

A close-up photograph of a construction worker wearing a plaid shirt and a high-visibility yellow safety vest. The worker is holding a blue hard hat in their hands. The background is blurred, showing other people in a similar setting.

Disability, Apprenticeship Access, Outcomes, and Future Income Earnings

EXPLORATION OF POSTSECONDARY PATHWAYS AND APPRENTICESHIP:
A Series of Analyses of TDSB linked to Education and Labour Market Longitudinal Platform (ELMLP) Data

Report #1

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May 2024

Published by:

The Ontario Council on Articulation and Transfer (ONCAT) |
Conseil Ontarien pour l'articulation et le transfert (CATON)

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Copyediting services provided by Beth McAuley, The Editing Company.

Brown, R., Walters, D., Parekh, G., Collis, R., Mishra, C., Abdulkarim, F. (2024).
Disability, apprenticeship access, outcomes, and future income earnings: Report 1.
Ontario Council on Articulation and Transfer.



Funding to support this report was provided by ONCAT (Ontario Council on Articulation and Transfer). The opinions, findings, conclusions, and recommendations expressed are those of the authors and do not necessarily reflect the views of ONCAT or the Government of Ontario.

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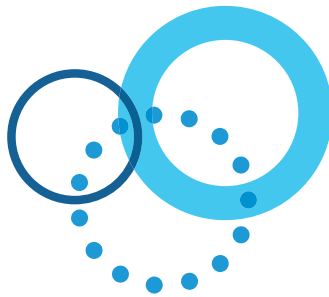


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Overview of Series of Reports

There were five associated analyses, organized into three reports. Report 1 looks at apprenticeship and disability, with the TDSB Grade 9 cohort dataset. Report 2 looks at issues of transfer as related to apprenticeship, with the TDSB Grade 9 cohort dataset. Report 3 examines transfer and apprentice completion in the context of a population of Ontario apprentices.

Report 1: Focus on Apprenticeship and Disability (TDSB Grade 9 Cohort Dataset)

1. Descriptives of the TDSB Grade 9 cohorts 2003-2009. This focused on the full Grade 9 cohort dataset, with detailed examination of both apprentices and other TDSB students in the six cohorts, starting in Grade 9 between 2003 and 2009, that is, $N = 101,590$. This included students not in the regression – those who did not graduate from high school and postsecondary programs.

2. Regression of students in the TDSB Grade 9 cohort dataset who started Grade 9 between Fall 2003 and Fall 2009. A series of regression models were used to predict earnings among trades graduates, while also controlling for important sociodemographic predictors, including (a) high school performance of all students who matched the RAIS (apprentice) dataset to 2020; (b) those who graduated from the TDSB but did not go to the postsecondary level, according to TDSB records; (c) university graduates (first credential to 2020-2021 according to PSIS); (d) college graduates (first credential to 2020-2021 according to PSIS); and (e) university or college graduates who transferred to postsecondary institutions prior to completion of their first credential (according to PSIS).

Report 2: Focus on Transfer TDSB Grade 9 Cohort Dataset

1. Descriptive tables on apprentice transfer. This looked at TDSB apprentices in the 2003-2009 cohorts in terms of 12 categories (combining categories of apprenticeship and postsecondary education). The focus was on “transfer,” which was defined as apprentices who had some amount of postsecondary education but had not graduated from that program, that is, $N = 3,840$ TDSB apprentices in the Grade 9 cohorts 2003-2009 (according to RAIS data to 2020).

2. Regression on apprentice transfer. This regression was also based on the same group of TDSB apprentices ($N = 3,840$) in the Grade 9 cohorts 2003-2009 (according to RAIS data to 2020).

Report 3: Descriptive tables and mean income tables of Ontario apprentices.

This focused on the 90,000 apprentices born between 1990 and 1995 for Ontario (there was a subcategory of TDSB cohort students). Note that this used the just-available update of RAIS, from 2020 to 2021, whereas the first three analyses used the earlier 2020 RAIS.

Executive Summary

The purpose of this report is to provide a detailed examination of apprentices who started Grade 9 between 2003 and 2009 in the Toronto District School Board. The analyses involve a comprehensive set of descriptive statistics that also includes those who did not graduate from high school or postsecondary programs. We also performed a series of regression models to predict earnings among apprenticeship graduates, while also controlling for important sociodemographic predictors, including high school performance. These analyses include those who graduated from the TDSB and: a) did not go to college or university; (b) graduated from university; (c) graduated from community colleges; and (d) graduated from university or college but transferred across postsecondary institutions. Central to these analyses is a comparative focus on the school-to-work transitions of students with disabilities.

The results of this study reveal that while graduates with Red Seal certificates clearly earn more than all other groups in our analyses, graduates of non-Red Seal programs and continuers who have not yet received their certificates also have earnings that are comparable to those who completed university undergraduate degree programs. It is important to note that we have examined only early career earnings; we do not know if apprenticeship certificate holders will continue to have earnings comparable to university graduates as their careers progress. We also found that students with disabilities enter apprenticeship programs at higher rates than college or university programs, and our regression analyses reveal that the difference in earnings between those with and without disabilities is negligible among those who enter trades programs, both Red Seal and non-Red Seal. In contrast, there is a sizable gap in earnings between those with and without disabilities among community college graduates, and especially among university degree holders. These findings hold even after controlling for sociodemographic characteristics and academic performance. The limitations of our study and suggestions for future research are discussed.

The apprenticeship landscape in Ontario

In Ontario, there are 144 registered trades, of which 23 are compulsory (Chatoor & Kaufman, 2020). Of the 144 registered trades, 51 are listed as Red Seal on the province's Skilled Trades Ontario website¹ under its Trades Information page (<https://www.skilledtradesontario.ca/about-trades/trades-information/Trades> Information, 2023). In contrast, workers do not need to be a registered apprentice or certified journeyperson to work in a voluntary trade (one that is not compulsory). In a compulsory trade, however, only a registered apprentice, Provisional Certificate of Qualification holder, or Certificate of Qualification holder can legally work in the trade. A Provisional Certificate of Qualification (<https://www.skilledtradesontario.ca/apprenticeship/provisional-certificate-of-qualification/>) is awarded to someone who has finished their apprenticeship but has not yet written the exam for a full Certificate of Qualification, and it is valid for one year².

In the voluntary trades, there is no major advantage to having the Certificate of Qualification as there is in the compulsory trades because it is not required to work legally. It is still required

1 See <https://www.skilledtradesontario.ca/about-trades/trades-information/>

2 See <https://www.skilledtradesontario.ca/apprenticeship/provisional-certificate-of-qualification/>

to train apprentices as a journeyperson, and the Skilled Trades Ontario website claims there are “many career benefits” in non-compulsory trades³ (<https://www.skilledtradesontario.ca/about-trades/work-in-the-non-compulsory-trades/>) but does not specify these. The website also claims it “can help you get better pay, more job opportunities and more responsibility” when you finish your apprenticeship (<https://www.skilledtradesontario.ca/apprenticeship/finishing-an-apprenticeship/>)⁴, but again offers limited details. The responsibility may refer to the ability to supervise an apprentice. Before the closure of the College of Trades January 1, 2022, Certificate of Qualification holders in the voluntary trades were listed on the public register, but under Skilled Trades Ontario only apprentices and journeypersons in the compulsory trades are listed. There appears to be no literature on benefits or drawbacks to having a Certificate of Qualification in a voluntary trade.

Overview of entry and completion trends

While apprenticeships are often seen as a post-high school pathway, in Canada more people enter the trades from the workforce or from postsecondary education (PSE) rather than directly from high school (Refling & Dion, 2015). In Canada, roughly half of apprentices are between the ages of 20 and 29 and more than 30% are 30 years of age or older (Refling & Dion, 2015). With an average age over 30, they tend to be older than college and university students and older than apprentices in other countries (Laporte & Mueller, 2011; MacDonald-Jenkins & Cornish, 2015). Of the four trade groups (construction, industrial, motive-power, and service) in Ontario, the group with the highest percentage of high school entrants was industrial with 35% (Chatoor & Kaufman, 2020). Apprenticeship programs vary in length (even for the same trade in different provinces/territories), but “the most common program duration at the national level is four years” (Zeman, 2023, p. 5). The most recent information on completion is for the cohort that began their apprenticeships in 2014. Of this group, 21% completed their apprenticeships within the expected timeframe, rising to 34% in 1.5 times the expected timeframe (Zeman, 2023, p. 5). (See the appendix for further details of this factor.)

Factors relating to selecting and completing apprenticeships

Several factors appear to play a role in both the selection and completion of apprenticeships. Family status has a role in students choosing to enter an apprenticeship. Students who completed a bachelor’s degree or a higher postgraduate degree tended to have wealthier parents than students pursuing apprenticeships. For instance, parents of those who completed a bachelor’s degree or above had a 64% higher income than the parents of apprentices who completed their training (\$110,000 vs. \$67,000) (Chatoor & Kaufman, 2020, p. 31). Of students who attended non-university PSE, 43% had two Canadian-born parents, as opposed to one immigrant parent (33%) or two immigrant parents (28%) (Lennon et al., 2011, p. 8). Additionally, first-generation students made up 49% of apprentices who completed their certificates, compared to 39% of college and 28% of university graduates (Chatoor & Kaufman, 2020, p. 11). Gender also appears to play a large role in directing which trades students choose for their

3 See <https://www.skilledtradesontario.ca/about-trades/work-in-the-non-compulsory-trades/>

4 See <https://www.skilledtradesontario.ca/apprenticeship/finishing-an-apprenticeship/>

apprenticeship training. In the service trades, women make up 64% of those enrolled, but they make up less than 3% in the other trades (Chatoor & Kaufman, 2020, p. 31).

The relationship between apprenticeships and postsecondary programs

For most trades in Ontario, apprentices “spend the better part of a year learning on the job (80%), then switch to in-class study for eight to 12 weeks (20%),” which is known as block release (Chatoor & Kaufman, 2020, p. 5). An alternate method, known as day release, involves “in-class instruction one day or two evenings per week from September to June” (Refling & Dion, 2015, p. 31). The mandatory in-class portion is usually offered through a college or union training centre under skilled instructors within the trade. Depending on the trade, this process of alternating job and classwork takes two to five years to complete (Chatoor & Kaufman, 2020, p. 6). As the apprentice engages in their on-site learning, they log their hours with the central authority which will inform them when it is time for them to move to their in-class training (“roughly 1,600 hours under the supervision of a certified journeyperson, according to the ratios of apprentice-to-journeyperson set out by the trade”) (Canadian Chamber of Commerce, 2013, p. 17; see also Chatoor & Kaufman, 2020).— in Ontario this is usually done at a public college.

In general, potential apprentices do not apply to a college program. After finding a sponsoring employer, potential apprentices register with the Ministry of Labour, Training and Skills Development and begin their on-the-job training. Only after they log sufficient hours do they receive their Offer of Classroom Training letter and apply for a seat at a college for training⁵. Some programs, at some colleges, offer an Ontario College Certificate (OCC) credential upon completion of all the in-class training. Durham College, for example, describes this as being “recognized by Ontario’s 24 colleges and beyond, an OCC can expand your options for post-secondary studies in the future and streamline your pathway to a diploma” (Durham College, para 4)⁶.

There are a limited number of programs called Co-op Diploma Apprenticeship Programs in which the apprentice graduates with a college diploma as well as the ability to write their qualifying exam (if applicable). In these programs, the student must apply to the college, meet all requirements for both the apprenticeship and the co-op program (which vary by college and program), and only register their apprenticeship with the Ministry of Labour, Training and Skills Development at the start of their work placement (Ministry of Advanced Education and Skills Development, 2017).

Disability and apprenticeships

Earlier research from the Toronto District School Board suggests that disabled secondary students may be encouraged to pursue apprenticeship opportunities (Parekh, 2013). However, disabled apprentices in Canada often encounter barriers to completing their certification. For instance, apprentices were reluctant to ask for accommodations due to embarrassment or from concerns that this would harm their relationship with the employer, and in many cases they would rather leave than ask (Canadian Apprenticeship Forum, 2009; Hansen & Hondzel, 2015).

5 See <https://www.algonquincollege.com/ro/apprenticeships/apprentice-program-availability/>

6 See <https://durhamcollege.ca/programs-and-courses/apprenticeships>

Disabled apprentices reported needing more accommodations during the in-class portion of their training than the on-site component, such as “audio modules, tutors, taping lectures, and readers for exams” (Canadian Apprenticeship Forum, 2009, p. 40). On the workplace side, employers are reluctant to take on disabled apprentices over concerns about profitability, perceiving disabled apprentices as “underqualified or incapable of performing a full range of duties” (Hansen & Hondzel, 2015, p. 24). Employers were also concerned with safety, additional supervision time, customer opinion, keeping their business competitive in their sector, the work being too demanding to accommodate disabled apprentices, and limited or no return on training investment (Canadian Apprenticeship Forum, 2009). Funding for colleges to provide for accommodations is available through the Support for Apprentices with Disabilities fund (Sweet et al., 2012). Employers participating in the Canadian Apprenticeship Forum study noted that in practice the cost of providing accommodations was not prohibitive, and not only were disabled apprentices’ productivity rates similar to other workers but also they were more reliable, had better retention rates and attendance, and took fewer sick days. In addition, when employers created a workplace culture where people felt comfortable to ask for support, it allowed apprentices to focus on their work and gain confidence (Canadian Apprenticeship Forum, 2009).

Methods

Data and Sample

The original data for this study comes from linking four large datasets: the Toronto District School Board's (TDSB) Grade 9 Cohort Dataset, and three datasets from Statistics Canada's Education and Labour Market Longitudinal Platform. These three datasets are the Registered Apprenticeship Information System (RAIS), the Postsecondary Student Information System (PSIS), and the T1 Family File (T1FF).

The Toronto District School Board's Grade 9 Cohort Dataset includes administrative data which starts from Grade 9 and continues throughout students' secondary school careers with the TDSB for up to five years. The Registered Apprenticeship Information System includes data on apprentices who are taking or have taken in-class or on-the-job training towards either a Red Seal or non-Red Seal trade, and whether they gained a certificate in that trade. The Postsecondary Student Information System includes data on the programs and outcomes of all students who have attended Canadian universities and colleges. The T1 Family File includes income information that comes from Canadian income tax records.

Section 1: Overview of Apprenticeship

Frequencies and Descriptives

Overall postsecondary outcomes. Table 1 provides an overview of all postsecondary outcomes in Ontario up to 2021, which include students who started Grade 9 in the TDSB between 2004 and 2009 (N = 101,590). Overall, three quarters (74.2%) of students were pursuing college or university education, with over half of the full population (57.2%) graduating from their college or university programs. Of all students, 4.5% had been pursuing apprenticeships, with 1.1% of the full population acquiring an apprenticeship certificate.⁷

TABLE 1
All Postsecondary Outcomes to 2021

Red seal certificate	0.7%
Non-red seal certificate	0.4%
Continuer apprentice	1.7%
Early leaver apprentice	1.7%
No PSE but HS graduate	7.7%
University graduate no mobility	40.7%
College graduate no mobility	9.3%
PSE transfer graduate	7.2%
High school nongraduate, no postsecondary	13.6%
University nongraduate	9.8%
College nongraduate	7.2%

⁷ As will be seen below in Table 2, approximately half of TDSB apprentices also attended postsecondary institutions in Canada, according to PSIS records.

Relationship between apprenticeship and PSE graduation. Apprentices who acquired a Red Seal certificate were the least likely to have also attended college or university (57.4%). Apprentices continuing their apprenticeships were the most likely (53.8% having attended or graduated from a college or university). Across postsecondary graduation categories, apprentices were least likely to graduate university (6.1%) than graduate college (20.6%). Approximately a quarter of apprentices pursued college or university education but did not graduate (24.1%) (Table 2).

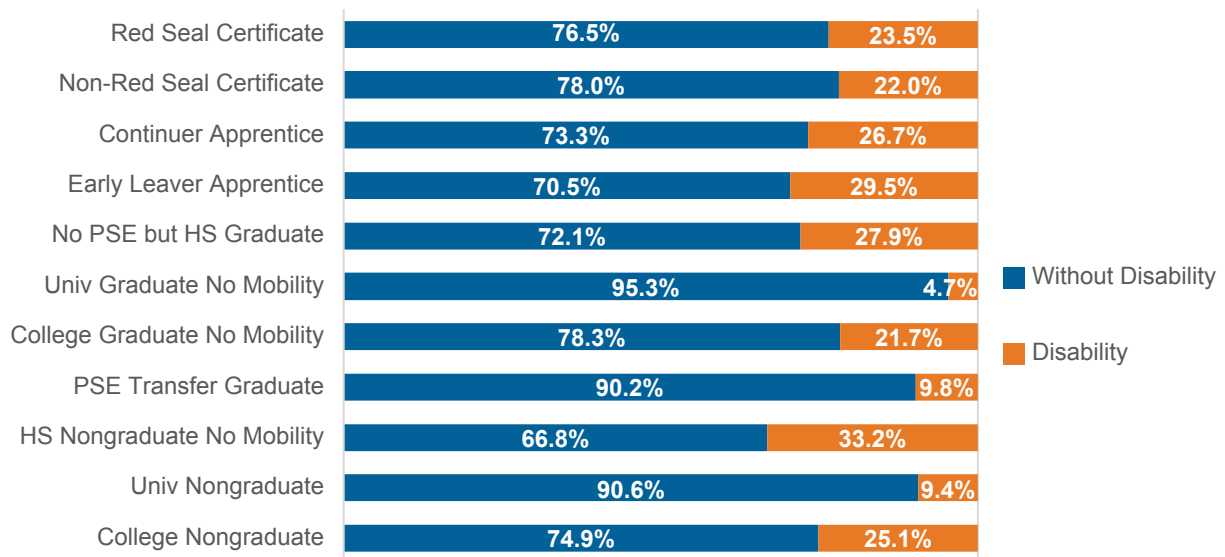
TABLE 2
Apprenticeship and Postsecondary Graduation to 2020

	No post- secondary	Postsecondary, didn't graduate	Graduated college	Graduated university
Red seal certificate	57.4%	19.1%	19.1%	4.4%
Non-red seal certificate	51.2%	22.0%	19.5%	7.3%
Continuer apprentice	46.2%	25.7%	21.1%	7.0%
Early leaver apprentice	48.3%	25.0%	21.0%	5.7%
All apprenticeship categories	49.1%	24.1%	20.6%	6.1%

Student demographics

Disability and postsecondary outcomes. Although the full sample had 15.2% of students with disability, only 4.7% of students graduated from the university program in which they had enrolled; 9.4% of students who attended university but did not graduate; and 9.8% of students who were PSE transfer graduates were disabled. The rate of disability was higher among students pursuing college and apprenticeship programs, and highest among students who did not graduate from high school (Figure 1).

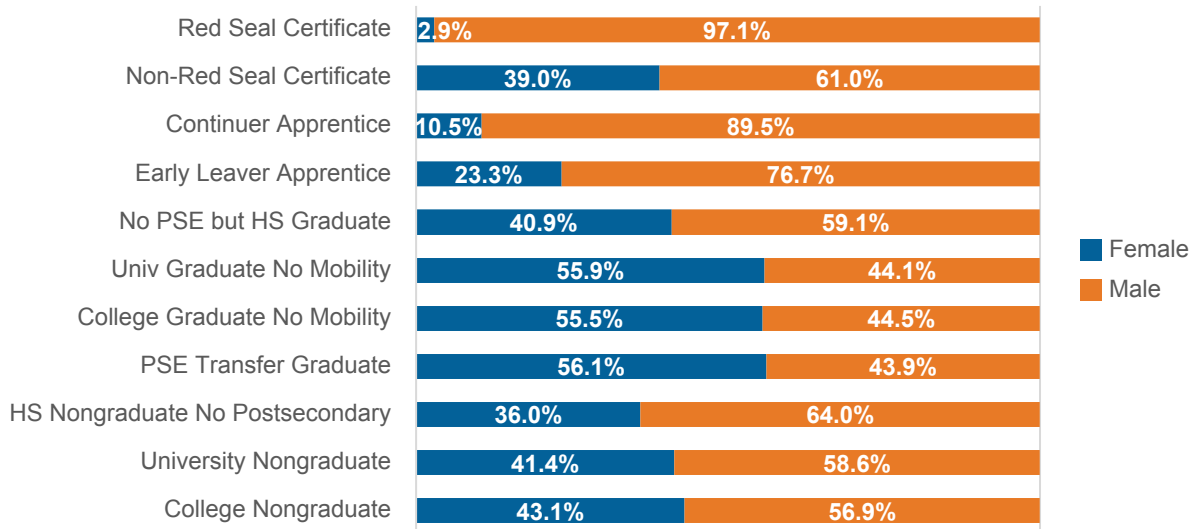
FIGURE 1
All Postsecondary Outcomes by Disability⁸



8 Individuals were coded as having a disability if they were accessing special education services (excluding gifted students) within the TDSB (see also p. 16).

Gender and postsecondary outcomes. University, college, and PSE transfer graduates were more likely to be female, with male students overrepresented among students who pursued university and college but did not graduate. Male students are disproportionately high among students pursuing apprenticeships, with only 10.5% of students continuing in an apprenticeship program and 2.9% of Red Seal certificate graduates identifying as female (Figure 2).

FIGURE 2
All Postsecondary Outcomes by Gender



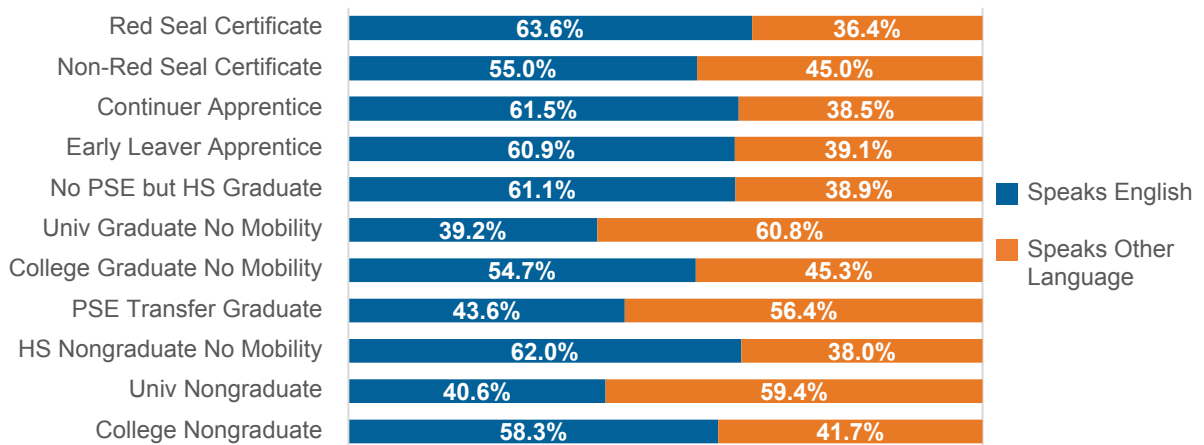
Income and postsecondary outcomes. Income is closely linked to PSE pathways and outcomes. For instance, university graduates (no mobility) are more likely to come from higher income neighbourhoods with 37% coming from the three highest income deciles. Conversely, 42% of students who did not complete high school live in the lowest income deciles. Interestingly, college nongraduates, early leaver apprentices, and students who only have a high school education also tend to live in lower-income neighbourhoods. Of the apprenticeship pathways, students who earned a Red Seal certificate were just as likely as university graduates to live in the three lowest income deciles (22%) and were also skewed towards higher income deciles (Table 3).

TABLE 3
All Postsecondary Outcomes by Deciles of Neighbourhood Income

	Lowest Decile					Highest				
	1	2	3	4	5	6	7	8	9	10
Red Seal Certificate	6%	7%	9%	9%	12%	10%	12%	12%	12%	10%
Non-Red Seal Certificate	10%	10%	10%	12%	12%	10%	10%	7%	10%	10%
Continuer Apprentice	12%	10%	9%	9%	11%	11%	10%	10%	10%	8%
Early Leaver Apprentice	13%	13%	11%	12%	10%	12%	9%	9%	8%	6%
No PSE but HS Graduate	13%	12%	11%	10%	10%	11%	10%	8%	8%	7%
Univ Graduate No Mobility	7%	7%	8%	9%	9%	11%	10%	11%	12%	14%
College Graduate No Mobility	11%	11%	10%	10%	10%	11%	10%	9%	10%	8%
PSE Transfer Graduate	9%	9%	9%	10%	10%	11%	10%	10%	11%	11%
HS Nongraduate No-Postsecondary	15%	14%	13%	10%	10%	10%	8%	8%	6%	5%
University Nongraduate	9%	10%	10%	10%	11%	11%	9%	10%	10%	10%
College Nongraduate	14%	11%	11%	11%	10%	11%	9%	9%	8%	6%
Total	10%	9%	10%	10%	10%	11%	10%	10%	10%	10%

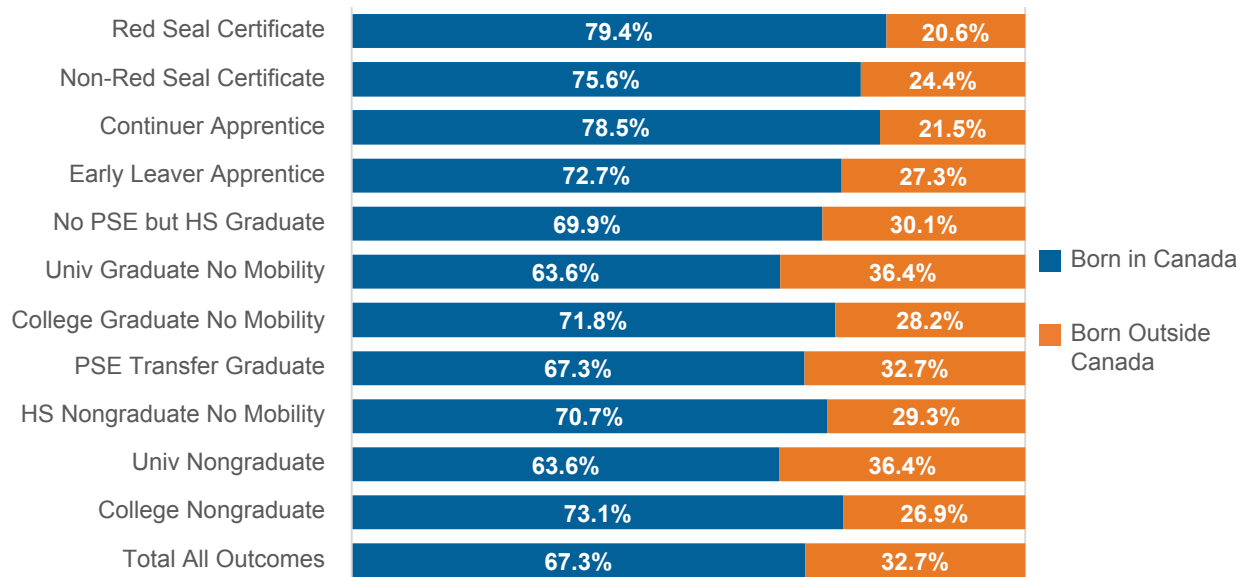
Language and postsecondary outcomes. The only pathway in which students were least likely to speak only English were PSE transfer graduates as well as university graduates and nongraduates. The pathways in which students were most likely to speak only English were Red Seal certificate graduates (63.6%) (Figure 3).

FIGURE 3
All Postsecondary Outcomes by Speaking English or Another Language



Students' place of birth and postsecondary outcomes. The proportion of students who were born outside of Canada nearly reaches or surpasses a third of the population of students who are pursuing university studies (graduates, nongraduates, and PSE transfer graduates). The pathway with the lowest proportion of students born outside of Canada are Red Seal certificate graduates (20.6%) (Figure 4).

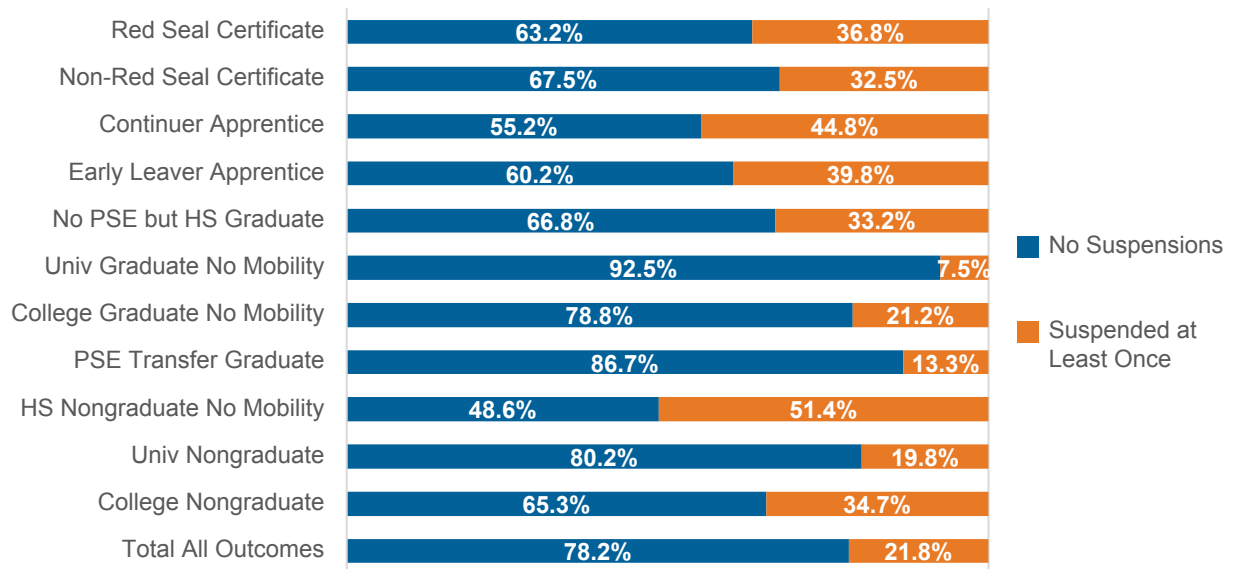
FIGURE 4
All Postsecondary Outcomes by Born Inside and Outside of Canada



School-based experiences

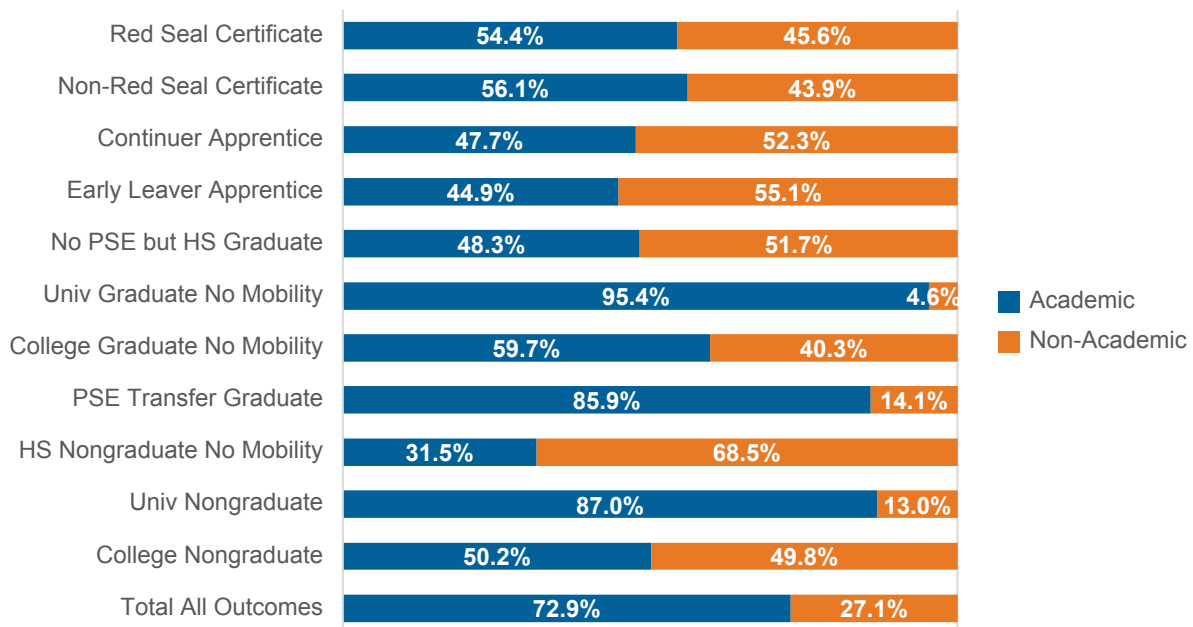
Public school suspensions and postsecondary outcomes. There are varied experiences of suspension across postsecondary pathways. At one end of the spectrum, students who graduated university (no mobility) had a suspension rate of 7.5%; on the other end, over half (51.4%) of students who did not graduate high school had been suspended. Overall, students pursuing university-related pathways (graduate, nongraduate, and PSE transfer) had the lowest suspension rates, with three of the four apprenticeship pathways having the second, third, and fourth highest rates of suspension (Figure 5).

FIGURE 5
All Postsecondary Outcomes by Cumulative Suspensions to End of High School



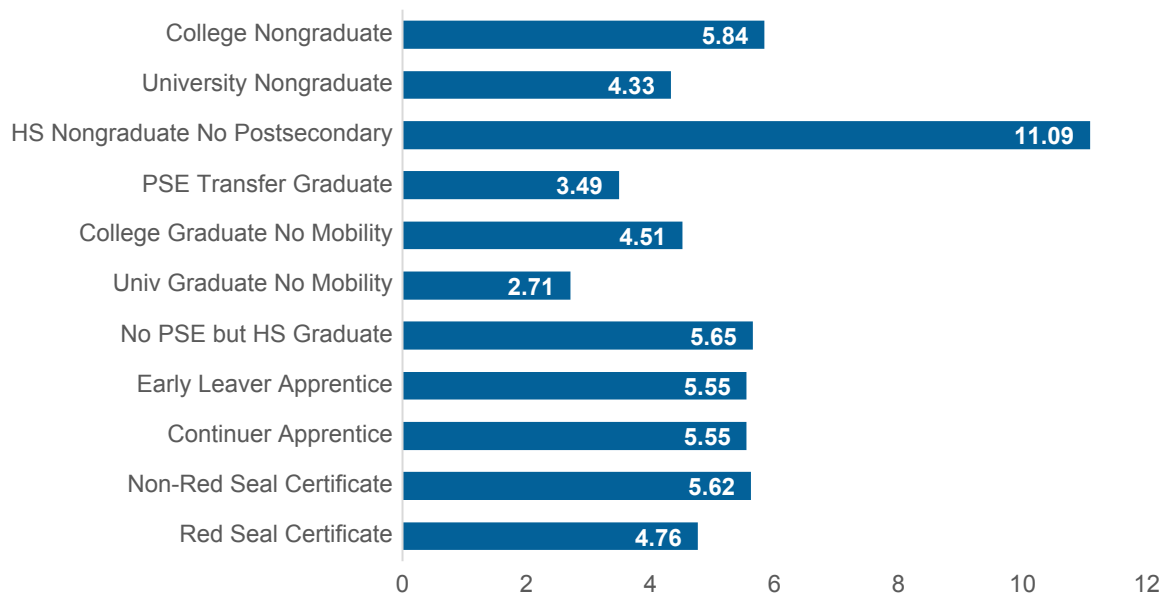
Secondary school program of study and postsecondary outcomes. Program of study has been evidenced to be an important measure of students' academic outcomes. Until recently, students entering Grade 9 could pursue courses at the Academic, Applied, or Locally Developed levels, with Academic being the most rigorous and connected to increased access to college and university (Quan & James, 2017). Students pursuing university-related pathways (graduate, nongraduate, and PSE transfer) were the most likely to pursue Academic level programming in Grade 9, with university graduates accessing Academic level programming at a rate of 95.4%. College-related pathways had students accessing Academic level programming in Grade 9 at a rate between 50.2% (nongraduates) and 59.7% (graduates). Similar rates were found for students who attained Red Seal (54.4%) and non-Red Seal (56.1%) apprenticeship certificates, leaving high school graduates, as well as apprenticeship continuers and leavers, between 44.9% and 48.3%. Less than a third of students who did not graduate high school pursued the majority of their Grade 9 courses at the Academic level (Figure 6).

FIGURE 6
All Postsecondary Outcomes by Grade 9 Program of Study



Grade 9 absenteeism and postsecondary outcomes. Students pursuing university-related pathways had the lowest rates of absenteeism. Conversely, students who did not graduate high school had the highest. College nongraduates, non-Red Seal certificate graduates, continuer and early leaver apprentices, and high school graduates who did not pursue PSE had similar rates of absenteeism in Grade 9 (Figure 7).

FIGURE 7
All Postsecondary Outcomes by Means of Grade 9 Absenteeism



Achievement Variables

Grade 9 credit accumulation and postsecondary outcomes. In Ontario, students are expected to acquire eight high school credits by the end of Grade 9. Failure to acquire eight credits within this time frame has shown to be a significant predictor of future academic outcomes (Brown et al., 2021). As earlier research has shown, credit accumulation has a relationship to postsecondary outcomes. Students pursuing university-related pathways (graduate, nongraduate, and PSE transfer) were the most likely to have acquired eight credits by the end of Grade 9. The next group most likely to reach this achievement milestone were students who acquired a Red Seal certificate (70.6%) (Table 4).

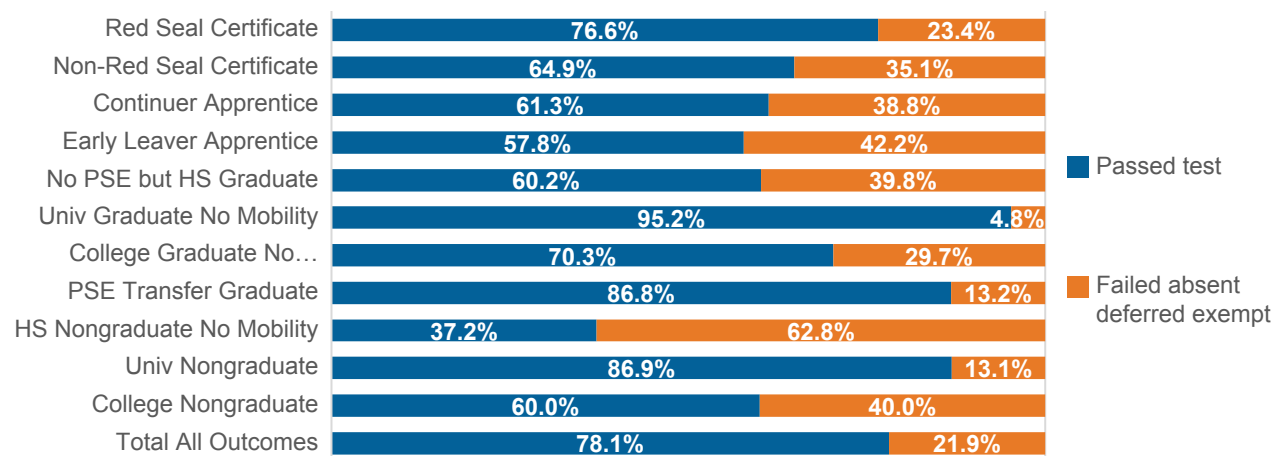
TABLE 4
All Postsecondary Outcomes by Grade 9 Credit Accumulation

	7 or fewer credits	8 credits	9 plus credits
Red seal certificate	25.0%	70.6%	4.4%
Non-red seal certificate	26.8%	68.3%	4.9%
Continuer apprentice	34.9%	60.5%	4.7%
Early leaver apprentice	35.8%	60.8%	3.4%
No PSE but HS graduate	33.7%	60.8%	5.5%
University graduate no mobility	2.9%	84.5%	12.6%
College graduate no mobility	23.0%	71.8%	5.2%
PSE transfer graduate	9.1%	81.0%	9.9%
High school nongraduate no postsecondary	69.9%	28.5%	1.6%
University nongraduate	14.8%	77.0%	8.2%
College nongraduate	38.5%	57.6%	3.9%
Total all outcomes	21.7%	70.1%	8.3%

Grade 10 literacy test and postsecondary outcomes. In Ontario, all high school graduates must pass a literacy test, typically offered in Grade 10, called the Ontario Secondary School Literacy Test (OSSLT). Some students are offered the opportunity to take a course in place of the test, but most often, the OSSLT is a mandatory assessment. As with credit accumulation, the four groups with the highest pass rate were the three university-related pathways –graduate (95.2%), nongraduate (86.9%), and PSE transfer (86.8%) – and students who completed a Red Seal certificate. Students with the lowest OSSLT pass rate were students who did not graduate high school (37.2%), students who were enrolled but did not graduate college (60%), and students who left their apprenticeships before completion (57.8%) (Figure 8).

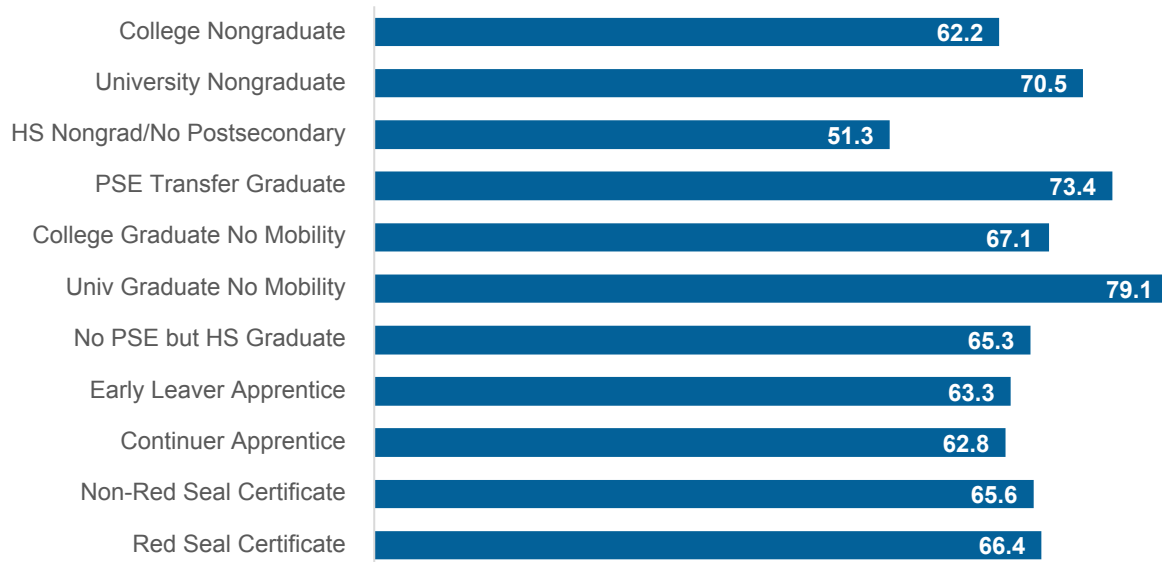
FIGURE 8

All Postsecondary Outcomes by Grade 10 Ontario Secondary School Literacy Test (OSSLT)



Average Grade 9 marks and postsecondary outcomes. Students pursuing university-related pathways were more likely to have higher average Grade 9 marks, ranging from 70.5 for university nongraduates, to 73.4 for PSE transfers, and 79.1 for university graduates. The next group of students with the highest average marks in Grade 9 were the Red Seal certificate graduates. The remaining college and apprenticeship pathway students had average marks that ranged in the 60s, with students who did not complete high school having an average Grade 9 mark of 51.3 (Figure 9).

FIGURE 9
All Postsecondary Outcomes by Means of Grade 9 Marks



Section 2. Regression Examining Apprenticeship and Disability

Data and Sample

As noted above, the original data for this study comes from linking four large datasets: the Toronto District School Board's (TDSB) Grade 9 Cohort Dataset, and three datasets from Statistics Canada's Education and Labour Market Longitudinal Platform. These three datasets are the Registered Apprenticeship Information System (RAIS), the Postsecondary Student Information System (PSIS), and the T1 Family File (T1FF).

The sample for this study consists of all TDSB students from the 2004-2009 Grade 9 cohorts who fall into one of these categories (for a total of 61,070 students):

- graduated from the TDSB but who have no record of postsecondary education or training in Canada following their high school diploma,
- have some apprenticeship experience or credential based on the RAIS dataset, whether they completed their program or not,
- graduated from a Canadian college or university with only one credential (anyone with more than one credential was excluded)
- graduated from a Canadian college or university but attended more than one institution for their one credential (transfer students⁹).

Variables

Dependent. The dependent variable for this study was the natural log of the total income, which was obtained from the individual's income tax record for 2020 (if 2020 was missing, we used earlier records adjusted for inflation to 2020 dollars). As is standard practice in the literature predicting income, we used a natural log of income to reduce the impact of outliers and to normalize the distribution of the dependent variable.

Independent. The two key independent variables for this study were students' postsecondary education or training pathway, and whether they were identified as having a disability. The postsecondary education and training variable was created from a combination of the PSIS and RAIS data, and has eight categories:

- graduates of a Red Seal trades program
- graduates of a non-Red Seal trades program
- currently enrolled in an apprenticeship program (continuer)
- began an apprenticeship program but stopped the program before completing it (early leaver)

9 This regression did not include students who did not complete high school, nor students who started postsecondary but did not graduate. Therefore the sample size of 61,070 is lower than the full sample of 101,590 in the TDSB Grade 9 cohort dataset.

- university graduates with only one degree
- college graduates with only one credential
- completed either a university or college program but who made at least one transfer during their one credential (transfer graduates)
- individuals who graduated from the TDSB but did not pursue any postsecondary education or training (no PSE)

Disability status is treated as a binary variable (0 = no, 1 = yes). Individuals were coded as having a disability if they were accessing special education services (excluding gifted students) within the TDSB.

Demographics and Controls

Sociodemographic data and other information about student characteristics and previous academic achievement were derived from the TDSB dataset and used as control variables in our models because they have been identified in prior research as important predictors in school-to-postsecondary transitions (e.g., Brown, 2010; Brown et al., 2021; Robson et al., 2019). The sociodemographic variables included whether the student spoke English only or also spoke another language (0 = English only, 1 = another language), whether they were born in Canada (0 = yes, 1 = no), their gender (0 = female, 1 = male), and their age when starting Grade 9 (0 = 14 or younger, 1 = 15 or older). The average income decile of the neighbourhood in which students lived during high school was derived from their postal code in the TDSB dataset, and was treated as a conceptually continuous variable. The variables related to their high school experience included whether the student had ever been suspended (0 = never, 1 = at least once in elementary or high school), whether they passed the Grade 10 Ontario Secondary School Literacy Test (OSSLT) on the first attempt (0 = yes, 1 = no), a three-category variable for the number of course credits accumulated in Grade 9 (7 or fewer, 8, or 9 or more), and a variable which indicated whether students were enrolled in an academic or non-academic stream in Grade 9. Lastly, there were two conceptually continuous variables related to academics: the percentage of days that a student was absent from school during Grade 9 (1 = 0–2%, 2 = 3–5%, 3 = 6–10%, 4 = 11–20%, and 5 = 21% or higher), and their overall average mark in Grade 9, as a percentage.

In the regression models, the variables capturing neighbourhood income, Grade 9 absenteeism, and Grade 9 average were treated as conceptually continuous. All other variables were treated as categorical, and the reference categories were provided in the regression table.

Results

This study employed a series of ordinary least squares regression models, which predicted the average (2020) taxable income based on postsecondary education or training pathway and disability status, with and without controls. The sociodemographic variables included language use, country of birth, gender, age when starting Grade 9, and neighbourhood income decile. The secondary school control variables were based on TDSB data and included whether they were ever suspended, whether they passed the Ontario Secondary School Literacy Test (OSSLT) on the first attempt, Grade 9 credit accumulation, Grade 9 academic level, Grade 9 absenteeism, and Grade 9 average marks. Due to space limitations for this report, the effects of the control variables are included in the tables but are not interpreted here.

Pathway and Disability

Table 5 shows the results of the least squares regression models examining the effects of postsecondary education or training and disability on the natural logarithm of income. The estimates in **Model 1** reveal that when comparing individuals with one or fewer postsecondary credentials, graduates of Red Seal trades programs have significantly higher incomes than any of the other postsecondary training or education groups ($p < 0.001$). This effect was still statistically significant in **Model 2**, which also includes the disability variable along with the other sociodemographic controls. The estimates for the disability variable reveal that individuals with disabilities earned less than their peers who do not have a disability ($p < 0.001$). As mentioned above, the estimates for the sociodemographic controls, which have previously been identified as important predictors of earnings, can be found in Table 5. In **Model 3**, which adds the secondary school controls, the effects of both the pathway and disability variables remain statistically significant ($p < 0.001$). Finally, **Model 4** includes the interaction between postsecondary education/training pathway, with disability status. The interaction is statistically significant ($p < .001$) revealing that the effect of disability on income depends on pathway, and vice versa. The estimates reveal that Red Seal trades graduates with no disability earn more than all other groups ($p < 0.001$), with the exception of the Red Seal graduates with disability group ($p = ns$).

For ease of interpretation, the predicted log incomes have been exponentiated to provide an estimate of the average predicted earnings in 2020 dollars for each group¹⁰. The predicted incomes obtained from the regression models, along with their corresponding 95% confidence intervals are provided in **Table 6** and plotted in **Figure 10**. The predicted earnings based on the estimates in Model 2 and Model 3 are calculated holding the control variables constant at typical values¹¹. The overall pattern of earnings is quite similar across all three models, so we will only interpret the values from Model 3. The estimates are rounded to the nearest hundred. As evidenced below, graduates of Red Seal trades programs earn the most (\$64,300), followed by non-Red Seal trades graduates (\$43,800), university graduates (\$39,400), trades program continuers – those still working on a trades program at the end of 2020 (\$39,300), college graduates (\$34,400), transfer graduates (\$34,100), and then trades program early leavers – those who started a trades program but left the program without completing it (\$33,500). The lowest income overall was among those who did not take any form of postsecondary education or training (\$27,700).

Finally, predicted average incomes and corresponding 95% confidence intervals for pathway group by disability status are displayed in **Table 7** and **Figure 11**; they are based on the regression estimates for the interaction between pathway and disability status in Model 4, and are calculated holding the control variables constant at typical values. In sum, the estimates in Figure B reveal that among the four trades program groups there is no statistically significant difference between those with and without disabilities (as evidenced by their overlapping 95%

10 Note that these exponentiated estimates are geometric means, which are closer to the median than to the arithmetic mean; hence our estimates are less sensitive to skewed distributions and outliers than the arithmetic mean would be.

11 Means are used for quantitative variables (i.e., neighbourhood income) and proportions are used for categorical variables.

confidence intervals); however, among the other four groups (the three higher education pathways and the no postsecondary pathway), those with disabilities do earn significantly less than their peers without disabilities.

The predicted average incomes are relatively similar (and the differences are not statistically significant) for those who did not have a disability versus those with, for Red Seal trades graduates (\$63,900 vs. \$61,800), non-Red Seal graduates (\$43,300 vs. \$43,800), trades program continuers (\$39,000 vs. \$37,500), or trades program early leavers (\$33,400 vs. \$31,600).

The largest difference in incomes is observed among the university graduate group – the predicted average income of an individual with one university credential who does not have a disability is \$40,000, while their peers with disabilities are predicted to earn more than \$6,000 less, only \$33,900, when controlling for the other variables in the model. The college graduates (\$34,800 vs. 31,300) and transfer graduates (\$33,500 vs. 30,800) have relatively similar differences, and the no postsecondary pathway group has the lowest predicted earnings, and a smaller but still statistically significant difference between those without and with a disability (\$27,900 vs. \$25,500).

TABLE 5
Ordinary Least Square Regression Predicting the Natural Log of Income Based on Type of Postsecondary Education or Training Attained, With and Without Controls (n = 61070)

Variables	Model 1			Model 2			Model 3			Model 4		
	b	SE(b)	p	b	SE(b)	p	b	SE(b)	p	b	SE(b)	p
PSE Group												
Red Seal (ref)	-	-	-	-	-	-	-	-	-	-	-	-
Non-Red Seal	-.436	.065	***	-.398	.065	***	-.384	.065	***			
Trades continuer	-.543	.046	***	-.520	.046	***	-.493	.046	***			
Trades early leaver	-.726	.046	***	-.679	.046	***	-.651	.046	***			
University graduate	-.449	.039	***	-.426	.040	***	-.490	.040	***			
College graduate	-.697	.040	***	-.634	.040	***	-.627	.040	***			
Transfer graduate	-.639	.041	***	-.602	.041	***	-.635	.041	***			
No PSE	-.937	.041	***	-.873	.041	***	-.843	.041	***			
Disability												
Without disability (ref)				-	-	-	-	-	-			
Disability				-.154	.013	***	-.113	-.014	***			
Languages												
English speaking only				-	-	-	-	-	-			
Speaks another language				.030	.009	***	.015	.009	n.s.	.015	.009	n.s.
Country of Birth												
Not born in Canada (ref)				-	-	-	-	-	-			
Born in Canada				.010	.010	n.s.	.006	.010	n.s.	.006	.010	n.s.
Gender												
Female (ref)				-	-	-	-	-	-			

Variables	Model 1			Model 2			Model 3			Model 4		
	b	SE(b)	p	b	SE(b)	p	b	SE(b)	p	b	SE(b)	p
Male				.111	.008	***	.113	.008	***	.114	.008	***
Age Starting Grade 9												
14 or younger (ref)				-	-	-	-	-	-	-	-	-
15 or older				-.053	.025	*	-.027	.025	n.s.	-.027	.025	n.s.
Income Decile				.011	.001	***	.009	.001	***	.009	.001	***
Suspended in School												
Never suspended							-	-	-	-	-	-
Suspended at least once							.038	.012	**	.038	.012	**
First Attempt OSSLT												
Passed							-	-	-	-	-	-
Did not pass							-.079	.013	***	-.081	.013	***
Grade 9 Credit Accumulation												
7 or fewer credits							-	-	-	-	-	-
8 credits							.014	.016	n.s.	.015	.016	n.s.
9 or more credits							.013	.020	n.s.	.014	.020	n.s.
Academic Level in Grade 9												
Academic POS (ref)							-	-	-	-	-	-
Non-academic POS							-.016	.013	n.s.	-.019	.013	n.s.
Percent Absent in Grade 9												
							-.029	.005	***	-.028	.005	***
Grade 9 Average Mark												
							.004	.001	***	.004	.001	***
PSE Group x Disability												
Red Seal x Without Disability (ref)										-	-	-
Red Seal x Disability										-.034	.091	n.s.
Non-Red Seal x Without Disability										-.390	.073	***
Non-Red Seal x Disability										-.379	.124	**
Continuer x Without Disability										-.495	.053	***
Continuer x Disability										-.535	.065	***
Early Leaver x Without Disability										-.649	.054	***
Early Leaver x Disability										-.706	.064	***
No PSE x Without Disability										-.831	.047	***
No PSE x Disability										-.921	.051	***
Univ Grad x Without Disability										-.469	.045	***

Variables	Model 1			Model 2			Model 3			Model 4		
	b	SE(b)	p	b	SE(b)	p	b	SE(b)	p	b	SE(b)	p
Univ Grad x Disability										-.633	.050	***
College Grad x Without Disability										-.609	.046	***
College Grad x Disability										-.715	.050	***
PSE Transfer x Without Disability										-.617	.046	***
PSE Transfer x Disability										-.732	.058	***
Constant		11.069			10.914			10.692			10.683	

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE 6
Predicted Mean Income Based on Type of Postsecondary Education or Training Attained
(n= 61070)

	Model 1			Model 2			Model 3		
	Margins	95% CI		Margins	95% CI		Margins	95% CI	
Red Seal	64159.02	59438.06	69254.96	61990.10	57415.52	66929.83	64306.11	59549.91	69441.50
Non-Red Seal	41498.39	37483.65	45942.69	41643.48	37624.47	46091.78	43784.71	39556.69	48464.65
Trades Continuer	37287.37	35507.17	39156.82	36851.07	35073.46	38718.39	39264.26	37337.00	41291.42
Trades Early Leaver	31054.84	29559.78	32625.84	31436.03	29910.95	33038.87	33522.43	31869.03	35261.61
University Grad	40956.67	40557.66	41359.19	40503.35	40099.94	40911.24	39401.14	38980.62	39826.59
College Grad	31947.84	31295.20	32613.77	32872.44	32194.15	33565.03	34366.24	33625.50	35123.30
Transfer Grad	33869.83	33095.08	34663.07	33948.50	33173.61	34741.15	34064.80	33286.93	34860.86
No PSE	25128.30	24526.02	25745.37	25882.18	25244.16	26536.06	27666.01	26935.76	28415.78

FIGURE 10
Predicted Mean Income Based on Type of Postsecondary Education or Training Attained, Across Models 1-3

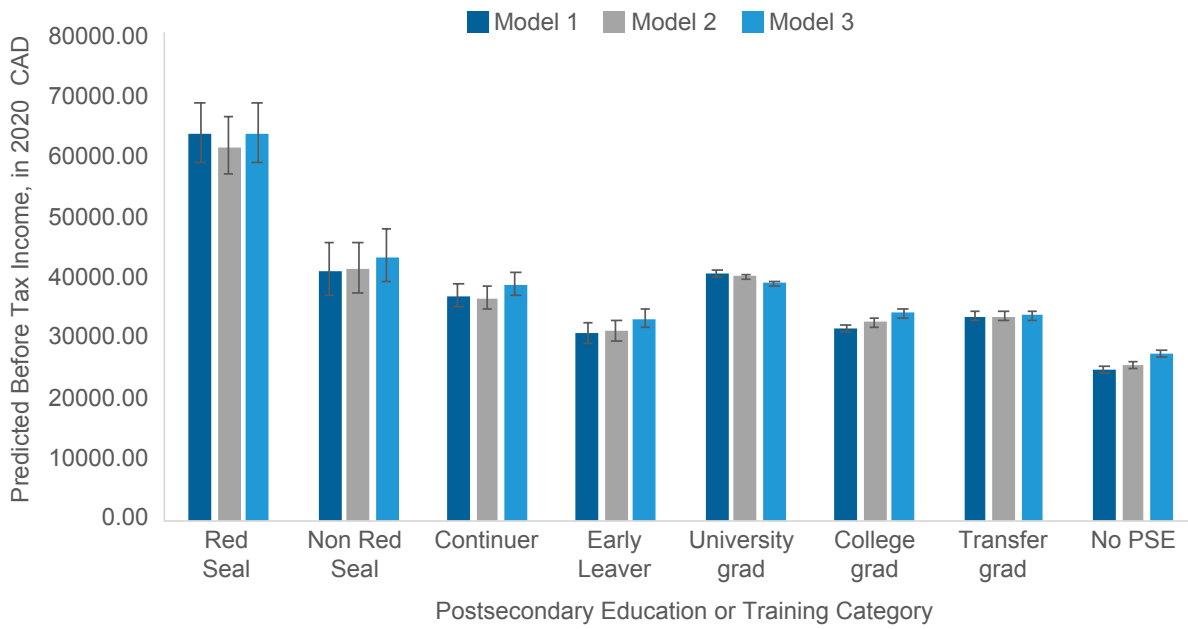
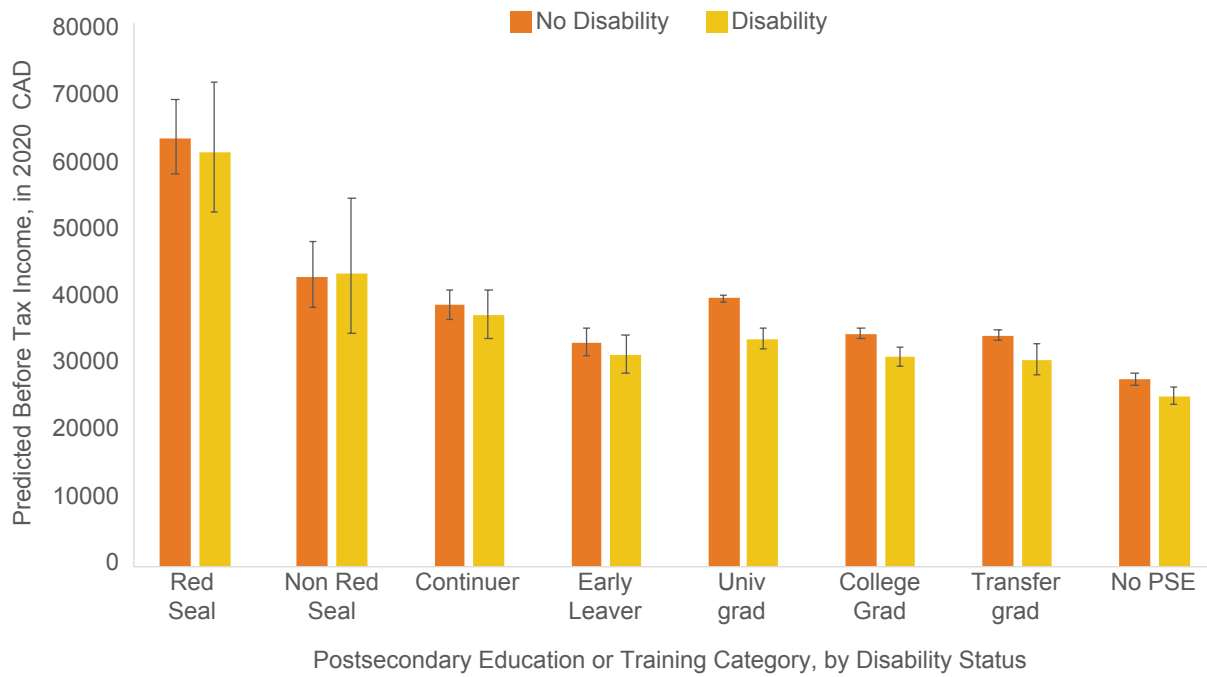


TABLE 7

Predicted Mean Income Based on Type of Postsecondary Education or Training Attained and Disability Status (n = 61063)

	Model 4		
	Margins	95% CI	
Red Seal x No Disability	63945.73	58580.08	69802.84
Red Seal x Disability	61794.52	52816.56	72298.60
Non-Red Seal x No Disability	43289.70	38655.33	48479.68
Non-Red Seal x Disability	43787.34	34857.72	55004.48
Continuer x No Disability	38992.32	36778.18	41339.76
Continuer x Disability	37467.53	34093.09	41176.38
Early Leaver x No Disability	33426.69	31496.76	35475.23
Early Leaver x Disability	31568.97	28789.33	34616.99
University Grad x No Disability	39993.41	39548.78	40443.05
University Grad x Disability	33941.71	32445.27	35507.53
College Grad x No Disability	34763.39	33937.98	35608.87
College Grad x Disability	31286.44	29861.94	32778.89
Transfer Grad x No Disability	34497.77	33667.90	35348.10
Transfer Grad x Disability	30755.99	28553.36	33128.19
No PSE x No Disability	27867.32	27041.01	28718.59
No PSE x Disability	25450.48	24230.08	26732.36

FIGURE 11
Predicted Mean Income Based on Type of Postsecondary Education or Training Attained, by Disability Status, in Model 4



Discussion

Of TDSB students examined here, 4.5% went on to pursue apprenticeships with slightly over half of TDSB apprentices having also attended a Canadian university or college. In terms of disability, 15.2% of the full sample were students with disabilities. The rate of disability was much higher for students pursuing the apprenticeship pathway, almost double for students who left their apprenticeship programs, and more than double for students who only had a high school education. Conversely, rates of disability were much lower among students pursuing a university pathway (see Table 3). As noted, students with disabilities enter apprenticeship programs at higher rates than college or university programs, yet, interestingly, our regression analyses reveal that the difference in earnings between those with and without disabilities is negligible among those who enter trades programs, both Red Seal and non-Red Seal. In contrast, there is a sizable gap in earnings between those with and without disabilities among community college graduates, and particularly among university degree holders. These findings hold true even after controlling for sociodemographic characteristics and academic performance and argue for the need for more research into the ongoing barriers disabled college and university graduates face in the workplace.

School factors were related to access and completion of apprenticeship programs. Aside from students who did not complete high school, students pursuing apprenticeship programs were the most likely to have experienced suspension, least likely to have taken Academic level courses, and most likely to have the highest levels of absenteeism. However, when it came to achievement variables, those students who had acquired an apprenticeship certificate, either Red Seal or non-Red Seal, tended to fare better academically than their peers who were continuing or who had left their apprenticeship programs, with students acquiring a Red Seal certificate having the highest history of achievement amongst these groups (e.g., credit accumulation, secondary school literacy test, and Grade 9 marks).

Although apprenticeships typically lead to professions within the trades, there were striking differences between apprenticeship pathways and outcomes. As seen in Table 1, around a quarter of apprentices completed their certificate programs (see also the Appendix; this will be examined in greater detail in Report 3). This is in comparison to colleges and universities where most students complete their credentials. There were also notable differences between apprentices who had achieved a Red Seal certificate or a non-Red Seal certificate, and those who were either continuing in or had left their certificate program. Of students who have successfully acquired an apprenticeship certificate, those who had a Red Seal certificate were disproportionately male (97%), were more likely to live in higher income neighbourhoods, were the least likely to speak a language other than English, and least likely to be born outside of Canada. Of apprenticeship pathways, students who acquired a non-Red Seal certificate were the least disproportionately male (still at 61%), were the most likely to speak a language other than English, were more equitably dispersed across income deciles, and close to a quarter (24%) were born outside of Canada. Students who were either continuing in or had left their apprenticeship programs were also notably male (90% and 77%, respectively) and were likely to speak a language other than English (roughly 39%). However, those who left the apprenticeship program were more likely to live in lower-income neighbourhoods and to have been born outside of Canada.

In terms of predicted earnings from the regression analyses, our key findings reveal that graduates of Red Seal apprenticeship programs earn significantly more than all other groups, including university undergraduate degree holders. The wage gap is considerable, even after controlling for important sociodemographic predictors as well as measures of academic performance. When examining access, it is interesting that students pursuing and completing Red Seal certificates are also more likely to arrive with some sociodemographic advantage.

Overall, this report has produced some very important findings that warrant greater attention. Although disabled students who successfully complete their apprenticeship program can expect equitably remuneration for their labour, disabled students are somewhat more overrepresented in the groups that leave or do not complete their apprenticeship certification. As such, we recommend reviewing the conditions within apprenticeship programs to identify how they can better support disabled students to completion. Moreover, students who participate in apprenticeship programs are overwhelmingly male. Most concerning is that men represent more than 97% of Red Seal graduates. Again, this finding warrants urgent attention and review of programs to assess their hospitality to women and gender diverse apprentices.

Those concerns, notwithstanding, there are other promising findings relating to apprenticeship programs that are worth emphasizing. For example, while graduates with Red Seal certificates clearly stand out from the rest of the crowd, graduates of non-Red Seal programs and continuers who have not yet received their certificates also have earnings that, at least at the beginning of their careers, are comparable to the earnings of early career workers who have completed university undergraduate degree programs. Important to note that we have not yet examined whether this pattern remains static over time and whether mobility in earnings is comparable. Future research is needed to examine the earnings trajectories of graduates of trades, college, and university programs to learn how their earnings change throughout the course of their careers. This will be possible when additional years of data are added to the *Education and Labour Market Longitudinal Platform (ELMLP)*.

References

- Brown R. (2010). *The Grade 9 Cohort of Fall 2004*. Toronto: Toronto District School Board.
- Canadian Apprenticeship Forum. (2009). *Workplace Accommodations for Persons with Disabilities in the Skilled Trades: A Preliminary Investigation*. Canadian Apprenticeship Forum Forum canadien sur l'apprentissage (CAF-FCA). <https://caf-fca.org/wp-content/uploads/2022/04/Workplace-accommodations-for-persons-with-disabilities-in-the-skilled-trades.pdf>
- Canadian Chamber of Commerce. (2013). *Upskilling the Workforce: Employer-Sponsored Training and Resolving the Skills Gap*. <https://www.voced.edu.au/content/ngv:58955>
- Chatoor, K., & Kaufman, A. (2020). *The Journey of Ontario Apprentices: From High School to the Workforce*. The Higher Education Quality Council of Ontario.
- Dostie, B. (2010). *Working Paper No. 67: A competing risks analysis of the determinants of low completion rates in the canadian apprenticeship system*. Canadian Labour Market and Skills Researcher Network.
- Frank, K., & Jovic, E. (2017) National Apprenticeship Survey: Canada Overview Report, 2015. Ottawa: Statistics Canada, 2017. URL: <https://www150.statcan.gc.ca/n1/en/pub/81-598-x/81-598-x2017001-eng.pdf?st=F26eKHdG>
- Hansen, R., & Hondzel, C. D. (2015). *The Apprentice Retention Program: Evaluation and Implications for Ontario*. The Higher Education Quality Council of Ontario.
- Laporte, C., & Mueller, R. (2011). The Completion Behaviour of Registered Apprentices: Who Continues, Who Quits, and Who Completes Programs? *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.2014879>
- Lennon, P. M. C., Zhao, H., Wang, S., & Gluszynski, T. (2011). *Educational Pathways of Youth in Ontario: Factors Impacting Educational Pathways*. The Higher Education Quality Council of Ontario.
- MacDonald-Jenkins, J., & Cornish, C. (2015). *Hybrid Delivery of College Instruction in the Skilled Trades: Supporting Apprenticeship Completion*. The Higher Education Quality Council of Ontario.
- Ministry of Advanced Education and Skills Development. (2017). *2018-19 Co-op Diploma Apprenticeship Program Guidelines*.
- Parekh, G. (2013). *Structured pathways. An exploration of program of study, school-wide and in-school programs, as well as promotion and transference across secondary schools in the Toronto District School Board* (Report No. 13/14-03). Toronto District School Board
- Quan, D & James, C.E. (2017). *Unlocking student potential through data: Final report*. Toronto, Ontario, Canada: Ontario Ministry of Education.

- Prism Economics and Analysis. (2020). *Apprentice Demand in Red Seal Trades: A 2020 National Labour Market Information Report*. Canadian Apprenticeship Forum. https://caf-fca.org/wp-content/uploads/2022/04/Apprentice-Demand_National-2020.pdf
- Refling, E., & Dion, N. (2015). *Apprenticeship in Ontario: An Exploratory Analysis*. The Higher Education Quality Council of Ontario.
- Robson, K., Maier, R., Anisef, P., & Brown, R.S. (2019). *High School Success and Access to Postsecondary Education*. Toronto: Higher Education Quality Council of Ontario. URL: https://heqco.ca/wp-content/uploads/2020/02/Formatted-CRP-report_FINAL.pdf
- Statistics Canada. (2022). *Table 37-10-0219-01 Apprenticeship programs by age groups, major trade groups, sex and registration status [dataset]*. <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=3710021901>
- Statistics Canada. (2023a). *Canadian Apprenticeship Longitudinal Indicators*. Statistics Canada. <https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2021018-eng.htm>
- Statistics Canada. (2023b). *Canadian Apprenticeship Registrations and Certifications*. Statistics Canada. <https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2020016-eng.htm>
- Sweet, R., Anisef, P., Brown, R., Adamuti-Trache, M., & Parekh, G. (2012). *Special Needs Students and Transitions to Postsecondary Education*. The Higher Education Quality Council of Ontario.
- Zeman, K. (2023). *From high school, into postsecondary education and on to the labour market*. 81. <https://www150.statcan.gc.ca/n1/en/pub/81-595-m/81-595-m2023004-eng.pdf?st=5Guxx6VV>

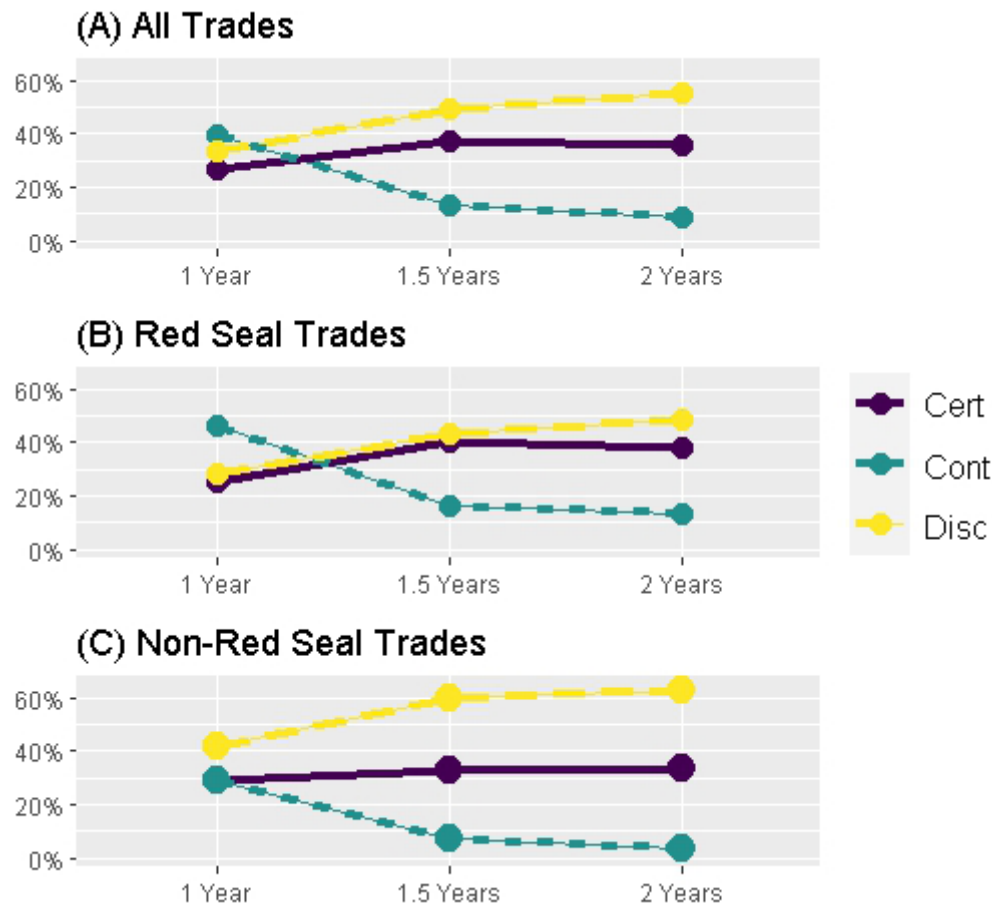
Appendix: Entry and Completion Times

In 2021, there were 17,520 new apprentice registrations in Ontario, consisting of 2,238 females and 15,279 males. For the same year, 9,741 apprentices earned their certification in all trades: 1,257 females and 8,484 males. In terms of the type of certification acquired, there were 8,736 Red Seal certifications (768 female and 7,971 male) and 1,002 (489 female and 513 male) non-Red Seal certifications. Overall, there are 79,791 existing registrations across all trades, for a total of 98,184 apprentices (12,402 female and 85,779 male) in Ontario in 2021 (Statistics Canada, 2023b).

In Ontario, approximately 70% of apprentices do not enter the trades from high school (Chatoor & Kaufman, 2020, p. 15). Generally, these apprentices register after working in the trade for some time (approximately 55%), or after some amount of other PSE (Chatoor & Kaufman, 2020, p. 15). In the service trades, 4.6% of apprentices have completed an apprenticeship and earned their certification in a different trade, and 45.4% have some other form of PSE credential. Similar trends exist across trade sectors. For instance, in the motive power trades, 6.2% of apprentices have certification in another trade, and 21% have some postsecondary education. In the industrial trades, the respective figures are 10.8% and 38.7% and, in the construction trades, the respective figures are 7.7% and 24.4% (all values from Chatoor & Kaufman, 2020, p. 13).

The most recent cohort data available from Statistics Canada that follows the trajectories of apprentices up until twice the expected completion time is from the cohort that registered in 2012. Figure A1 show where the cohort members are after the *expected* duration of the program as well as after *1.5* times and *double* the expected duration of the program. Apprentices are in one of three categories: those who have completed their exam and are certified (cert), those who continue to be registered but have not earned certification (cont), and those who have discontinued their apprenticeship (disc).

FIGURE A1
2012 Cohort Completion, Continuation, and Discontinuation Rates



Note: All data taken from Statistics Canada (2023a) for the 2012 entry cohort. Note that the data for “double time” is preliminary and appears to contain errors, as the number of certifications is lower than for “1.5 times.”

Data from the 2016 entry cohort (the most recent available) shows that after the expected completion time, only 19.9% of the cohort was certified (17% in Red Seal trades, 28.7% in non-Red Seal trades) (Statistics Canada, 2023a). This is notably lower than the 2012 cohort.







Based on data from Statistics Canada (Statistics Canada, 2022, 2023b), for 2021, the fields identified in Figure A2 are the fields with the largest number of newly registered apprentices¹².

Using the data and colour scheme from the Canadian Apprenticeship Forum (2021), Figure A2 illustrates where the number of projected completed apprenticeships are too low, just right, or too high for the market: green is ample; red is at risk; and yellow is balanced. Thus, red is the most in demand and green is the least in demand. Note that the Canadian Apprenticeship Forum’s “construction electrician” is being linked to Statistics Canada’s more general

12 This paragraph and table extracted from Collis (2023) National Scan of Apprenticeship Programs (internal report).

“electricians,” so this may not be accurate for all electrician apprentices; this is similar for “cook” and “food services”. This data only considers the largest 15 Red Seal trades, which encompasses 67% of apprentices across all Red Seal trades (Prism Economics and Analysis, 2020).

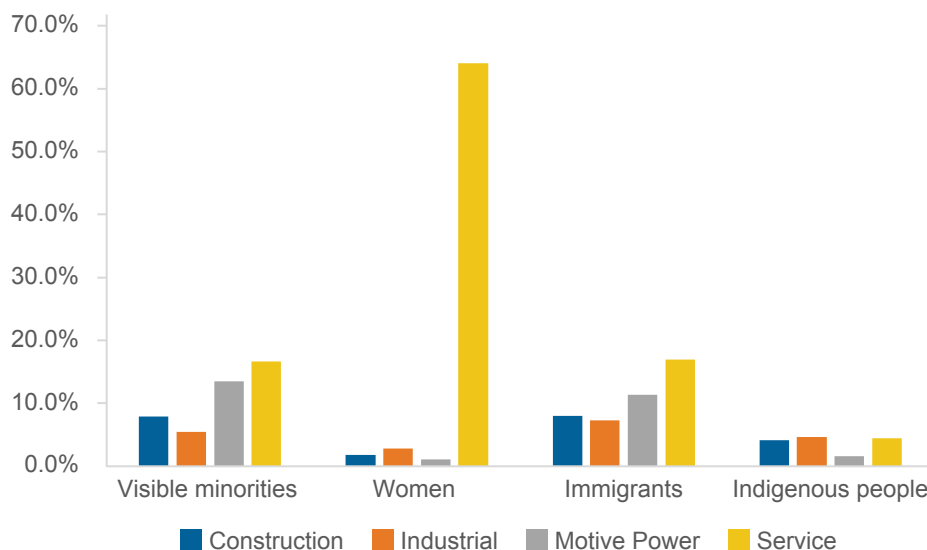
FIGURE A2
Trades with the Largest Number of Newly Registered Apprentices (2021 Cohort)

	Canada			Ontario		
	All	Male	Female	All	Male	Female
 ELECTRICIANS	11,358	10,638	720	3,579	3,390	186
 CARPENTERS	11,217	10,524	693	1,638	1,521	120
 PLUMBERS	7,746	7,422	324	1,902	1,842	63
 AUTOMOTIVE SERVICE	7,023	6,546	477	2,790	2,658	132
 HAIRSTYLIST/ ESTHETICIANS	2,097	282	1,812	747	81	666
 FOOD SERVICE	3,078	1,788	1,290	195	120	75

Note: Green = ample; yellow = balanced; red = at risk.

The racial and gender breakdown of the trades by visible minority, women, immigrants, and Indigenous apprentices is shown in Figure A3 and Table A3.

FIGURE A3
Distribution of Marginalized Populations Across the Four Trade Sectors



Note: All numbers are from Chatoor and Kaufman (2020, p. 21).

Visible minorities, women, immigrants, and Indigenous people are vastly underrepresented in all trade groups except service, which is “lower-paying” (Refling & Dion, 2015, p. 21). The National Apprenticeship Survey (Frank & Jovic, 2017) showed that 7% of all respondents reported having a disability and 92.6% reported they did not.

Factors that positively influence on completion include being married (Dostie, 2010; Hansen & Hondzel, 2015), education level and high school grades (Hansen & Hondzel, 2015; Laporte & Mueller, 2011; Refling & Dion, 2015), prior technical training (Refling & Dion, 2015), unionization (Laporte & Mueller, 2011), and being “able-bodied” (Hansen & Hondzel, 2015).

Factors that negatively influence completion rates include program length, being a member of a minority group (e.g., Indigenous, disabled, racialized, or immigrant), having children, being divorced or single, low levels of education, involvement in a youth apprenticeship program in high school, instability in employment, lack of compulsory certification, and cost (Dostie, 2010; Laporte & Mueller, 2011; MacDonald-Jenkins & Cornish, 2015; Refling & Dion, 2015; Taylor & Watt-Malcolm, 2007). Of note is that Laporte and Mueller (2011) found no relationship between participation in trade-related or co-op programs in high school and completion. Additionally, as for reasons for non-completion, Hansen and Hondzel (2015) reported that 33% of students who did not complete their apprenticeship cited “non-specific personal reasons”; 20% either found a better job or disliked the conditions at their on-site job; and 21% left because of “problems with paperwork, administration, communication and a lack of information” (p. 8).

Compulsory certification did influence completion, with a 10% higher completion rate and higher post-certification wages in the compulsory trades (Refling & Dion, 2015). It is important to consider that, unlike other forms of PSE where there is a significant boost in earnings for completion (the sheepskin effect), this is not necessarily the case for voluntary trades, where certification is not required (Laporte & Mueller, 2011). The nature of apprenticeship can also lead to reduced completion rates: if jobs are scarce, apprentices can be laid off and be unable to

complete the hours they need, but if jobs are abundant they may not be able to take off work to do their in-class studies (Laporte & Mueller, 2011). In their examination of success rates at Mohawk College, Dooley and Payne (2013) found that while apprentices did take longer than the minimum time to complete their program, there was no evidence that this was due to academic challenges, and that neither gender nor census neighbourhood characteristics had an impact on academic outcomes. They did find a correlation between higher Grade 12 marks and completion of the program.

