but IEMLTs could access it through immigrant-serving agencies and educational organizations that have subscriptions.)
8. Commercial job search websites: [Indeed](#), [eluta.ca](#), [Monster](#), [Workopolis](#), [Simply Hired Canada](#), [Wow Jobs](#), [Careerbuilder](#)
  9. Some hints about 'how to search', and criteria/terms to use for job searches. Provide suggestions such as using alternate job titles, using key job duties, finding the names of specific companies by researching the different types of organizations that hire people in that occupation, using Google searches, and using commercial job search sites such as Indeed.ca.
  10. Consider suggestion from Advisory Committee (received from the January 21<sup>st</sup> distribution of draft fact sheets): add to introductory paragraph that some professions are interrelated and could be included in different groups (e.g. environmental technicians, food technologists could be a part of a chemical technology) and some professions from a bigger group have their own descriptions in fact sheets.
  11. The value of working with an advisor. Provide information on one-on-one counselling, help with working in Canada in general, how to identify transferable skills and match to possible jobs, and how to navigate the reality of the differences in jurisdictions in Canada.
    - a. Identify immigrant serving agencies.
  12. Provide link to website that does the calculations for wage and salary information conversions: <http://easycalculation.com/mortgage/hourly-wages-to-salary.php>

# APPENDICES

- A. Glossary**
- B. MLT Competency Model**
- C. NOC Structure Example**
- D. Master List of Occupations**
- E. Criteria for Selection of Alternate Careers**
- F. Table of Competency Comparisons of Occupations**
- G. Selection and Organization of Fact Sheets**
- H. Bibliography**



**AUTHORS' NOTES:**

With the exception of Appendix A: Glossary, which is necessary as context for the report outcomes, the additional appendices included here are working documents from the project. They are included here as content which may be useful for future efforts regarding alternate careers, so that efforts and activities from this project do not need to be repeated in the future by CSMLS or others.

Hopefully these appendices will provide some background, context, and learning for others in working towards viable alternate careers for internationally educated professionals.

It is also noted that in the areas of regulation, ongoing professional improvement, and labour market supply and demand things are constantly changing. For this reason, resources and links are provided to be able to check for current information in the future.

As working documents, these appendices are not in a formal presentation format.

## APPENDIX A:

### Glossary of Terms Used in Research: Identifying Alternate Careers for Internationally Educated Medical Lab Technologists

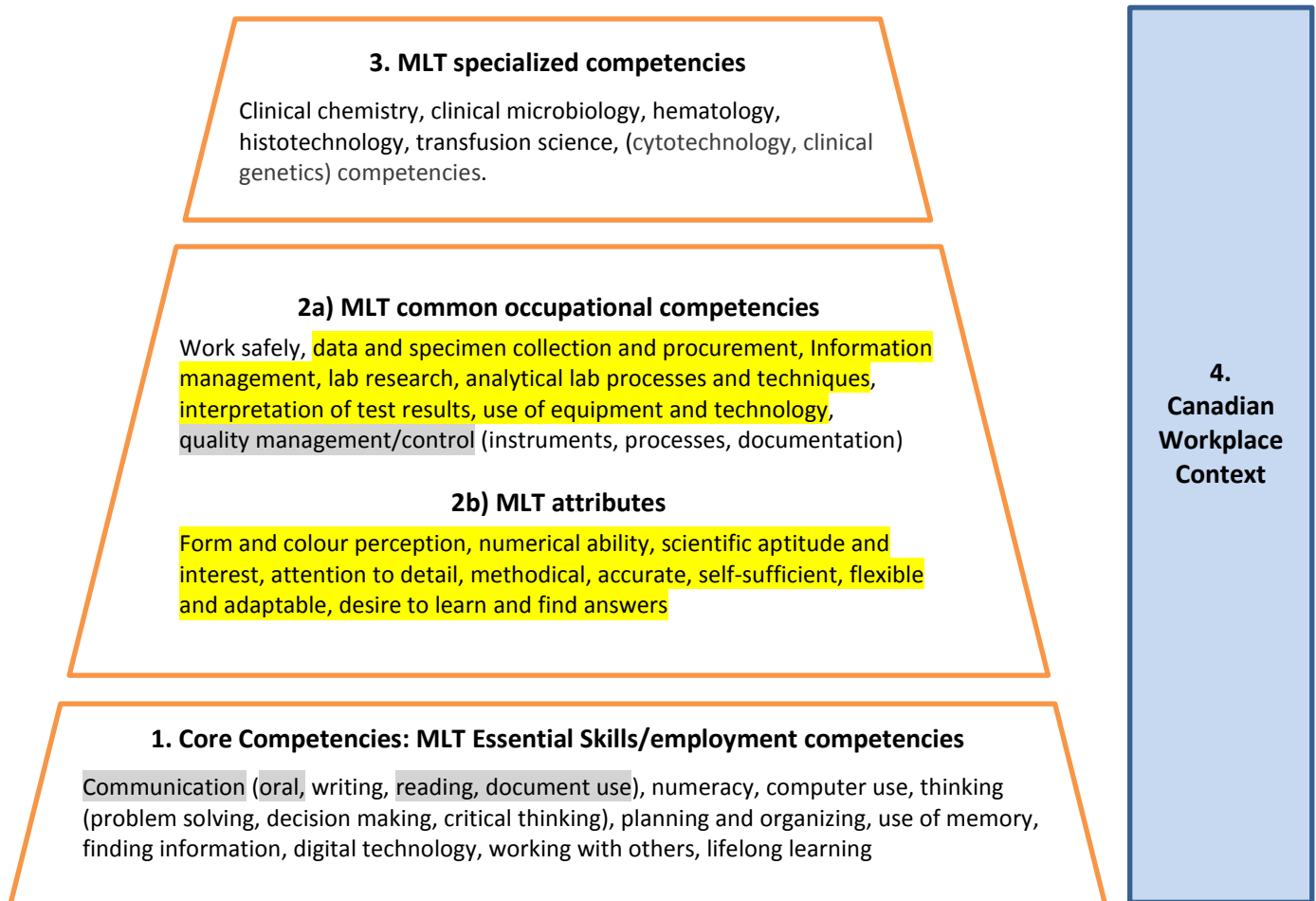
The following definitions reflect how the terms are used for the purposes of this project.

<b>alternate career</b> also known as: <ul style="list-style-type: none"> <li>• similar occupations</li> <li>• related jobs</li> </ul>	a full, permanent career in an unregulated profession that may or may not be in the medical field.  The target audience (in this project) is internationally educated applicants who have skills/education/experience that are significantly different from Canadian entry-to-practice standards and are likely to be unsuccessful in challenging certification as an MLT. This definition excludes the notion of temporary or “interim” work an applicant may take while trying to become a licensed MLT (advisory committee call, Nov 2013)
<b>attitude</b>	an expression of favor or disfavor toward a person, place, thing, or event; attitudes can be formed from a person's past and present; attitude is measurable and changeable and influences a person's emotions and behavior; attitudes are indicated or described by the behaviours that reflect them
<b>attributes</b> <ul style="list-style-type: none"> <li>• also known as traits</li> </ul>	qualities or characteristics of a person
<b>competencies</b>	the combination of knowledge, skills and attitudes required to fulfill occupational responsibilities; often stated as measurable outcomes with criteria that can be observed and measured
<b>types of competencies</b>	<p><b>1. Core competencies</b> (Essential Skills/employability skills): attributes and skills that people in the workforce will require <i>to some degree</i> in order to be successful, regardless of their level in the hierarchy, their occupation, or their educational background</p> <p><b>NOTE:</b> ‘Corporate’ core competencies may be emphasized differently depending on the organization, e.g. resolving conflict, while an ‘essential’ core interpersonal skill in one department may be only ‘desirable’ in another.</p> <p><b>2. Work specific competencies:</b> are sector/job specific and may vary from organization to organization or job to job; describe in detail the work that needs to be done or expected behaviors.</p> <ul style="list-style-type: none"> <li>a) common occupational competencies – common to all roles and specialties of the occupation</li> <li>b) specialized competencies – additional competencies held by those in specialized areas of the occupation</li> </ul>

<b>critical thinking</b> (as defined in CSMLS MLT Competency Profile)	thinking skills used to solve problems, e.g. “demonstrates an open inquiring mind and self-directed learning process in resolving analytical, workplace and career challenges” (CSMLS Competency Profile, General Medical Laboratory Technologist, 2005)
<b>critical thinking</b> (as defined in HRSDC’s Essential Skills)	making rational judgments through a logical thought process of evaluating ideas or information, and using objective criteria to make a judgment about value, or to identify strengths and weaknesses (Readers’ Guide to Essential Skills Profiles, HRSDC, 2007)
<b>Essential Skills</b>	when capitalized in this report, the term “Essential Skills” refers to research findings and products developed by Human Resources and Skill Development Canada; their work covers nine transferable (employability) skill areas: reading text, writing, document use, numeracy, oral communication, thinking, digital technology, working with others, continuous learning; they are a type of core competency (see “types of competencies” above)
<b>interpersonal skills</b>	Personal abilities and traits that enable people to interact effectively and harmoniously with other people; examples of interpersonal skills are cooperating with others and communicating a clear message; interpersonal skills are also called “soft skills”; they are a type of core competency (see “types of competencies” above)
<b>job</b>	a specific position in a particular establishment; the conceptual foundation for alternate careers research is occupations, not jobs (NOC Career Handbook, 2001)
<b>occupation</b>	a collection of similar jobs that share some or all of a set of main duties; the conceptual foundation for alternate careers research is occupations not jobs, which vary in expectations by workplace (NOC Career Handbook, 2001)
<b>regulated occupation</b>	when a licence from a regulatory body is required in order to work in an occupation (mandatory licensing). Regulated occupations with mandatory licensing are controlled by provincial and territorial (and sometimes federal) law and governed by a professional organization or regulatory body.
<b>skill</b>	the ability to <u>do</u> something (usually includes the application of knowledge); a term often used in the place of “competencies” where knowledge and attitudes are also being referred to, e.g. transferable skills
<b>transferable skills</b>	a summary term for occupational knowledge, skills and attitudes required by other occupations; transferable skills used in all occupations are referred to as workplace essential skills or employability skills which are core competencies (see “types of competencies” above).

## APPENDIX B:

### Model of MLT Competencies



- Yellow highlights indicate emphasis for skills matching
  - Grey highlighting notes possible areas of IEMLT weakness
- (Based on CSMLS *Addressing the Competency Gaps of IEMLTs. 2010*, refresher gap statistics, and feedback from CSMLS staff)

## **NOTES re: model of MLT competencies:**

### **1. Core competencies: MLT Essential Skills/employment competencies**

- attributes and skills that most people in the workforce will require or need to develop to *some degree* in order to be successful, regardless of their level in the hierarchy, their occupation, or their work preparation. Incorporates HRSDC Essential Skills and the related competencies in the MLT Competency Profile.

### **2a) MLT common occupational competencies**

- common to all roles and specialties of the occupation.

### **2b) MLT attributes**

- qualities or characteristics required for successful job behaviour.

### **3. MLT specialized competencies**

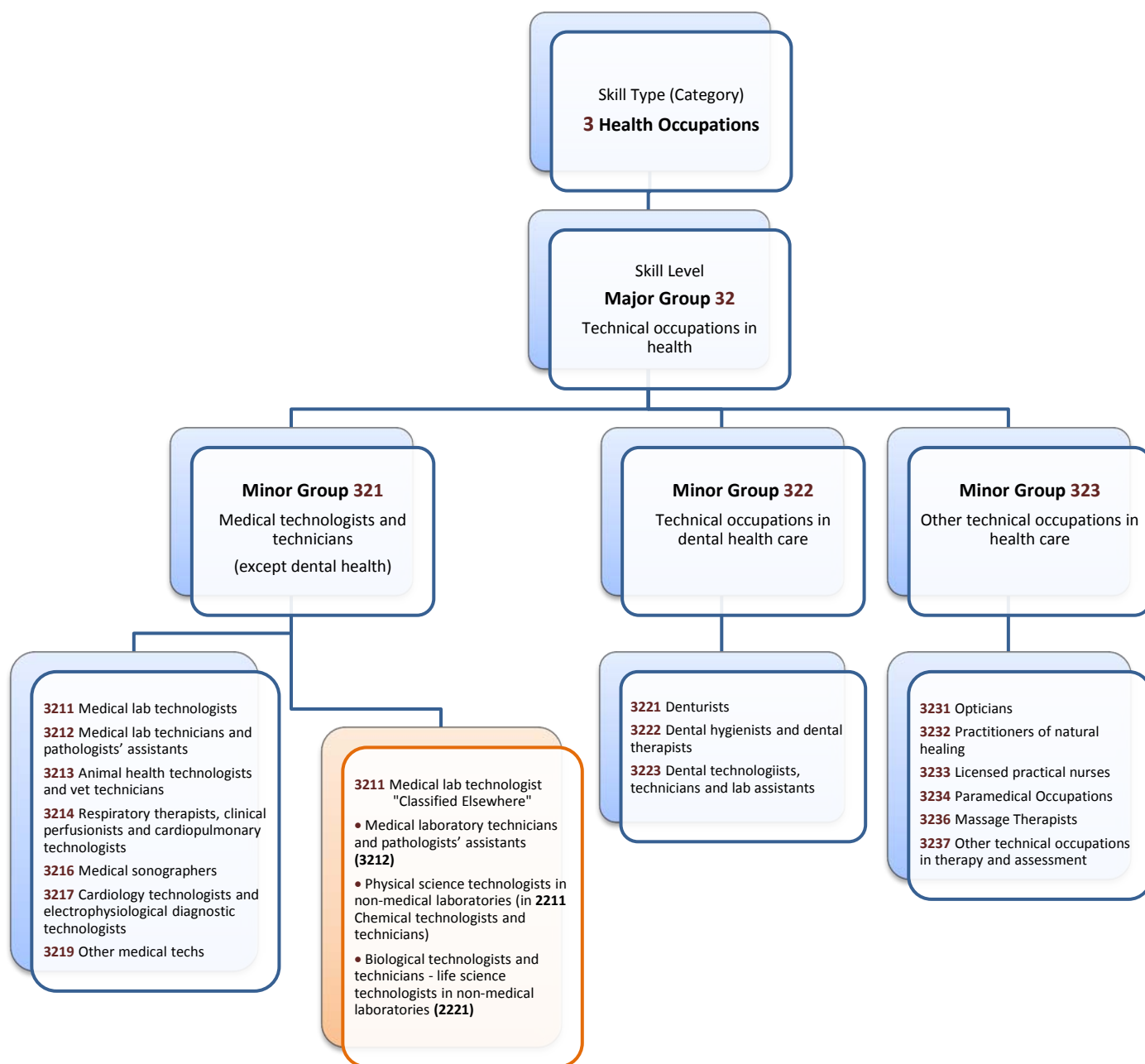
- additional competencies held by those in specialized areas of the occupation. Those certified as a Canadian MLT will have all of these competencies (unless cytotechnology and clinical genetics are included), but IEMLTs may not.

### **4. Canadian Workplace Context**

One of the deficits that may be inherent for IEMLTs looking for certification as a Canadian MLT is often related to the context of practise within the Canadian environment, e.g. legislation, health team emphasis, greater independence and responsibility for decision-making etc). The Canadian context can affect the application of competencies, and may be one factor in lower success rate of IEMLT certification success. It is assumed here that in transferring to an alternate non-regulated career, that IEMLTs will be able to learn the Canadian context through workplace experience, mentoring, or short courses while working.

## APPENDIX C:

### THE NOC STRUCTURE – Example using Health Occupations (Skill Type/Category 3)





## APPENDIX D:

### Master List – Options for Alternate Careers for IEMLTs Working Copy

#### Introduction

This list shows the occupations that were selected as alternate career options for internationally educated medical lab technologists (IEMLTs). The list includes 138 occupations. Most of these occupations were eventually eliminated according to criteria (see Appendix E) to arrive at a list of 10-12 occupations that were deemed to be the best options. Fact sheets were then developed for the priority occupations.

Key:

The occupations that were eliminated from the list have been struck out with the reason following in parentheses.

- **(R)** means that the occupation was eliminated because it is regulated in three or more provinces.
- **(E)** means that the education requirements are too low or too high, i.e. no post-secondary or more than 3 years of post-secondary.  
**Note:** The education levels of the NOC occupations was not verified until we were researching for the fact sheets as occupations designated to this skill level in the NOC usually require college or vocational education or apprenticeship training.
- **(AC)** means that the advisory committee deemed the occupation as a poor match or lower priority based on their knowledge of medical lab technologists and the given occupation.

The 23 unit groups included have been highlighted in yellow for easy identification.

## **SOURCE A: NOC**

### **SKILL TYPE 2 NATURAL AND APPLIED SCIENCES AND RELATED OCCUPATIONS and 3 HEALTH OCCUPATIONS**

#### **A1. From MAJOR GROUP 22 - TECHNICAL OCCUPATIONS RELATED TO NATURAL AND APPLIED SCIENCES**

##### **221 Technical Occupations in Physical Sciences**

###### **2211 Chemical technicians/technologists**

1. Biochemistry technicians/technologists
2. ~~Dyeing and finishing technicians/technologists (AC)~~
3. ~~Environmental technicians/technologists (AC)~~
4. Water quality technicians
5. Water and wastewater laboratory technologists
6. Food science technologists
7. ~~Petrochemical technicians/technologists (AC)~~
8. ~~Pharmaceutical inspectors (AC)~~

###### **2212 Geological and mineral technologists and technicians**

9. Assayers
10. ~~Geological Technicians (AC)~~
11. ~~Geophysical Technologists (AC)~~
12. ~~Groundwater Technologists (AC)~~
13. ~~Log Technicians (AC)~~
14. ~~Marine Geoscience Technologists (AC)~~
15. ~~Metallurgical Technologists (AC)~~
16. ~~Mineralogy Technicians (AC)~~
17. ~~Mining Engineering Technologists (AC)~~
18. ~~Mining Technologists (AC)~~
19. ~~Petroleum Engineering Technologists (AC)~~
20. ~~Petroleum Technicians (AC)~~
21. ~~Petrology Technicians (AC)~~
22. ~~Reservoir Engineering Technicians (AC)~~
23. ~~Rock Mechanics Technicians (AC)~~
24. ~~Seismic Technicians (AC)~~
25. ~~Welding Technologists (AC)~~

## **222 Technical Occupations in Life Sciences**

### **2221 Biological/Biology Technologists and Technicians**

- 26. Agri-biotech, e.g. functional foods, animal nutritional supplements, livestock vaccines, plant genetics, animal genetics, agri-fibre composites
- 27. Agricultural Sciences Technicians/Technologists, e.g. crop production, dairy, poultry
- 28. Aquaculture Technicians/Technologists
- 29. Bio-energy, e.g. biodiesel, ethanol, methane, bio-oil
- 30. Bio-health, e.g. medical devices, biopharmaceuticals, nutraceuticals, natural-compound bioactives
- 31. Bio-industrial, e.g. bioadhesives, biocatalysts, biocoatings, biosolvents, bioplastics
- ~~32. Botanical Technician/Technologists (AC)~~
- ~~33. Environmental Technician/Technologists (repeat of environmental technicians/technologists under Chemical occupations)~~
- 34. Fisheries Technician/Technologists
- 35. Microbiology Technician/Technologists
- ~~36. Wildlife Technician/Technologists, e.g. marine biology, ornithology, entomology (AC)~~
- 37. Quality Control/Safety Inspectors, e.g. food, wine, beer processing

### **2222 Agricultural and fish products inspectors**

- 38. Fish and Fish Products Inspectors
- 39. Fruit And Vegetables Inspectors
- 40. Grain Inspectors
- 41. Meat Inspectors
- 42. Plant Protection Inspectors

### **~~2223 Forestry Technologists and Technicians (AC)~~**

- ~~43. Conservation Technicians—Forestry~~
- ~~44. Cruising Technicians—Forestry~~
- ~~45. Enforcement Officers—Forestry~~
- ~~46. Extension Rangers—Forestry~~
- ~~47. Fire Suppression Officers—Forestry~~
- ~~48. Forest Fire Technicians~~
- ~~49. Forest Survey Technicians~~
- ~~50. Forestry Technicians~~
- ~~51. Forestry Technologists~~
- ~~52. Resource Officers, Forest Inventory~~
- ~~53. Resource Technicians—Forestry~~
- ~~54. Silviculture Technicians~~

**2224 Conservation and Fishery Officers (AC)**

- 55. Conservation Officers
- 56. Fish And Wildlife Officers
- 57. Fishery Officers
- 58. Forest Rangers — Wildlife Management
- 59. Game Officers
- 60. Game Wardens
- 61. Natural Resources Officers
- 62. Park Rangers

**2225 Landscape and horticulture technicians and specialists (AC)**

- 63. Arborist and Tree Service Technicians
- 64. Golf Course Superintendents
- 65. Horticulturists
- 66. Hydroponics Technicians
- 67. Landscape Architectural Technician and Technologists
- 68. Landscape Gardeners
- 69. Lawn Care Specialists
- 70. Tree Service Technicians

**A2. From MAJOR GROUP 32 - TECHNICAL AND SKILLED OCCUPATIONS IN HEALTH**

**321 Medical Technologists and Technicians (Except Dental Health)**

**3212 Medical Laboratory Technicians and Pathologists' Assistants**

- 71. Medical Laboratory Technicians
- 72. Pathologists' Assistants

**3213 Animal health technologists and veterinary technicians**

- 73. Animal Health Technologists
- 74. Veterinary Technicians

**3214 Respiratory therapists, clinical perfusionists and cardiopulmonary technologists (R)**

- 75. Respiratory Therapist (R)
- 76. Clinical Perfusionist (R)
- 77. Cardiopulmonary Technologist (R)

**3215 Medical radiation technologists (R)**

- 78. Radiological Technologists (R)
- 79. Nuclear Medicine Technologists (R)
- 80. Radiation Therapists (R)
- 81. 3216 Medical Sonographers (R)
- 82. 3217 Cardiology Technologists and Electrophysiological Diagnostic Technologist (R)

**~~3219 Other Medical Technologists and Technicians (except dental health) (R)~~**

- ~~83. Ocularists~~
- ~~84. Ocularist Technicians~~
- ~~85. Prosthetists and Orthotists~~
- ~~86. Prosthetic and Orthotic Technicians~~
- ~~87. Dietary Technicians~~
- ~~88. Food and Nutrition Technicians — dietetics~~
- ~~89. Pharmacy Technicians~~

**A3. from NOC - 322 Technical Occupations in Dental Health Care**

**~~90. 3221 Denturists (R)~~**

**3222 Dental Hygienists and Dental Therapists (R)**

- ~~91. Dental Hygienists (R)~~
- ~~92. Dental Therapists (R)~~

**3223 Dental technologists, technicians and laboratory assistants (AC)**

- ~~93. Dental Technologists and Technicians (R)~~
- ~~94. Dental Laboratory Assistants (AC)~~

**A3. from NOC - 323 Other Technical Occupations in Health Care (Except Dental)**

**~~95. 3231 Opticians (R)~~**

**3232 Practitioners of Natural Healing (AC)**

- ~~96. — Acupuncturists (R)~~
- ~~97. — Aromatherapists (AC)~~
- ~~98. — Ayurvedic practitioner (AC)~~
- ~~99. — Herbalists (AC)~~
- ~~100. Homeopaths (AC)~~
- ~~101. Reflexologists (AC)~~
- ~~102. Traditional Chinese Medical Practitioners (AC)~~

**~~103. 3233 Licensed Practical Nurses (R)~~**

**~~104. 3234 Paramedical Occupations (R)~~**

**~~105. 3236 Massage Therapists (R)~~**

**3237 Other technical occupations in therapy and assessment (AC)**

- ~~106. Hearing Aid Practitioners (R)~~
- ~~107. Audiology Technicians (AC)~~
- ~~108. Audiometric Assistants (AC)~~
- ~~109. Audiometric Technicians (AC)~~
- ~~110. Communicative Disorders Assistants (AC)~~
- ~~111. Speech Technicians (AC)~~
- ~~112. Speech Therapy Assistants (AC)~~
- ~~113. Ophthalmic Assistant/Technicians (AC)~~
- ~~114. Ophthalmic Technologists (AC)~~
- ~~115. Ophthalmologist Assistants (AC)~~
- ~~116. Occupational Therapy Assistants (AC)~~
- ~~117. Physical Rehabilitation Technicians (AC)~~
- ~~118. Physiotherapy Technicians (AC)~~

**SOURCE B: RECOMMENDATIONS FROM SMEs, CAREER SITES, AND RESEARCH REPORTS**

**Note:** Some of these occupations have been crossed out because they are repeats of ones listed under Source A above.

- ~~119. Medical Laboratory Assistants~~ (included under NOC 3212)
- ~~120. Pathologists' Assistants (E)~~
- ~~121. Biotechnology~~ (included under NOC 2221)
- ~~122. Quality Control/Assurance Food Processing~~ (included under NOC 2221)
- ~~123. Veterinary Related Work~~ (included under NOC 3213)
- ~~124. Food Safety Inspectors~~ (included under NOC 2221)
- 125. Sales - Laboratory Technology and Pharmaceutical Sales
- ~~126. Infection Prevention and Control (E)~~
- ~~127. Laboratory Workers – biotechnology~~ (included under NOC 2221)
- ~~128. Copy Editors (E)~~
- ~~129. Accounts Payable/Receivable (E)~~
- ~~130. Food/beer/wine quality control~~ (included under NOC 2221)
- ~~131. Insurance Medical Testers~~ (lack of information available)
- ~~132. Food and Safety Inspectors~~ (included under NOC 2221)
- ~~133. Environmental Technologist~~ (included under NOC 2211 and 2221)
- 134. Health Records Professionals
- ~~135. Drug Screen Technician~~ (lack of information)
- 136. Vocational Instructors (most employers require certification in subject area, e.g. certification as MLT)

## APPENDIX E:

### Selection Criteria for Alternate Careers

Item	Criteria and Range	Rationale
<b>Primary Criteria – for selection</b>		
1. NOC Skill Type and Level	<ul style="list-style-type: none"> <li>• Skill types 2 and 3 = Occupations in the fields of Health and Natural and applied sciences</li> <li>• Skill Level B = Occupations that usually require college or vocational education or apprenticeship training.</li> </ul>	These occupations are at the same skill level as MLTs and in a related field or type of work
2. SME input +	<ul style="list-style-type: none"> <li>• SME recommendations based on personal experience</li> <li>• Related occupations recommended by NOC in MLT description, career site occupational profiles, research reports</li> </ul>	These sources were used to identify occupations that might not have been included in the primary approach
<b>Secondary Criteria – for elimination and prioritization</b>		
3. Non-regulated	Occupations that have mandatory licensing in 3 or more jurisdictions will not be included.  (A recommendation for the future might be to go by requirements of top 2 or 3 provinces where most IEMLTs reside).	
4. Match to common competencies and traits of MLTs	Common MLT competencies have been identified by comparing content of numerous profiles of the occupation (e.g. CSMLS, NOC, provincial job profiles)	The best alternate careers for the most IEMLTs will allow them to transfer their skills gained from education and work experience in their original career

Item	Criteria and Range	Rationale
<b>Secondary Criteria – for elimination and prioritization</b>		
5. Labour market - job availability	Occupations with current good to high demand.  Demand should be national, but can be in one region, e.g. prairies, Ontario if demand is large. If demand is regional, we will name on fact sheet.	We do not want to recommend careers for which there is little demand. This information was not available on a national basis, and to check all cities was too time-intensive. We therefore direct readers to <a href="http://www.workingincanada.gc.ca">www.workingincanada.gc.ca</a> where they can check job demand for their city of interest.
6. Salary level	Occupations with a range of salaries, but not below \$35,000/year or \$17/hr.	We should not be directing IEMLTs to occupations with low pay and little chance for career mobility and progression.  Average annual salary information for MLT follows (rounded off): <ul style="list-style-type: none"> <li>• Service Canada 2006 data - \$46,000</li> <li>• ALIS Alberta 2011 data - \$69,000</li> <li>• Jobs Canada 2013 data - \$55,000</li> </ul> Poverty line (after income tax) for 2012 for a family of four was \$31,000 (Statistics Canada).  For comparison: wage in Toronto for an MLA job ad was \$21-27/hr. (\$21-27/hr. = \$43,680- 56,160/year)
7. Career mobility and progression	Occupations that provide opportunities for career mobility and progression will be given preference.	
8. Language requirements based on CLB levels	IEMLTs require CLB 6 as entry, 8 for exam/profession.  Note language requirements on Fact Sheet if identified, but do not use this as a criteria for eliminating occupations. (This a 'nice to have' criteria.)	English/French language competence is essential to success in the workplace.



Item	Criteria and Range	Rationale
<b>Secondary Criteria – for elimination and prioritization</b>		
9. HRSDC Essential Skills levels	<p>Alternate occupations will be evaluated to ensure they are in the range of complexity ratings of MLTs:</p> <p><b>Reading Text</b> typical = 1-4</p> <p><b>Document Use</b> = 1-3</p> <p><b>Writing</b> = 1-3</p> <p><b>Numeracy:</b></p> <p>    Money Math = 2</p> <p>    Scheduling, Budgeting and Accounting Math = 3</p> <p>    Measurement and Calculation Math = 2-3</p> <p>    Data Analysis Math = 2-3</p> <p>    Numerical Estimation = 1</p> <p>    Oral Communication = 1-3</p> <p>    Thinking Skills:</p> <p>        Problem Solving = 1-3</p> <p>        Decision Making = 2-3</p> <p>        Critical Thinking = 2-3</p> <p>        Finding Information = 2-3</p> <p>        Digital Technology = 2-3</p> <p>        Working with Others = 3</p> <p>        Continuous Learning = 3</p> <p>The most important Essential Skills for MLTs are <b>Numeracy</b> and <b>Critical Thinking</b></p>	<p>We will seek occupations that use Essential Skills at similar complexity levels as MLTs. If a promising occupation uses Essential Skills at a more complex level in a few areas, it may not be eliminated but this information will be considered in the final selections.</p>

Item	Criteria and Range	Rationale
<b>Secondary Criteria – for elimination and prioritization</b>		
10. Industries	Occupations in health sector and a range of others, selected based on where the best matches are.	Including careers from a variety of industries will provide IEMLTs with a variety of options and information about the range of related careers available in Canada

## APPENDIX F:

### Competency and Attribute Comparisons Working Chart at Feb 4, 2014

Highlighted skills and attributes may be transferable from MLT.

Possible Alternate Careers	Common Occupational Competencies	Attributes
<b>3211 Medical Laboratory Technologist</b>	<ul style="list-style-type: none"> <li>• Collect and procure appropriate data and specimens.</li> <li>• Prepare specimens for analysis and ensures appropriate storage</li> <li>• Use a computer for data entry, storage and retrieval, and apply information management skills</li> <li>• Demonstrate research skills to investigate, evaluate or problem solve.</li> <li>• Apply analysis and synthesis skills in implementing lab processes and techniques</li> <li>• Interprets and validates test results using established protocols</li> <li>• Use and maintain computers, laboratory information systems and standard laboratory equipment/instruments</li> <li>• Works safely and securely according to established protocols and procedures, safety guidelines, and existing legislation related to general lab safety and security and working with hazardous materials.</li> <li>• Uses effective listening, verbal and written communication in dealings with laboratory colleagues, patients, students, clients, and other health professionals.</li> <li>• Consistently and continuously follows quality management/control practices</li> </ul>	<ul style="list-style-type: none"> <li>• Form and colour perception</li> <li>• numerical ability</li> <li>• scientific aptitude</li> <li>• attention to detail</li> <li>• methodical</li> <li>• accurate</li> <li>• self-sufficient</li> <li>• flexible &amp; adaptable</li> <li>• desire to learn and find answers</li> <li>• manual dexterity</li> <li>• both a team and independent worker</li> </ul>

Possible Alternate Careers	Common Occupational Competencies	Attributes
<b>2211</b> Chemical Technologists and Technician <b>(description of technologist)</b>	<ul style="list-style-type: none"> <li>Carry out chemical reactions</li> <li>Prepare standards and samples</li> <li>Analyze samples using bench methods and sophisticated instrumentation</li> <li>Prepare reports and required documentation (information management)</li> <li>Maintain and upgrade laboratory instruments and equipment</li> <li>Manage projects and make presentations about results</li> </ul> <p>(from Chemical Technologist profile in ALIS OCCinfo)</p>	<ul style="list-style-type: none"> <li>strong analytical skills (competencies)</li> <li>an aptitude for science and mathematics</li> <li>manual dexterity</li> <li>strong oral and written communication skills</li> <li>the ability to pay close attention to details</li> </ul> <p>(from Chemical Technologist profile in ALIS OCCinfo)</p>
<b>2212</b> Geological and Mineral Technologists and Technicians <b>(Assayer)</b>	<ul style="list-style-type: none"> <li>Analyze various types of minerals and ores for the purpose of identifying properties of those substances, as well as their value</li> <li>Analyze samples for the purpose of finding specific types of ores or metals, such as gold, silver or platinum</li> <li>Process materials and analyze base metals, non-metallic materials, concentrates, effluents and air samples</li> <li>Use spectrographic analysis, chemical solutions, and chemical or laboratory equipment, such as furnaces, beakers, graduates, pipettes and crucibles</li> <li>Use chemical processes such as fire or dry assay procedures and wet chemical methods</li> <li>Use laboratory, qualitative and quantitative analysis techniques</li> <li>Perform statistical analysis</li> <li>Liaise with tradespeople, engineers and management</li> <li>Prepare reports and submit to management</li> <li>Weigh residues on scale to determine the proportion of pure gold, silver, platinum or other metals</li> </ul> <p>(from WelcomeBC Certified Assayer profile, Pace Career Centre in the US, and Academic Invest)</p>	<p>An assayer and sampler should:</p> <ul style="list-style-type: none"> <li>have an analytical mind</li> <li>have an aptitude for scientific inquiry</li> <li>be responsible, systematic and neat</li> <li>be interested in the environment and especially geology</li> <li>maintain good interpersonal relations</li> <li>have an exceptional degree of accuracy (competencies)</li> </ul> <p>(from Pace Career Centre in the US, and Academic Invest)</p>

Possible Alternate Careers	Common Occupational Competencies	Attributes
<p><b>2221</b> Biological/ Biology Technologists</p>	<ul style="list-style-type: none"> <li>• Set up and conduct biological, microbiological and biochemical tests and laboratory analyses in support of research and quality control in food production, sanitation, pharmaceutical production, biotechnology and other fields</li> <li>• Apply methods and techniques such as microscopy, histochemistry, chromatography, electrophoresis and spectroscopy</li> <li>• Perform experimental procedures in agriculture, plant breeding, animal husbandry, biology and biomedical research</li> <li>• Conduct field research and surveys to collect data and samples of water, soil, and plant and animal populations</li> <li>• Conduct environmental monitoring and compliance activities for the protection of fisheries stock, wildlife and other natural resources</li> <li>• Analyze data and prepare reports</li> <li>• Conduct or supervise operational programs such as fish hatchery, greenhouse and livestock production programs</li> </ul> <p>Source: StatsCan info based on NOC</p>	<ul style="list-style-type: none"> <li>• Good communication skills</li> <li>• Good health and physical stamina</li> <li>• Ability to keep detailed, accurate records</li> <li>• Finger dexterity required to adjust microscopes and other fine instruments?</li> <li>• Ability to work independently and in a team environment</li> <li>• Ability to see details at close range</li> <li>• Ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (methodical)</li> <li>• Ability to use scientific rules and methods to solve problems (scientific aptitude and desire to find answers)</li> <li>• Understands implications of new information for both current and future problem-solving and decision-making (desire to learn)</li> </ul> <p>(from Biological Technician profile in ALIS OCCinfo, Career Profiles at Canadian Council of Technicians and Technologists, and Careers.org)</p>

Possible Alternate Careers	Common Occupational Competencies	Attributes
<b>2221</b> Biological/ Biology Technicians	<p>(from Stats Can based on NOC)</p> <ul style="list-style-type: none"> <li>Assist in conducting biological, microbiological and biochemical tests and laboratory analyses</li> <li>Perform limited range of technical functions in support of agriculture, plant breeding, animal husbandry, biology, biomedical research and environmental protection</li> <li>Assist in conducting field research and surveys to collect data and samples of water, soil, and plant and animal populations</li> <li>Assist in analysis of data and preparation of reports.</li> </ul> <p>(from ECO Canada):</p> <ul style="list-style-type: none"> <li>Record and analyze experimental data for evaluation by research personnel.</li> <li>Assist and conduct research, including collecting information and samples such as water and soil.</li> <li>Prepare chemical reagents and media.</li> <li>Conduct standardized biological, microbiological, and biochemical tests and laboratory analyses.</li> <li>Monitor and observe experiments. Ensure compliance with applicable regulations, for example environmental, occupational health and safety, and animal-care regulations.</li> <li>Write reports and summaries of findings.</li> <li>Set up, adjust, calibrate, clean, maintain, and troubleshoot laboratory and field equipment.</li> <li>Order equipment and supplies, including researching new equipment and contacting vendors for detailed specifications, pricing, and on-site demonstrations.</li> <li>Work with vendors to design custom equipment.</li> <li>Liaise with the public, for example answering questions and conducting facility tours.</li> </ul>	<ul style="list-style-type: none"> <li>Good communication skills</li> <li>Good health and physical stamina</li> <li>Ability to keep detailed, accurate records</li> <li>Finger dexterity required to adjust microscopes and other fine instruments?</li> <li>Ability to work independently and in a team environment</li> <li>Ability to see details at close range</li> <li>Ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (methodical)</li> <li>Ability to use scientific rules and methods to solve problems (scientific aptitude and desire to find answers)</li> <li>Understands implications of new information for both current and future problem-solving and decision-making (desire to learn)</li> </ul> <p>(from Biological Technician profile in ALIS OCCinfo, Career Profiles at Canadian Council of Technicians and Technologists, and Careers.org)</p>

Possible Alternate Careers	Common Occupational Competencies	Attributes
<b>2211.1</b> Food Scientist Technologists	<p>May work in one of four areas:</p> <ol style="list-style-type: none"> <li>1. <b>Applied research and development:</b> <ul style="list-style-type: none"> <li>• Assist in development of new processing methods and new or improved foods to meet customer requests for healthier and safer foods</li> <li>• <b>Conduct tests</b> to see that products meet government and industry standards and satisfy consumer needs</li> </ul> </li> <li>2. <b>Quality control or assurance:</b> <ul style="list-style-type: none"> <li>• Check raw ingredients for freshness, maturity or stability for processing</li> <li>• Check finished products for safety, quality and nutritional value</li> <li>• Develop scientifically-based quality assurance programs</li> <li>• Inspect processing line operations</li> <li>• Develop and improve packaging and storage methods</li> </ul> </li> <li>3. <b>Processing plants:</b> <ul style="list-style-type: none"> <li>• Develop production specifications</li> <li>• Schedule processing operations</li> <li>• Evaluate processing and storage operations</li> </ul> </li> <li>4. <b>Regulatory agencies:</b> <ul style="list-style-type: none"> <li>• Inspect food processing operations (see Agricultural Commodity Inspector)</li> </ul> </li> </ol> <p>(from Food Science Technologist profile in ALIS OCCinfo)</p>	<ul style="list-style-type: none"> <li>• Good organizational skills</li> <li>• A high degree of intellectual curiosity</li> <li>• Ability to work well as part of a team</li> <li>• Creative problem solving skills (desire to learn and find answers)</li> <li>• Good interpersonal skills</li> <li>• Enjoy using instruments and equipment to perform tasks requiring precision</li> <li>• Enjoy analyzing data and conducting sampling and analysis programs</li> </ul> <p>(from Food Science Technologist profile in ALIS OCCinfo)</p>

Possible Alternate Careers	Common Occupational Competencies	Attributes
<b>2221</b> Food Processing Quality Control Technician (2211)	<ul style="list-style-type: none"> <li>• Quality assurance and control</li> <li>• Assist in set up and conduction of chemical experiments, tests and analysis</li> <li>• Operate and maintain laboratory equipment,</li> <li>• Compile records and interpret experimental or analytical results,</li> <li>• Prepare solution, reagents, and sample formulations,</li> <li>• Develop and conduct programs of sampling and analysis,</li> <li>• Assist in developing chemical engineering processes,</li> <li>• Assist in development of standards, health and safety measures</li> <li>• Know and use computer hardware and software</li> </ul> <p>(from various job descriptions)</p>	<ul style="list-style-type: none"> <li>• Work under pressure, tight deadlines,</li> <li>• Manual dexterity,</li> <li>• Attention to detail,</li> <li>• Hand-eye co-ordination,</li> <li>• Ability to distinguish between colours</li> </ul>
<b>2222.2</b> Agricultural Commodity Inspector  Agricultural and fish products inspectors	<p>The duties and responsibilities of agricultural commodity inspectors vary depending on the types of products they inspect (for example, fruits and vegetables, meat, grains). They may specialize in a particular type of product or inspect more than one type of product. In general, however, they:</p> <ul style="list-style-type: none"> <li>• conduct Hazards Analysis and Critical Control Point (HACCP) audits to identify potential food safety hazards so action can be taken to reduce or eliminate hazards</li> <li>• conduct inspections, checking sanitation, quality control and food safety programs</li> <li>• ensure accurate product labelling and packaging</li> <li>• interpret and enforce government acts and regulations, explain the standards required and make recommendations to agricultural product plant managers.</li> </ul>	<p>Agricultural commodity inspectors need the following characteristics:</p> <ul style="list-style-type: none"> <li>• the ability to communicate well in person and in writing</li> <li>• the ability to pay close attention to details</li> <li>• the ability to make objective evaluation decisions</li> <li>• high ethical standards</li> <li>• the ability to be firm yet diplomatic when dealing with clients who may not agree with their application and enforcement of regulations.</li> </ul> <p>They should enjoy having clear rules and organized methods for their work, analyzing information, and dealing with people.</p>



Possible Alternate Careers	Common Occupational Competencies	Attributes
<b>3212</b> Medical Lab Technicians	<ul style="list-style-type: none"> <li>• Verify information on documents that accompany specimens (information management)</li> <li>• Enter data into computers (information management and use of technology)</li> <li>• Collect, label and deliver specimens, e.g. blood samples</li> <li>• Perform pre-analytical procedures on specimens from a variety of sources, e.g. prepare slides of blood and other fluids for examination under a microscope</li> <li>• Make chemical solutions and stocks of culture media</li> <li>• Plant specimens to culture bacteria</li> <li>• Set up, operate and maintain laboratory equipment</li> <li>• Handle hazardous materials</li> <li>• Maintain stock levels of laboratory supplies</li> </ul> <p>(from Medical Lab Assistant profile in ALIS OCCinfo and December 7<sup>th</sup> draft of MLA fact sheet)</p>	<ul style="list-style-type: none"> <li>• Ability to follow instructions, pay close attention to detail and take precise readings</li> <li>• Ability to work quickly and accurately</li> <li>• Good finger and manual dexterity to handle specimens and small laboratory equipment</li> <li>• Normal colour vision</li> <li>• Good communication and problem solving skills (desire to learn and find answers)</li> <li>• Good organizational and time management skills</li> <li>• Ability to work both independently and as part of a team</li> <li>• Ability to work in a changing environment (adaptable)</li> <li>• Interpersonal skills required to work well with co-workers and the public</li> <li>• Demonstrates good patient care skills</li> <li>• Enjoy taking a methodical approach to their work</li> <li>• Ability to use scientific rules and methods to solve problems (scientific aptitude and desire to find answers)</li> <li>• Desire to keep up-to-date technically and apply new knowledge (desire to learn)</li> </ul> <p>(from Medical Lab Assistant profile in ALIS OCCinfo and December 11th draft of MLA fact sheet)</p>

Possible Alternate Careers	Common Occupational Competencies	Attributes
<b>3212</b> Pathologists' Assistants	<ul style="list-style-type: none"> <li>• Prepare specimens for testing and microscopic examination</li> <li>• Assist with analysis of medical samples</li> <li>• Study tissues for medical diagnosis, treatment and prevention purposes</li> <li>• Perform and assist with surgical specimens</li> <li>• Train and supervise junior resident pathologists, pathologists' assistants, and morgue attendants</li> </ul> <p>(from Pathologist's Assistant profile in ALIS OCCinfo)</p>	<ul style="list-style-type: none"> <li>• Interpersonal skills, and the ability to work well with coworkers and the public</li> <li>• Ability to follow instructions</li> <li>• Precision and attention to detail</li> <li>• Ability to work quickly and accurately</li> <li>• Good manual dexterity</li> <li>• Normal colour vision</li> <li>• Communication and problem-solving skills</li> <li>• Organizational skills</li> </ul> <p>(from Pathologist's Assistant profile in ALIS OCCinfo)</p>

Possible Alternate Careers	Common Occupational Competencies	Attributes
<b>3213</b> Animal health technologists	<ul style="list-style-type: none"> <li>collect and prepare laboratory specimens for testing</li> <li>perform blood, urine, fecal and other routine laboratory tests</li> <li>fill and dispense prescriptions and administer prescribed medications and treatments</li> <li>receive and prepare animals for examination or surgery</li> <li>monitor and evaluate clinical symptoms</li> <li>assist veterinarians in procedures and surgical operations</li> <li>administer and monitor anesthetic</li> <li>produce and develop radiographs</li> <li>administer emergency first aid</li> <li>perform dental cleaning</li> <li>restrain animals for examination, vaccination, medication administration and veterinary nursing care</li> <li>calculate and administer medications and fluids</li> <li>implement radiation safety and quality control procedures</li> <li>provide</li> <li>animal health care education to</li> <li>owners (e.g. behaviour problems in pets)</li> <li>assist in the euthanasia of animals</li> <li>clean, maintain and sterilize surgical and medical instruments and equipment</li> <li>manage pharmaceutical and product inventory</li> <li>ensure facility sanitation to control the spread of disease</li> <li>assist in food animal monitoring programs to promote food safety and public health</li> <li>maintain medical records and log books (information management?)</li> </ul> <p>(from Animal Health Technologist profile in ALIS OCCinfo)</p>	<ul style="list-style-type: none"> <li>Confidence in working with animals</li> <li>Strong interest in medicine</li> <li>Ability to work quickly and decisively under pressure</li> <li>Good manual dexterity</li> <li>Aptitude for math, record keeping and writing reports (information management in occupational competencies)</li> <li>Good organization skills</li> <li>Good physical health and strength</li> <li>High degree of integrity</li> <li>Excellent communication and interpersonal skills</li> <li>Ability to work well in a team environment</li> <li>Enjoy having clear rules and guidelines for their work, and performing laboratory and diagnostic procedures (in common occupational competencies)</li> </ul> <p>(from Animal Health Technologist profile in ALIS OCCinfo)</p>

Possible Alternate Careers	Common Occupational Competencies	Attributes
<b>3213</b> Animal Care Technician	<ul style="list-style-type: none"> <li>• Provide animal care</li> <li>• Order, receive, ship animals</li> <li>• Collect, preserve, store and dispose of samples</li> <li>• Prepare samples for analysis</li> <li>• Analyze samples and determine results</li> <li>• Record and report results</li> <li>• Manage laboratory and test equipment supply inventory</li> <li>• Ensure quality of work practices</li> </ul> <p>(from BioTalent's Animal Care Technicians Competency Profile Checklist)</p>	<ul style="list-style-type: none"> <li>• Organize work</li> <li>• Demonstrate attention to detail</li> <li>• Identify problems/concerns</li> <li>• Manage data and information</li> <li>• Adapt to change in work environment</li> <li>• Build effective working relationships</li> <li>• Communicate effectively</li> <li>• Demonstrate persistence</li> <li>• Embrace continual learning and development</li> </ul> <p>(from BioTalent's Animal Care Technicians Competency Profile Checklist)</p>

## APPENDIX G:

### Organization and Format of Fact Sheets – at Feb 5/14

This document demonstrates the work to blend the highlighting of occupational fields with specific information for some sample 'good match' occupations.

#### Under 221 Technical Occupations in Physical Sciences

1. Fact Sheet - 2211 Chemical technicians/technologists  
Occupations to highlight:
  - Biochemistry technicians/technologists (not highlighted as little career information available)
  - Water quality technicians
  - Water and wastewater laboratory technologists
2. Fact Sheet - Food science technologists
3. Fact Sheet - 2212 Geological and mineral technologists and technicians  
Occupations to highlight:
  - Assayer

#### Under 222 Technical Occupations in Life Sciences

4. Fact Sheet - 2221 Biological/Biology Technologists and Technicians  
Occupations to highlight:
  - Fisheries Technician/Technologists (Not a close match to MLT. Highlighted aquaculture technologists instead as a closer match)
  - Microbiology Technician/Technologists (not highlighted because specialization of MLT)
  - Quality Control/Safety Inspectors, e.g. food and wine processing
5. Fact Sheet - Biotechnology industry/bio-economy: agri-biotech, bio-energy, biohealth, bioindustrial  
Occupations to highlight:
  - Lab workers
  - Research assistants
  - Animal care attendants and technicians (added as BioTalent has career resources for them)
6. Fact Sheet - Biotechnology laboratory workers  
~~Fact Sheet - 2222 Agricultural and fish products inspectors~~ (Grouped under title: agricultural commodity inspectors. Not included because weak match with MLT skills and traits)  
Occupations to highlight:
  - Fish and fish products inspectors
  - Fruit and vegetables inspectors
  - Grain inspectors
  - Meat inspectors
  - Plant protection inspectors

## Under 321 Medical Technologists and Technicians

7. Fact Sheet - 3212 Medical Lab Techs and Pathologists' Assistants  
Occupations to highlight:
  - Medical Laboratory Technicians
  - ~~Pathologists' Assistants~~ (not included as education requirements moving towards a bachelor's or master's degree)
8. Fact Sheet - 3213 Animal health technologists and veterinary techs  
Occupations to highlight:
  - Animal Health Technologists
  - ~~Veterinary Technicians~~ (included as one of the other titles used for animal health technologists)

## Occupations Recommended by SMEs, Career Sites and Research Reports

9. Fact Sheet - Sales--laboratory technology and pharmaceuticals  
**Notes:** part of NOC 6221 Technical sales specialists—wholesale trade; this NOC includes titles such as diagnostic instrument sales representative, medical equipment and supplies salesperson, and pharmaceutical sales representative; this occupation includes training customers in use and maintenance of equipment
10. Fact Sheet - Health records professionals  
**Notes:** part of NOC 1413 Records management technician, ALIS references emerging occupation of health information technology specialist; another specialization could be medical coding specialist – see <http://www.innerbody.com/careers-in-health/becoming-medical-coding-specialist.html> – little skill transfer to this occupation, but good knowledge transfer potential
11. ~~Fact Sheet—Vocational instructors~~  
**Notes:** part of NOC 4021 College and other vocational instruction  
Requirement of MLT certification or degree.

## APPENDIX H:

### Bibliography

#### Literature

BioTalent Canada. (2007). Recognizing talent: Capitalizing on the skills of foreign-trained professionals for a vital bio-economy. Retrieved from <http://www.biotalent.ca/past-research#recognizingtalent>

BioTalent Canada. (2013). Talent Opportunities: Bringing Newcomers to Canada's Bio-economy. Retrieved from <http://www.biotalent.ca/en/newcomers>

BioTalent Canada. (2013). Sequencing the Data: Labour Market Information Report. Retrieved from <http://www.biotalent.ca/en/sequencing>

Canadian Society for Medical Laboratory Science. (2005). Competency Profile: General Medical Laboratory Technologist. Hamilton, ON. Retrieved from <http://www.csmls.org/Certification/Competency-Profiles.aspx>

Canadian Society for Medical Laboratory Science. (2010). Resources for Internationally Educated Medical Laboratory Technologists. Hamilton, ON. (Unpublished project report).  
Health Force Ontario Marketing and Recruitment Agency. (2013). Alternative career toolkit: Module 1. Toronto, ON: Queen's Printer for Ontario. Retrieved from <http://www.healthforceontario.ca/UserFiles/file/Physician/Outside/alternative-career-toolkit-2013-en.pdf>

Centre for Canadian Language Benchmarks. (2009). Language for Work: CLB and Essential Skills for Job Analysts. Retrieved from [http://www.language.ca/index.cfm?Voir=sections&Id=17375&M=4038&Repertoire\\_No=2137991327](http://www.language.ca/index.cfm?Voir=sections&Id=17375&M=4038&Repertoire_No=2137991327)

Citizenship and Immigration Canada. (2011). Planning to work in Canada?: An essential workbook for newcomers. Foreign Credentials Referral Office. Retrieved from <http://www.cic.gc.ca/english/pdf/pub/workbook-national.pdf>

Citizenship and Immigration Canada. (2011). Planning to work in Canada?: An essential workbook for newcomers. Foreign Credentials Referral Office. Retrieved from <http://www.cic.gc.ca/english/pdf/pub/workbook-national.pdf>

Government of Alberta, Human Services. (2013). Career Planner: Choosing an Occupation. Retrieved from <http://alis.alberta.ca/pdf/cshop/careerplanner.pdf>

Grant, M. (2009). Bridging Programs for Internationally Educated Medical Laboratory Technologists: A Business Case. Canadian Society for Medical Laboratory Science. Hamilton, ON. Retrieved from <http://www.csmls.org/About-CSMLS/Publications/Research-Reports.aspx>

Grant, M., Strachan, A., Nielson, C., Verburg, M. (2008). Investigation of Language Assessment Tools and Benchmarks Necessary for Success for Internationally Educated Medical Laboratory Technologists. Canadian Society for Medical Laboratory Sciences. Hamilton, ON. Retrieved from <http://www.csmls.org/About-CSMLS/Publications/Research-Reports.aspx>

LIM Consulting Associates. (2013). Foreign qualification recognition and alternative careers: Report submitted to the best practices and thematic task team of the foreign qualifications recognition working group. Retrieved from <http://novascotia.ca/lae/RplLabourMobility/documents/AlternativeCareersResearchReport.pdf>

Paul, R. (2013). HIRE – IEHPs: A preliminary report of an environmental scan of human resources practices, employment opportunities and Alternate Careers for internationally educated health professionals in Ontario. (Unpublished project report). Toronto, ON: The Hobbes Group Inc.

Simosko, S. (2012). Assessing the Skills and Competencies of Internationally Trained Immigrants: A Manual for Regulatory Bodies, Employers and Other Stakeholders. Canadian Association for Prior Learning Assessment. Retrieved from [http://capla.ca/Immigrants\\_to\\_Canada\\_2.php](http://capla.ca/Immigrants_to_Canada_2.php)

## Websites

Canadian Industry Statistics (CIS) at <http://www.ic.gc.ca/eic/site/cis-sic.nsf/eng/home>

Alberta Health Services, Careers Profiles  
at <http://www.albertahealthservices.ca/careers/page4.asp>

Atlantic Connection for internationally educated health professionals, Self-Assessment Readiness Tools (SART®) for IEHPs at [http://www.iehptoolkits.com/iehp/tiki-index.php?page=Self-Assessment+Readiness+Tools+\(SART®\)+for+IEHPs](http://www.iehptoolkits.com/iehp/tiki-index.php?page=Self-Assessment+Readiness+Tools+(SART®)+for+IEHPs)

Alberta Learning Information Services at <http://alis.alberta.ca/index.html>

BioTalent at <https://www.biotalent.ca>

Career Key® Canada at <http://www.careerkey-ca.org>

Canadian Information Centre for International Credentials (CICIC) at <http://cicic.ca/431/about-the-centre.canada>

Career Cruising at <http://public.careercruising.com/ca/en>

CareerInsite at <http://careerinsite.alberta.ca/careerinsite.aspx>



easycalculation.com at <http://easycalculation.com/mortgage/hourly-wages-to-salary.php>

Holland College Career Key at <http://www.careerkey.org/education-options/holland-college-major-environment.html#.UmCnRJ1zYSk>

Manitoba's WorkinfoNET at <http://mb.workinfo.net.ca/en/other-workinfo-nets/index.php>

National Occupational Classification (NOC) 2011 Tutorial  
at <http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/Tutorial.aspx>

National Occupational Classification (NOC) 2011 Occupational Structure by Skill Type  
at <http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/OccupationIndex.aspx>

National Occupational Classification (NOC) Career Handbook  
at <http://www5.hrsdc.gc.ca/NOC/English/CH/2001/Welcome.aspx>

National Occupational Classification (NOC) 2011 Occupational Descriptions  
at [http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/QuickSearch.aspx?val65=\\*](http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/QuickSearch.aspx?val65=*)

Service Canada's Job Bank at <http://www.jobbank.gc.ca/intro-eng.aspx>  
[SchoolFinder.com](http://www.schoolfinder.com) at <http://www.schoolfinder.com>

Red River College Career Exploration at <http://www.rrc.ca/index.php?pid=3122>

Riley Guide at <http://www.rileyguide.com/assess.html>  
and <http://www.rileyguide.com/careers.html>

Working in Canada at <http://www.workingincanada.gc.ca/home-eng.do?lang=eng>

Welcome BC at <http://www.welcomebc.ca/Work/work-in-bc.aspx>

WorkBC at <http://www.workbc.ca/Job-Seekers.aspx>

ALIS at <http://alis.alberta.ca/index.html>

Ontario Ministry of Training, Colleges and Universities, Ontario Job Futures at  
<http://www.tcu.gov.on.ca/eng/labourmarket/ojf/>

Manitoba's WorkinfoNET at <http://mb.workinfo.net.ca/en/other-workinfo-nets/index.php>

Settlement.Org at <http://www.settlement.org/index.asp>

CanadaVisa.com (sponsored by Campbell Cohen Immigration lawyers) at  
<http://www.canadavisa.com/canada-immigration-career-zone.html>

Job search websites: [Indeed](#), [eluta.ca](#), [Monster](#), [Workopolis](#)

## Resources Used for Fact Sheets

### Assayers:

Academic Invest at <http://www.academicinvest.com/science-careers/chemistry-careers/how-to-become-an-assayer>

ALIS OCCinfo - Geological and Geophysical Technologists  
at [http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro\\_ID=71002509](http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro_ID=71002509)

British Columbia's Assayers Certification Program at <http://commons.bcit.ca/assayerscert/>

Canadian Mineral Analysts at <http://www.canadianmineralanalysts.com>

Career Cruising at <https://www2.careercruising.com/careers/profile-at-a-glance/87>

Certified Assayers Foundation of British Columbia at <http://www.bcassayer.com>

Earth Sciences Canada at  
<http://www.earthsciencescanada.com/careers/what-can-i-be.php#panel>

Essential Skills Profile for Geological and Mineral Technologists and Technicians (NOC 2212) at  
[http://www.workingincanada.gc.ca/es\\_view\\_profile-eng.do?prof\\_id=105&lang=eng](http://www.workingincanada.gc.ca/es_view_profile-eng.do?prof_id=105&lang=eng)

MiHR Career Profiles  
at <http://www.acareerinmining.ca/en/Career%20Profile%20Salary/assaylabtechnician.asp>

NOC 2011 at <http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/QuickSearch.aspx?val65=2212>

UBC Faculty of Science at <http://www.eos.ubc.ca/academic/careers/geological.html>

Wikipedia at <http://en.wikipedia.org/wiki/Assayer>

WiseGeek at <http://www.wisegeek.com/what-does-an-assayer-do.htm>

Welcome BC at <http://www.welcomebc.ca/Work/find-a-job/occupational-guides/Occupation/Certified-Assayers.aspx>

Working in Canada  
at [http://www.workingincanada.gc.ca/LMI\\_report\\_bynoc.do?&noc=2212&reportOption=wage](http://www.workingincanada.gc.ca/LMI_report_bynoc.do?&noc=2212&reportOption=wage)

### **Animal Health Technologists:**

ALIS OCCinfo profile for Animal Health Technologist at

<http://alis.alberta.ca/occinfo/Content/RequestAction.asp?format=html&aspAction=GetTitleSearch>

Biotalent at <http://www.biotalent.ca/en/careerplanning>

Canadian Association of Animal Health Technologists and Technicians at <http://caahtt-acttsa.ca>

Canadian Association for Laboratory Animal Science (CALAS) at <http://calas-acsal.org/about-us/>

Canadian Council on Animal Care at <http://www.ccac.ca/en>

Canadian Information Centre for International Credentials at

[http://cicic.ca/684/Animal\\_Health\\_Technicians\\_and\\_Technologists.canada?noc=3213](http://cicic.ca/684/Animal_Health_Technicians_and_Technologists.canada?noc=3213)

Canadian Veterinary Medical Association at <http://www.canadianveterinarians.net>

Essential Skills Profile for animal health techs at [http://www.workingincanada.gc.ca/report-eng.do?area=25349&lang=eng&noc=3213&action=final&ln=n&regionKeyword=Edmonton%2C+Alberta&s=3&source=0&titleKeyword=animal+health+technologist#report\\_tabs\\_container2](http://www.workingincanada.gc.ca/report-eng.do?area=25349&lang=eng&noc=3213&action=final&ln=n&regionKeyword=Edmonton%2C+Alberta&s=3&source=0&titleKeyword=animal+health+technologist#report_tabs_container2)

NOC 2011 at <http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/QuickSearch.aspx?val65=3213>

Welcome BC at <http://www.welcomebc.ca/Work/find-a-job/occupational-guides/Occupation/Animal-Health-Technologists.aspx>

Work BC at <http://www.workbc.ca/Job-Seekers/Career-Profiles/3213>

Working in Canada at [http://www.workingincanada.gc.ca/report-eng.do?area=25349&lang=eng&noc=3213&action=final&ln=n&regionKeyword=Edmonton%2C+Alberta&s=3&source=0&titleKeyword=animal+health+technologist#report\\_tabs\\_container2](http://www.workingincanada.gc.ca/report-eng.do?area=25349&lang=eng&noc=3213&action=final&ln=n&regionKeyword=Edmonton%2C+Alberta&s=3&source=0&titleKeyword=animal+health+technologist#report_tabs_container2)

### **Biological Technologists and Technicians**

ALIS OCCinfo profile for Biological Technician at

[http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro\\_ID=71001558&SNT\\_ID=25](http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro_ID=71001558&SNT_ID=25)

Aquaculture Association of Canada at <http://www.aquacultureassociation.ca>

[Aquaculturejobs.com](http://Aquaculturejobs.com)

Association of Science and Engineering Technology Professionals of Alberta at [www.aset.ab.ca](http://www.aset.ab.ca)

BioTalent at [www.biotalent.ca](http://www.biotalent.ca)

BIOTECCanada at [www.biotech.ca](http://www.biotech.ca)

Canadian Agriculture Human Resource Council at <http://www.cahrc-ccrha.ca/agri-pathways>

Canadian Aquaculture Industry Alliance at <http://www.aquaculture.ca/index.php>

Canadian Aquaculture Institute at <http://lifelonglearning.upei.ca/cai/about-us>

Canadian Council of Technicians and Technologists (CCTT) at  
<http://www.cctt.ca/template.asp?id=B900B8B1D6FF4882B5CFE6890EA6E2D2>

Canadian Environmental Certification Approvals Board at [www.cecab.org](http://www.cecab.org)

Career Cruising at <https://www2.careercruising.com/careers/printer-friendly/56>

NOC 2011 at  
<http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/ViewAllTitlesQuickSearch.aspx?val=2&val1=221&val65=2221>

ECO Canada at  
<http://www.eco.ca/occupationalprofiles/profiles/biological-technician/69/#sthash.0bqhNYxX.dpuf>

Employment Ontario at [http://www.tcu.gov.on.ca/eng/labourmarket/ojf/pdf/2221\\_e.pdf](http://www.tcu.gov.on.ca/eng/labourmarket/ojf/pdf/2221_e.pdf)

Essential Skills Profile for Biological Technologists and Technicians at  
[http://www.workingincanada.gc.ca/es\\_view\\_profile-eng.do?prof\\_id=233&lang=eng](http://www.workingincanada.gc.ca/es_view_profile-eng.do?prof_id=233&lang=eng)

Fisheries and Oceans Canada at <http://www.dfo-mpo.gc.ca/index-eng.htm>

Statistics Canada at  
<http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVDDetail&db=imdb&dis=2&adm=8&TV=D=122372&CVD=122376&CPV=2221&CST=01012011&MLV=4&CLV=4&CHVD>

Technology Registrations Canada at <https://www.technologyregistrationscanada.ca>

Working in Canada at  
[http://www.workingincanada.gc.ca/LMI\\_report\\_bynoc.do?&noc=2221&reportOption=wage](http://www.workingincanada.gc.ca/LMI_report_bynoc.do?&noc=2221&reportOption=wage)

## **Biotechnology**

BioTalent's *Sequencing the Data: Labour Market Information Report* at <http://www.biotalent.ca/en/sequencing>

BioTalent's Skills Profile for Laboratory Worker at <http://www.biotalent.ca/skills-profiles-list>

BioTalent's Skills Profile for Research Assistant at <http://www.biotalent.ca/skills-profiles-list>

BioTalent's Skills Profile for Animal Care Attendant at <http://www.biotalent.ca/skills-profiles-list>

BioTalent's Skills Profile for Animal Care Technician at <http://www.biotalent.ca/skills-profiles-list>

## **Biotechnology Lab Workers**

BioTalent Canada's *Sequencing the Data: Labour Market Information Report* at <http://www.biotalent.ca/en/sequencing>

BioTalent Canada's Skills Profile for Laboratory Worker at <http://www.biotalent.ca/skills-profiles-list>

BioTalent Canada's *Recognizing talent: Capitalizing on the skills of foreign-trained professionals for a vital bio-economy* at <http://www.biotalent.ca/past-research#recognizingtalent>

BioTalent Canada's Career Tools at <http://www.biotalent.ca/en/careerplanning>

BIOTECCanada at [www.biotech.ca](http://www.biotech.ca)

Career Cruising at <https://www2.careercruising.com/careers/profile-at-a-glance/603>

## **Chemical Technologists and Technicians**

ALIS OCCInfo profile for chemical technologist at [http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro\\_ID=71001587&SNT\\_ID=25](http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro_ID=71001587&SNT_ID=25)

Canadian Council of Technicians and Technologists at <http://www.cctt.ca/template.asp?id=c838bb260ca24e9b9c56273b2c9be0d0>

Canadian Society for Chemistry (CSC) at <http://www.cheminst.ca/about/cic/csc>

Chemical Institute of Canada (CIC) at <http://www.cheminst.ca/about/cic>

Employment Ontario at [http://www.tcu.gov.on.ca/eng/labourmarket/ojf/pdf/2211\\_e.pdf](http://www.tcu.gov.on.ca/eng/labourmarket/ojf/pdf/2211_e.pdf)

Essential Skills Profile at

[http://www.workingincanada.gc.ca/es\\_view\\_profile-eng.do?prof\\_id=85&lang=eng](http://www.workingincanada.gc.ca/es_view_profile-eng.do?prof_id=85&lang=eng)

NOC 2011 at <http://www5.hrsdc.gc.ca/noc/english/noc/2011/QuickSearch.aspx?val65=2211>

Technology Professionals Canada (TPC) at <http://technologyprofessionals.ca/en.aspx>

Work BC at <https://www.workbc.ca/Job-Seekers/Career-Profiles/2211#section-overview>

Working in Canada at [http://www.workingincanada.gc.ca/report-eng.do?area=25349&lang=eng&noc=2211&action=final&ln=n&regionKeyword=Edmonton%2C+Alberta&s=1&source=2&titleKeyword=chemical+technician#report\\_tabs\\_container2](http://www.workingincanada.gc.ca/report-eng.do?area=25349&lang=eng&noc=2211&action=final&ln=n&regionKeyword=Edmonton%2C+Alberta&s=1&source=2&titleKeyword=chemical+technician#report_tabs_container2)

### **Food Technologists**

ALIS OCCinfo profile for Food Science Technologist at

[http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro\\_ID=71002488&SNT\\_ID=25](http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro_ID=71002488&SNT_ID=25)

ALIS WAGEinfo at

<http://alis.alberta.ca/wageinfo/Content/RequestAction.asp?format=html&aspAction=GetWageHomePage&Page=Home>

Canadian Institute for Food Science and Technology (CIFST) at

<http://www.cifst.ca/>

Essential Skills Profile at [http://www.workingincanada.gc.ca/es\\_search-eng.do?source=2&titleKeyword=food+technologist&action=Search&noc=2211](http://www.workingincanada.gc.ca/es_search-eng.do?source=2&titleKeyword=food+technologist&action=Search&noc=2211)

Guelph Food Technology Centre at <http://www.gftc.ca/default.aspx>

Manitoba Food Processors Association at <http://www.mfpa.mb.ca/index.cfm?PageID=12>

Ontario College of Technology at <http://www.ocot.ca/articles/haccp1.html>

Skilled immigrant infocentre at

[http://skilledimmigrants.vpl.ca/index.php/guides/industry/food\\_technologists\\_technicians](http://skilledimmigrants.vpl.ca/index.php/guides/industry/food_technologists_technicians)

Working in Canada at [http://www.workingincanada.gc.ca/report-eng.do?area=25349&lang=eng&noc=2211&action=final&ln=n&regionKeyword=Edmonton%2C+Alberta&s=1&source=2&titleKeyword=chemical+technician#report\\_tabs\\_container2](http://www.workingincanada.gc.ca/report-eng.do?area=25349&lang=eng&noc=2211&action=final&ln=n&regionKeyword=Edmonton%2C+Alberta&s=1&source=2&titleKeyword=chemical+technician#report_tabs_container2)

## **Health Information Management Professionals**

Alberta Health Services at <http://www.albertahealthservices.ca/careers/page168.asp>

ALIS OCCinfo profile for Health Information Management Professional at [http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetTitlesSearchFirstLetter&Page=TitleSearch&SNT\\_ID=55&FirstLetter=H&Results=TRUE&format=html](http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetTitlesSearchFirstLetter&Page=TitleSearch&SNT_ID=55&FirstLetter=H&Results=TRUE&format=html)

Canada Health Infoway at [www.infoway.ca](http://www.infoway.ca)

Canadian Health Information Management Association at <https://www.echima.ca/about-us>

Canadian Health Information Management Association's Transforming Health Information Management: The Evolution of the HIM® Professional at <https://www.echima.ca/governance/workforce-transformation>

Canadian Health Information Management Association's Health Information Management (HIM): Human Resource Package at [https://www.echima.ca/media/documents/HIM\\_HR\\_Doc%202012\\_13.pdf](https://www.echima.ca/media/documents/HIM_HR_Doc%202012_13.pdf)

Canadian Institute for Health Information (CIHI) at <http://www.cihi.ca/CIHI-ext-portal/internet/EN/Home/home/cihi000001>

George Brown College at <http://www.georgebrown.ca/C139-2013-2014/>

Health Canada at <http://www.hc-sc.gc.ca/hcs-sss/ehealth-esante/index-eng.php>

Information Communications and Technology Council (ICTC) at <http://www.ictc-ctic.ca>

Information Technology Association of Canada (ITAC) at <http://itac.ca>

NOC 2011 at <http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/QuickSearch.aspx?val65=1252>

Ontario's Health Care Information Sheet #16 at <http://www.imd-info.ca/info%20sheets/16%20healthinfo.pdf>

## **Medical Lab Assistants**

ALIS OCCinfo profile for Medical Laboratory Assistant at [http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro\\_ID=71035753&SNT\\_ID=25](http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro_ID=71035753&SNT_ID=25)

Canadian Society for Medical Laboratory Science (CSMLS) at <http://www.csmls.org/About-CSMLS/Becoming-a-Lab-Professional.aspx>

Canadian Society for Medical Laboratory Science's (CSMLS) Medical Laboratory Assistants Competency Profile at <http://csmls.org/Certification/Competency-Profiles.aspx>

Canadian Society for Medical Laboratory Science's (CSMLS) Personal Competency Rating Booklet for Medical Laboratory Assistant at [http://csmls.org/csmls/media/documents/certification/mla\\_personal\\_competency\\_rating\\_booklet.pdf](http://csmls.org/csmls/media/documents/certification/mla_personal_competency_rating_booklet.pdf)

Essential Skills Profile at [http://www.workingincanada.gc.ca/es\\_view\\_profile-eng.do?prof\\_id=152&lang=eng](http://www.workingincanada.gc.ca/es_view_profile-eng.do?prof_id=152&lang=eng)

Health Canada at <http://www.hc-sc.gc.ca/hcs-sss/medi-assur/index-eng.php>

NOC 2011 at <http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/QuickSearch.aspx?val65=3212>

Work BC at <http://www.workbc.ca/Job-Seekers/Career-Profiles/3212>

Working in Canada at <http://www.workingincanada.gc.ca/report-eng.do?area=25349&lang=eng&noc=3212&action=final&ln=n&regionKeyword=Edmonton%2C+Alberta&s=1&source=2&titleKeyword=medical+laboratory+technician#wages>

### **Technical Sales Specialists**

ALIS OCCinfo profile for Technical Sales Representative at [http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro\\_ID=71001976&SNT\\_ID=25](http://alis.alberta.ca/occinfo/Content/RequestAction.asp?aspAction=GetHTMLProfile&format=html&occPro_ID=71001976&SNT_ID=25)

BioTalent Canada's career pathway for Sales Representative at <http://www.biotalent.ca/en/biocareer-pathways>

BioTalent Canada's skills at-a-glance for Sales Representative at <http://www.biotalent.ca/bio-economy-skills-glance>

Canadian Association for Pharmacy Distribution Management at <http://www.capdm.ca>

Canadian Generic Pharmaceutical Association (CGPA) at <http://www.canadiangenerics.ca/en/resources/links.asp#medical>

Canadian Medical Device Industry (CMDI) certificate at <http://www.humber.ca/education-training-solutions/canadian-medical-device-industry>

Canadian Professional Sales Association (CPSA) at <http://www.cpsa.com>

MEDEC (Canada's medical technology companies) at <http://www.medec.org/en>

NOC 2011 at <http://www5.hrsdc.gc.ca/NOC/English/NOC/2011/QuickSearch.aspx?val65=6221>



Employment Ontario at [http://www.tcu.gov.on.ca/eng/labourmarket/ojf/pdf/6221\\_e.pdf](http://www.tcu.gov.on.ca/eng/labourmarket/ojf/pdf/6221_e.pdf)

Work BC at <http://www.workbc.ca/Job-Seekers/Career-Profiles/6221>)

Working in Canada at [http://www.workingincanada.gc.ca/wage-outlook\\_search-eng.do;jsessionid=2059C2DA33EA6EBE7453AA95FA9EE0A8.imnav1?reportOption=wage](http://www.workingincanada.gc.ca/wage-outlook_search-eng.do;jsessionid=2059C2DA33EA6EBE7453AA95FA9EE0A8.imnav1?reportOption=wage)