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Technical Reference Guides for the Education and Labour Market Longitudinal Platform (ELMLP)

Pathways and earnings indicators for registered apprentices in Canada

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1. Introduction

Statistics Canada, in collaboration with the provinces and territories, Employment and Social Development Canada (ESDC), and other stakeholders, has developed the Education and Labour Market Longitudinal Platform (ELMLP).

The ELMLP allows longitudinal integration of administrative data related to education with other data sources to provide customized data sets for analytical purposes.

The ELMLP Program fills data gaps and enables a greater understanding of student and apprenticeship pathways, transitions to the labour market and outcomes over time.

Data from the ELMLP can help address a wide range of policy questions pertaining to student and apprenticeship persistence, completion, mobility and pathways as well as their labour market outcomes.

These data will allow policy makers to understand the different types of trajectories that students can take through their post-secondary education or apprenticeship training as well as student characteristics that may be related to these trajectories.

Target audiences for the ELMLP include ministries of education, apprenticeship authorities, postsecondary institutions, federal government departments, students and parents interested in graduate outcomes and other stakeholder groups involved in education and the labour market.

2. The Education and Labour Market Longitudinal Platform

2.1 The key features of the ELMLP

1. **Platform** – The Platform allows researchers to unlock information about past cohorts of college/university students and registered apprentices, to better understand their pathways and how their education and training affected their career prospects.
2. **Securely integrated datasets** – These integrated datasets allow us to know more than what a single dataset or survey can provide. Integrated datasets means that all of the datasets in the ELMLP may be linked with each other using an anonymous linkage identifier located on each file. After identifying which ELMLP datasets are needed to answer a specific research or policy question, researchers can then use the anonymous linkage identifier located on each file to bring these datasets together. The integration of datasets is carried out within the Statistics Canada Social Data Linkage Environment (SDLE), which maintains the highest privacy and data security standards.
3. **Longitudinal data** – The data available within the Platform are linked longitudinally, allowing researchers to better understand the behaviours and outcomes of students and apprentices over time.
4. **Accessible data** – All datasets prepared for the Platform will be made available to researchers through the Research Data Centres network across Canada.

2.2 Accessibility, confidentiality and privacy

The integrated datasets in the ELMLP are deemed sensitive statistical information and subject to the confidentiality requirements of the *Statistics Act*. Statistics Canada employees who build the integrated datasets for research purposes have access to the data only after it has been stripped of personal identifiers. Furthermore, only Statistics Canada employees and deemed employees who have an approved need to access the data for their analytical work are allowed access to the linked analytical files.

This data will be treated with the same level of confidentiality as surveys administered by Statistics Canada.

Findings from the ELMLP will be released through Statistics Canada's website.

The ELMLP data will also be available in Statistics Canada's Research Data Centres (RDC) to researchers with approved projects only. These researchers will be provided with access in a secure setting at the RDCs, which are staffed by Statistics Canada employees. The RDCs are operated under the provisions of the *Statistics Act* in accordance with all confidentiality rules, and are accessible to researchers once they have been sworn in under the *Statistics Act* as "deemed employees."

2.3 Core and supplementary datasets

The ELMLP consists of two types of datasets: **core** and **supplementary**.

Core datasets will be updated in the ELMLP on an annual basis and include:

1. **The Postsecondary Student Information System (PSIS)** - a data holding of all public college and university enrolments and graduates by type of program and credential, and field of study for each school year. The ELMLP consists of PSIS data from 2009 onwards for all provinces and territories, as well as from 2005 onwards for the Maritime Provinces.
2. **The Registered Apprenticeship Information System (RAIS**) - an administrative dataset of pan-Canadian (provincial and territorial) annual data on registered apprentices and trade qualifiers. The ELMLP consists of RAIS data from 2008 onward.
3. **Income tax** - select information from income-tax data from 2004 onwards is available for all PSIS and RAIS records that were linked to the income-tax data.

Supplementary datasets are additional datasets that will be integrated into the platform in order to add new indicators for research purposes. Over time, the number of supplementary datasets that are brought into the ELMLP will grow and could include survey data already collected by Statistics Canada, administrative data already obtained by Statistics Canada, and administrative data not yet available at Statistics Canada.

3. Data sources

3.1 Data sources and record linkages

The Registered Apprenticeship Information System (RAIS) is the foremost source of information on apprentices in Canada. On an annual basis, the RAIS produces cross-sectional statistics on registrations in apprenticeship programs and certifications in trades. The cross-sectional annual RAIS files are not structured to support longitudinal studies, and they do not contain information on apprentice employment income.

The annual RAIS files from 2008 to 2016 were linked longitudinally to themselves to produce longitudinal indicators on apprenticeship training. Those files were then linked to the T1 Family File for the 2004 to 2016 tax years to produce indicators on apprentice employment income.

Probabilistic record linkages were conducted in the Social Data Linkage Environment. Successful linkages were dependent on the completeness of personal identifiers available in the RAIS files. Nearly 99% of the records in each of the RAIS files from 2008 to 2016 were successfully linked to Statistics Canada's Derived Record Depository.

For more information on record linkage, visit the Social Data Linkage Environment. For more information on tax data, visit the T1 Family File.

3.2 Concepts used by the Registered Apprenticeship Information System

Designated trades are trades for which apprenticeship training is made available, and for which certificates are granted. Apprenticeship training and trade qualifications in Canada are governed by provincial and territorial jurisdictions. These jurisdictions determine the trades for which apprenticeship training is made available and certificates are granted. The jurisdictions also determine which designated trades require certification in order to work unsupervised in the trade.

Registered apprentices are individuals in a supervised work training program in a designated trade within their provincial or territorial jurisdiction. The apprentice must be registered with the appropriate governing body (usually a ministry of education or labour, or a trade-specific industry governing body) to complete the training.

The **reference period** for the annual RAIS file is the calendar year.

New registrations occur when individuals newly register in an apprenticeship training program during the reference period.

Red Seal programs have common standards to assess the skills of tradespersons across Canada in specific trades, referred to as the Red Seal trades. Tradespersons who pass examinations to meet the Red Seal standards receive a Red Seal endorsement on their provincial or territorial trade certificates.

Certification- In order to work unsupervised in a number of trades in Canada, it is necessary to be a certified journeyperson. Requirements for obtaining such a designation vary widely across jurisdictions as well as across the trades themselves. In most instances, apprentices become certified journeypersons after completing such requirements as supervised on-the-job training, technical training as well as passing one or more examinations.

3.3 Confidentiality and rounding

All data are subject to the confidentiality procedures of rounding and suppression.

To protect the confidentiality of the population of interest, counts and amounts are rounded. Rounding may increase, decrease or cause no change to counts and amounts. Rounding can affect the results obtained from calculations. For example, when percentages are calculated from rounded data, results may be distorted as both the numerator and denominator have been rounded. The distortion can be greatest with small numbers.

To produce estimates of apprenticeship income, the disclosure control rules, as outlined on the T1 Family File web page, were used.

Margins of error caused by rounding and suppression because of small cohort sizes are well documented in the RAIS statistical tables (37-10-0001-01, 37-10-0016-01 and 37-10-0017-01).

4. Methodology of the apprenticeship pathway indicators

The primary purpose of the apprenticeship pathways component is to produce a set of indicators on how well apprentices are faring during their apprenticeship training. The purpose of this section is to define these indicators and to inform data users of their limitations.

4.1 Indicator definitions

Pathways cohort: a group of apprentices that are newly registered for an apprenticeship program during the given calendar year.

Certification rate: the percentage of newly registered apprentices (pathways cohort) that received a certificate within the program duration, one and a half times the program duration, and twice the program duration.

Continuation rate: the percentage of newly registered apprentices (pathways cohort) that are still registered after the program duration, one and a half times the program duration, and twice the program duration.

Discontinuation rate: the percentage of newly registered apprentices (pathways cohort) that discontinued a given apprenticeship program within the program duration, one and a half times the program duration, and twice the program duration.

Median time to certification: the median time it takes from registration to receive a certificate for those who certify within one and a half times the program duration, and twice the program duration.

Median time to discontinuation: the median time it takes since registration to discontinue a program for those who discontinue within one and a half times the program duration, and twice the program duration.

Median age at registration: the median age of pathways cohorts at registration.

Median age at certification: the median age at certification for those who certify within one and a half times the program duration and twice the program duration (for the pathways cohorts).

4.2 Limitations of the apprenticeship pathway indicators

4.2.1 Provincial and territorial variations

Apprenticeship programs are administered by provinces and territories. Each province and territory works with its respective industries to customize its programs to address the specific labour market demands and the training needs of its workers.

Furthermore, apprenticeships are primarily work-based training, and different employers offer different work experiences and contexts for learning. As a result, apprenticeship programs for the same trade may differ across jurisdictions. For instance, to receive a certificate in the same trade, one jurisdiction may offer a four-year program while another offers a three-year program. One jurisdiction may classify a trade as compulsory while another classifies it as voluntary. One jurisdiction may offer the interprovincial Red Seal endorsement for the trade while another may only offer provincial certification. Some jurisdictions may provide apprentices with a certificate as they reach each level of a program, while others may provide just one certificate when apprentices have successfully completed all levels and the certification exam. Jurisdictions may have different apprentice-to-journeyperson ratios. These differing administrative practices can make it more difficult to compare certification rates between jurisdictions and across the trades themselves.

4.2.2 Certification versus employment

Workers are not required to undertake or complete apprenticeship programs to practise voluntary trades. It is common for workers to practise certain voluntary trades after receiving some apprenticeship training, without obtaining a certificate. Results from the 2015 National Apprenticeship Survey (NAS) suggest that many apprentices who discontinued voluntary programs (e.g., cook, carpenter and heavy-duty equipment technician programs) were still employed in a job related to their trade after leaving their programs.

4.2.3 Varying economic realities

Employers play an important role in supporting apprentices throughout their programs. For instance, apprentices may require regular leave from work to attend technical training. Employers also have to sign off on the fulfillment of all requirements (hours and/or skills) before apprentices can seek certification. Finding and maintaining employment that provides the required hours and scope of practice affect apprentices' ability to obtain a certificate. Any interprovincial or trade-level comparison should take into account the varying economic realities that exist across jurisdictions and across the trades themselves.

5. Methodology of the apprenticeship income indicators

Employment income data for the RAIS statistical tables (37-10-0016-01 and 37-10-0017-01) are obtained from the T1 Family File.

Employment income includes employment earnings (wages and salaries, commissions from employment, training allowances, tips and gratuities, and tax-exempted Indian employment income) and net self-employment income (net income from business, profession, farming, fishing and commissions). Net self-employment income may be positive, negative or zero.

All income data are adjusted for inflation and are reported in 2016 constant Canadian dollars.

5.1 Indicator definitions

Income cohorts are groups of individual apprentices who certify in their apprenticeship programs during the given calendar year.

Median age at certification for all those who became certified in the given calendar year (for the income cohorts) is available in both of the following tables.

Longitudinal analysis, RAIS table 37-10-0017-01

Median employment incomes of apprentices who became certified in selected trades are calculated at four years before certification, two years before certification, the year of certification, two years after certification and four years after certification.

Apprentices who filed taxes in the tax years corresponding to all five points in time contribute to these estimates. Median employment incomes are presented as two measures, including and excluding those with self-employment income. Percentages of tax-filers and non-self-employed tax-filers during this timeframe are given in this statistical table.

This table is most appropriate for measuring the progression of incomes over time.

The **progression of median employment income** is the percentage difference between the median employment income at certification and the median employment income at two and four years after certification.

Cross-sectional analysis, RAIS table 37-10-0016-01

Median employment incomes of apprentices are calculated at two and five years after certification.

Apprentices who file taxes two or five years after certification contribute to the median employment income of the corresponding year. Median employment income is presented as two measures, including and excluding those with self-employment income. Percentages of tax-filers and non-self-employed tax-filers after two and five years are given in this table.

This table is most appropriate for comparisons with the Postsecondary Student Information System (PSIS).

5.2 Limitations of the apprenticeship income indicators

Income data for the RAIS tables (37-10-0016-01 and 37-10-0017-01) are obtained from the T1 Family File. These data may not necessarily reflect full-time or full-year employment, they do not account for the number of hours worked, and they do not necessarily reflect employment in the trades of interest. For more information on tax data, visit the T1 Family File.

Apprentices who do not file taxes during the timeframes associated with the estimates are excluded from these income estimates. Percentages of tax-filers are provided in the RAIS tables (37-10-0016-01 and 37-10-0017-01) as important quality indicators.

Individuals with self-employment income are another consideration in tax data analysis. The 2011 Statistics Canada study "The financial well-being of the self-employed"[1] demonstrated that Canadians with only employment income are quite different from those with incorporated and non-incorporated self-employment income. Only apprentices with non-incorporated self-employment income can be identified through current data holdings. Therefore, median employment incomes are presented as two measures, including and excluding those with non-incorporated self-employment incomes.

1. LaRochelle-Coté, Sébastien and Uppal, Sharanjit. 2011. "The financial well-being of the self-employed." *Perspectives on Labour and Income.* Autumn 2011, vol. 23, no. 4. Statistics Canada Catalogue no. 75-001-XIE

6. Geography and trades

Apprenticeship indicators are produced for selected trades, including 14 Red Seal[2] trades with the largest number of registrations in Canada. Estimates are available for Canada, all provinces including the Atlantic Provinces, the Atlantic region, and the territories grouped together to obtain sufficient cohort sizes.

Appendix A of this document contains a complete list of all of the trades included in the RAIS statistical tables (37-10-0001-01, 37-10-0016-01 and 37-10-0017-01).

In Canada, apprenticeship programs and certifications in trades are administered by provincial and territorial jurisdictions. As a result, definitions that govern apprenticeship programs and the way data are reported to Statistics Canada can vary considerably across jurisdictions and across the trades themselves. Focusing on the most common Red Seal trades in Canada helps to reduce some of these jurisdictional differences.

The selected trades also include four non–Red Seal trades in Ontario (child and youth worker, developmental service worker, early childhood educator and educational assistant). These are designated trades only in Ontario and were included to better account for women following apprenticeship programs in Canada.

Estimates at the Canada and jurisdictional levels are available for 14 Red Seal trades with the largest number of registrations. All jurisdictions where these are designated trades contribute to the Canada-level estimates. Some jurisdictional estimates may not be available because of small cohort sizes that fall below predetermined thresholds. Predetermined thresholds were specified to ensure estimates of acceptable quality and to ensure data confidentiality. For more information see Appendix A of this document.

The selected trades cover nearly 60% of all new registrations in Canada. This coverage varies by jurisdiction and is lowest for Quebec (38%), the territories (39%), and British Columbia (49%). The following table gives these results for all new registrations in 2008.These results will vary for other cohorts.

Few estimates are available in the territories because of small cohort sizes. Quebec and British Columbia were excluded from the Canada- and provincial-level estimates on a number of occasions because of different administrative practices. For more information, see Appendix A of this document.

Table 1
New registrations in all trades versus new registrations in the selected trades in Canada and by jurisdiction, 2008 cohort

New registrations	All trades	Selected trades	Percent
Canada	92,472	54,459	58.9
Newfoundland and Labrador	1,260	963	76.4
Prince Edward Island	231	150	64.9
Nova Scotia	1,470	1,086	73.9
New Brunswick	1,350	1,011	74.9
Quebec	19,452	7,320	37.6
Ontario	25,260	16,362	64.8
Manitoba	2,580	1,767	68.5
Saskatchewan	2,904	2,235	77.0
Alberta	23,133	16,287	70.4
British Columbia	14,544	7,164	49.3
Territories	294	114	38.8

Source: Statistics Canada, RAIS longitudinal (2008 to 2016).

2. The Red Seal Program sets common occupational standards used to assess the skills of tradespersons across Canada in specific trades, referred to as the Red Seal trades. Tradespersons who meet the Red Seal standards, through examination, receive a Red Seal endorsement on their provincial or territorial certificates of qualification.

Appendix A

Table 2
Trades and jurisdictions included in the RAIS statistical tables 37-10-0001-01, 37-10-0016-01 and 37-10-0017-01

Top 14 Red Seal trades[1]	Number of jurisdictions	Jurisdictions that contribute to the indicators available at the Canada level										
Automotive service technician[2,3]	9	N.L.	P.E.I.	N.S.	N.B.	.	Ont.	Man.	Sask.	Alta.	.	Territories
Carpenter	11	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Territories
Construction electrician	11	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Territories
Cook[3]	10	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	.	Territories
Hairstylist[3,4]	8	N.L.	P.E.I.	.	.	Que.	Ont.	Man.	Sask.	Alta.	.	Territories
Heavy-duty equipment technician[2]	10	N.L.	P.E.I.	N.S.	N.B.	.	Ont.	Man.	Sask.	Alta.	B.C.	Territories
Industrial electrician[2,5]	8	N.L.	P.E.I.	N.S.	N.B.	.	Ont.	Man.	.	.	B.C.	Territories
Industrial mechanic (millwright)[2]	10	N.L.	P.E.I.	N.S.	N.B.	.	Ont.	Man.	Sask.	Alta.	B.C.	Territories
Plumber[2]	10	N.L.	P.E.I.	N.S.	N.B.	.	Ont.	Man.	Sask.	Alta.	B.C.	Territories
Refrigeration and air conditioning mechanic	11	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Territories
Sheet metal worker	11	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Territories
Steamfitter/pipefitter[2]	10	N.L.	P.E.I.	N.S.	N.B.	.	Ont.	Man.	Sask.	Alta.	B.C.	Territories
Truck and transport mechanic[2]	10	N.L.	P.E.I.	N.S.	N.B.	.	Ont.	Man.	Sask.	Alta.	B.C.	Territories
Welder[3]	10	N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	.	Territories
Additional trades to better account for women following apprenticeship programs	**Number of jurisdictions**	**Estimates made available only in the following jurisdictions**										
Child and youth worker[6,7]	1	.	.	.	.	.	Ont.	.	.	.	.	.
Developmental service worker[6,7]	1	.	.	.	.	.	Ont.	.	.	.	.	.
Early childhood educator[6,7]	1	.	.	.	.	.	Ont.	.	.	.	.	.
Educational assistant[6,7]	1	.	.	.	.	.	Ont.	.	.	.	.	.
Landscape horticulturist	7	.	.	.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	.
Additional trades for common programs at the jurisdictional level	**Number of jurisdictions**	**Estimates made available only in the following jurisdictions**										
Agricultural equipment technician	1	.	.	.	.	.	.	.	Sask.	.	.	.
Bricklayer	1	.	.	.	.	Que.	.	.	.	.	.	.
Crane operator[6]	1	.	.	.	.	.	.	.	.	Alta.	.	.
Industrial instrumentation and control technician	1	.	.	.	.	.	.	.	.	Alta.	.	.
Painter and decorator	1	.	.	.	.	Que.	.	.	.	.	.	.
Roofer	2	.	.	.	.	Que.	.	.	.	.	B.C.	.

. not available for any reference period

1. While some jurisdictions were able to contribute to the Canada-level results, some jurisdictional-level estimates or estimates for women may not be available because of small cohort sizes that fall below predetermined thresholds. These were specified to ensure estimates of acceptable quality and to ensure the confidentiality of the data.

2. In Quebec, different administrative practices led to the following trades being excluded from the RAIS statistical tables (37-10-0001-01, 37-10-0016-01 and 37-10-0017-01):
Automotive service technician—Quebec does not provide data for this trade as a part of the RAIS.
Heavy-duty equipment technician—No certifications were recorded in the RAIS during the reference period.
Industrial electrician—Certifications were granted immediately upon newly registering for this trade and virtually no discontinuations were observed after twice the program duration.
Industrial mechanic (millwright)—No certifications were recorded in the RAIS during the reference period.
Plumber—Few new registrations and certifications were recorded in the RAIS during the reference period.
Steamfitter/pipefitter—No certifications were recorded in the RAIS during the reference period.
Truck and transport mechanic—Apprenticeship training is not offered in Quebec.

3. In British Columbia, different administrative practices led to the following trades being excluded from the RAIS statistical tables (37-10-0001-01, 37-10-0016-01 and 37-10-0017-01):
Automotive service technician—In 2009, this four-year program was divided into four one-year programs (with certificates granted at the end of each year completed); this has an impact on comparisons over time and with other jurisdictions.
Cook—In 2009, this three-year program was divided into three one-year programs (with certificates granted at the end of each year completed); this has an impact on comparisons over time and with other jurisdictions.
Hairstylist—The Red Seal exam was not offered prior to 2014, which resulted in virtually no certifications being granted in this province during the reference period.
Welder—Apprentices who newly register in this trade in British Columbia have already completed the required training; certificates are therefore granted almost immediately upon newly registering.

4. Hairstylist is not a designated trade in Nova Scotia or New Brunswick. See Section 3 for the definition of a designated trade.

5. Industrial electrician is not a designated trade in Saskatchewan or Alberta. See Section 3 for the definition of a designated trade.

6. Not all trades included in the RAIS statistical tables (37-10-0001-01, 37-10-0016-01 and 37-10-0017-01) are Red Seal. Non–Red Seal trades include.
Ontario: child and youth worker, developmental service worker, early childhood educator and educational assistant
Alberta: crane operator includes all four branches of the Alberta trade, both Red Seal and non–Red Seal—boom truck, tower crane and wellhead boom are non–Red Seal; mobile crane is Red Seal.

7. Child and youth worker, developmental service worker, early childhood educator and educational assistant are designated trades only in Ontario. See Section 3 for the definition of a designated trade.

Source: Statistics Canada, RAIS longitudinal (2008 to 2016).

Appendix B

Table 3
Program durations for Canada-level estimates, RAIS statistical table 37-10-0001-01

Trades available at the Canada level[1]	Canada program duration	Program duration of jurisdictions that contribute to the trades available at the Canada level										
		N.L.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Territories
Automotive service technician	4	4	4	4	4	.	4	4	4	4	.	4
Carpenter	4	4	4	4	4	3	4	4	4	4	4	4
Construction electrician	4	4	4	4	4	4	5	4	4	4	4	4
Cook[2]	4	3	3	3	3	2	4	3	3	3	.	3
Hairstylist[3]	2	2	3	.	.	2	2	2	2	2	.	2
Heavy-duty equipment technician	4	4	4	4	4	.	4	4	4	4	4	4
Industrial electrician[3]	4	4	4	4	5	.	5	4	.	.	4	4
Industrial mechanic (millwright)	4	4	4	4	4	.	5	4	4	4	4	4
Plumber	4	4	4	4	4	.	5	5	4	4	4	4
Refrigeration and air conditioning mechanic	4	4	4	4	4	4	5	5	4	4	4	4
Sheet metal worker	4	4	4	4	4	3	5	4	4	4	4	4
Steamfitter/pipefitter	4	4	4	4	4	.	5	5	4	3	4	4
Truck and transport mechanic	4	4	4	4	4	.	4	4	4	3	4	4
Welder[3]	3	3	3	3	3	2	4	3	3	3	.	3
Landscape horticulturist	4	.	.	.	3	3	4	3	4	4	4	.

. not available for any reference period

1. Throughout the reference period, there are some instances where the program duration of the selected trades fluctuates over the years. While the above table represents the most up-to-date durations reported for the trades available at the Canada level, changes in program durations for all selected trades are shown in the RAIS table (37-10-0001-01).

2. While the majority of jurisdictions offer a three-year program for the cook trade, the majority of apprentices come from Ontario, which offers a four-year program. Therefore, the Canada program duration for the cook trade was edited to four years.

3. Consistency edits were made to the following trades at the jurisdictional level where multiple program durations occurred within the same year:
In 2014 and 2015, the hairstylist trade in Quebec was offered as a two- and three-year program. This was edited to be only a two-year program in these years.
In 2010 and 2011, the welder trade in Quebec was offered as a two- and three-year program. This was edited to be only a two-year program in these years.
In 2009, the industrial electrician trade in Ontario was offered as a four- and five-year program. This was edited to be only a five-year program in this year.

Source: Statistics Canada, RAIS longitudinal (2008 to 2016).