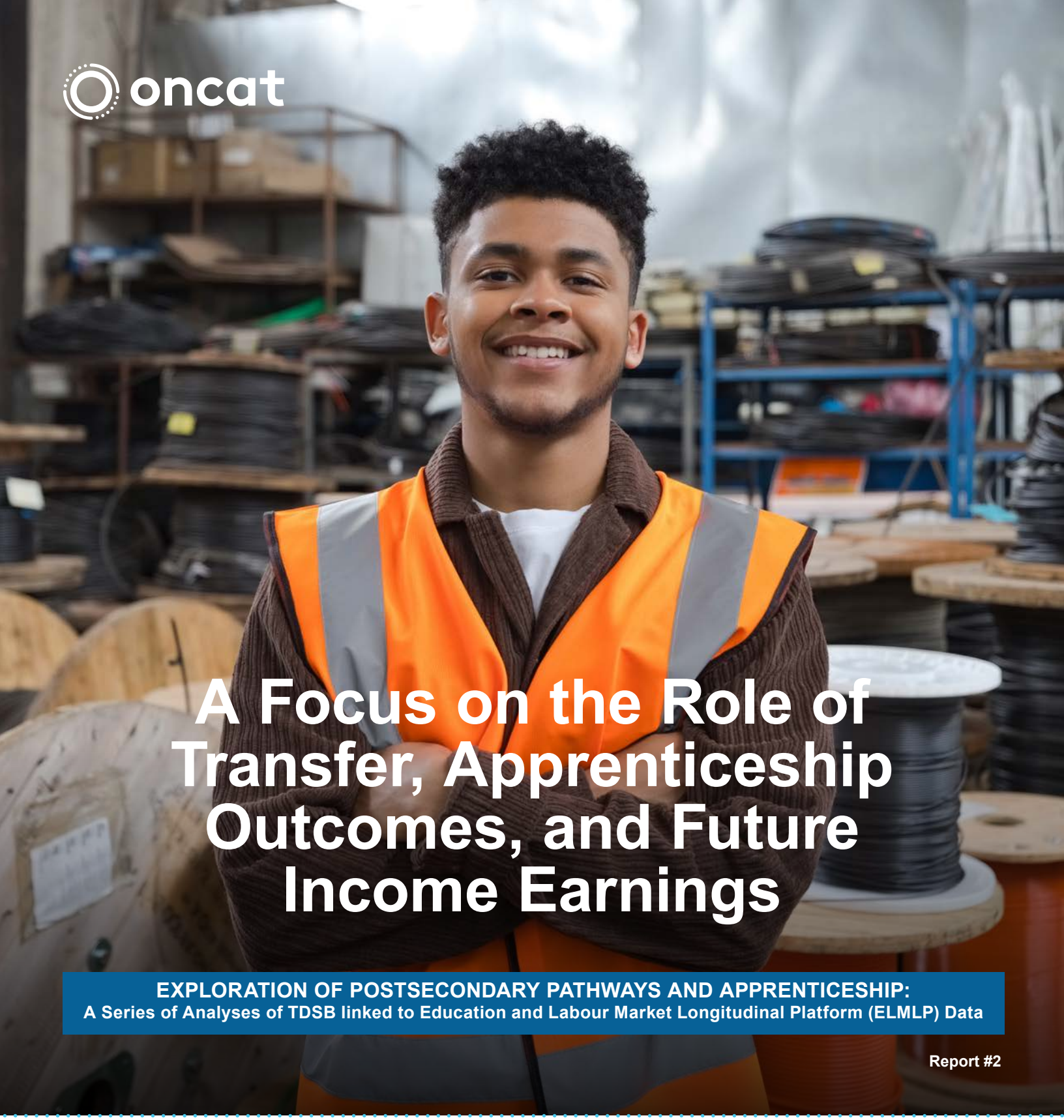

A Focus on the Role of Transfer, Apprenticeship Outcomes, and Future Income Earnings

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

Report #2

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Executive Summary

Drawing on data of Toronto District School Board (TDSB) students who started Grade 9 between 2004 and 2009, and who were registered apprentices identified through the Registered Apprenticeship Information System (RAIS), this study examines the earnings outcomes for students who had enrolled in an apprenticeship credential program, with a specific focus on those who transferred among programs. For this analysis, transfer refers to students who have (1) completed a Red Seal certificate and are enrolled but have not yet completed a postsecondary credential; (2) completed a non-Red Seal certificate and are enrolled but have not yet completed a postsecondary credential; (3) enrolled but not completed an apprenticeship certificate and are also enrolled but have not yet completed a postsecondary credential; and (4) left their apprenticeship certificate program and have enrolled but have not yet completed a postsecondary credential. We provide detailed statistics relating to demographics, school-based experiences, and future income earnings.

Key findings of this study include:

- Almost a quarter of students pursuing an apprenticeship program could also be characterized as transfer students, and close to a quarter of transfer students were identified as having a disability.
- Overall, having other postsecondary credential/experience is generally beneficial for non-Red Seal graduates but not for those with Red Seal certificates.
- While there seems to be a strong relationship between gender and the apprenticeship pathway, the relationship between gender and the transfer program is less apparent. As with the entirety of the apprenticeship field, males were disproportionately overrepresented in transfer programs.
- Students pursuing apprenticeships also did not reveal any meaningful or statistically significant differences in earnings between those with and without disabilities, regardless of whether they completed or transferred from other postsecondary programs.
- Income was also more strongly related to pathway than to transfer, with transfer students who had left their apprenticeship program earning the least and transfer students who had acquired a Red Seal certificate earning the most among all transfer pathways.

Potential explanations for our findings and limitations of our research are discussed.

Section 1: Focus on Transfer

According to Chatoor and Kaufman (2020), 45.4% of those entering an apprenticeship program in the services trades have completed some (non-trade) postsecondary education (PSE). This drops to 21% in the motive power trades, 38.7% in the industrial trades, and 24.4% in the construction trades. Malette et al. (2022) have noted that "virtually nothing is known in Canada about students with some university education who transfer into apprenticeship programmes" (p. 2), which is largely due to Statistics Canada not tracking students who did not complete PSE before transferring. In interviews with students who did transfer from university to an apprenticeship, students reported that reasons for transferring included interest alignment, entering university due to family pressure, and a preference for outdoor physical labour instead of undergraduate coursework leading to an office job. Of note, while administrators attributed transfers to economic stability, students reported they were transferring for reasons of interest alignment and even though their university program aligned with their academic aptitudes, it did not fulfill their personal interests (p. 13).

The following analysis examines postsecondary outcomes for students who had enrolled in an apprenticeship credential program with a focus on transfer. For this analysis, transfer is captured by students who have (1) completed a Red Seal certificate and are enrolled but have not yet completed a postsecondary credential: (2) completed a non-Red Seal certificate and are enrolled but have not yet completed a postsecondary credential; (3) enrolled but not completed an apprenticeship certificate and are also enrolled but have not yet completed a postsecondary credential; and (4) left their apprenticeship certificate program and have enrolled but have not yet completed a postsecondary credential. We examine outcomes, demographics, school-based experiences, and future income earnings.

Methods

Data and Sample

For this analysis we are looking at TDSB students who started Grade 9 between 2004 and 2009, and who were registered apprentices identified through RAIS up to the 2020 calendar year (N = 3,840).[1]

Variable Descriptions

Red Seal Certificate/Postsecondary Credential: Students who have completed a Red Seal certificate and a postsecondary credential.

Red Seal Certificate/Transfer: Students who have completed a Red Seal certificate and are enrolled but have not yet completed a postsecondary credential. As students may be moving

1 As noted in Report 1, the 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).

between postsecondary systems (e.g., apprenticeship and college, or apprenticeship and university), this factor is a proxy for transfer.

Red Seal Certificate/No Postsecondary: Students who have completed a Red Seal certificate and have not enrolled in an alternate postsecondary program.

Non-Red Seal Certificate/Postsecondary Credential: Students who have completed a non-Red Seal certificate and a postsecondary credential.

Non-Red Seal Certificate/Transfer: Students who have completed a non-Red Seal certificate and are enrolled but have not yet completed a postsecondary credential. As students may be moving between postsecondary systems (e.g., apprenticeship and college, or apprenticeship and university), this factor is a proxy for transfer.

Non-Red Seal Certificate/No Postsecondary: Students who have completed a Red Seal certificate and have not enrolled in an alternate postsecondary program.

Continue/Postsecondary Credential: Students who have enrolled but not completed an apprenticeship certificate but have completed a postsecondary credential.

Continue/Transfer: Students who have enrolled but not completed an apprenticeship certificate and are also enrolled but have not yet completed a postsecondary credential. As students may be moving between postsecondary systems (e.g., apprenticeship and college, or apprenticeship and university), this factor is a proxy for transfer.

Continue/No Postsecondary: Students who have enrolled but not completed an apprenticeship certificate and have not enrolled in an alternate postsecondary program.

Left/Postsecondary Credential: Students who left their apprenticeship certificate program and have a postsecondary credential.

Left/Transfer: Students who left their apprenticeship certificate program and have enrolled but have not yet completed a postsecondary credential. As students may be moving between postsecondary systems (e.g., apprenticeship and college, or apprenticeship and university), this factor is a proxy for transfer.

Left/No Postsecondary: Students who left their apprenticeship certificate program and have not enrolled in an alternate postsecondary program.

Descriptive results

Overall apprenticeship outcomes. Generally speaking, of TDSB students who entered into an apprenticeship program, approximately 15% earned a Red Seal certificate, with about 9% earning a non-Red Seal certificate, leaving close to three quarters of students either continuing in or leaving the apprenticeship program. The two largest groups were students who had not enrolled in a college or university program and who were either continuing in or had left their apprenticeship program. Almost a quarter of students who had enrolled in an apprenticeship program could also be characterized as transfer students (i.e., students who were simultaneously enrolled in a college or university program) (Table 1).

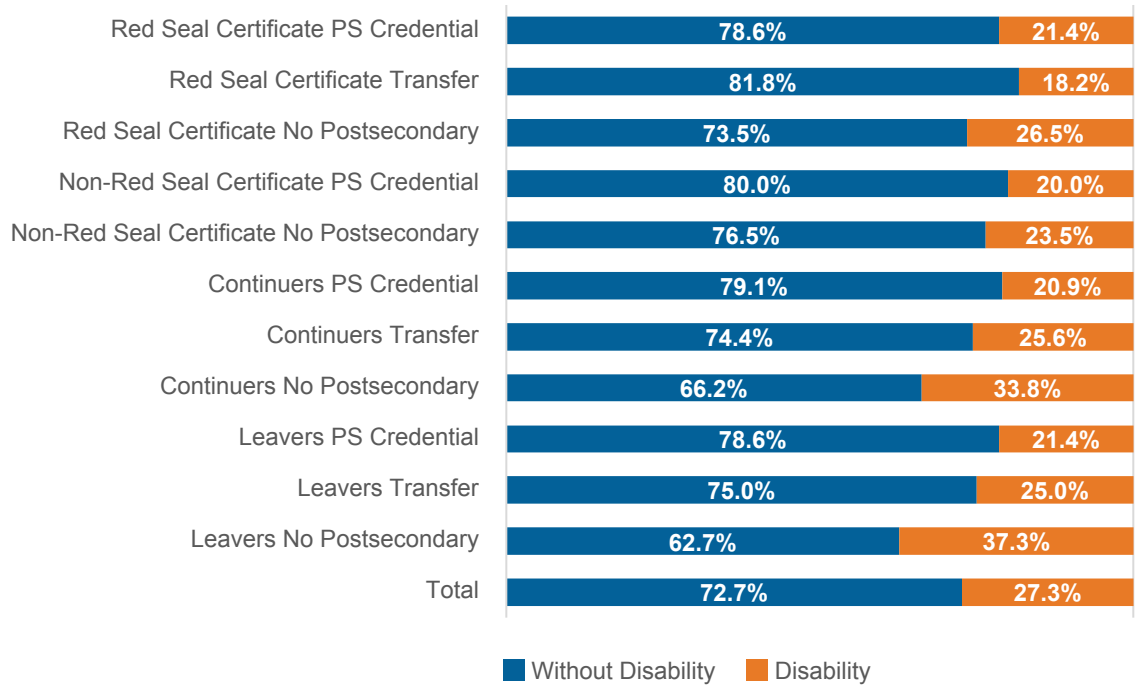
TABLE 1
Apprenticeship Credential and Postsecondary Options in TDSB

Red Seal Certificate PS Credential	3.6%	
Red Seal Certificate Transfer	2.9%	
Red Seal Certificate No Postsecondary	8.9%	
Non-Red Seal Certificate PS Credential	**2.6%**	
Non-Red Seal Certificate Transfer	**1.8%**	8.8%
Non-Red Seal Certificate No Postsecondary	**4.4%**	
Continuers PS Credential	11.2%	
Continuers Transfer	10.2%	
Continuers No Postsecondary	16.9%	
Leavers PS Credential	10.7%	
Leavers Transfer	9.4%	
Leavers No Postsecondary	17.4%	
Total	**100.0%**	

Student demographics

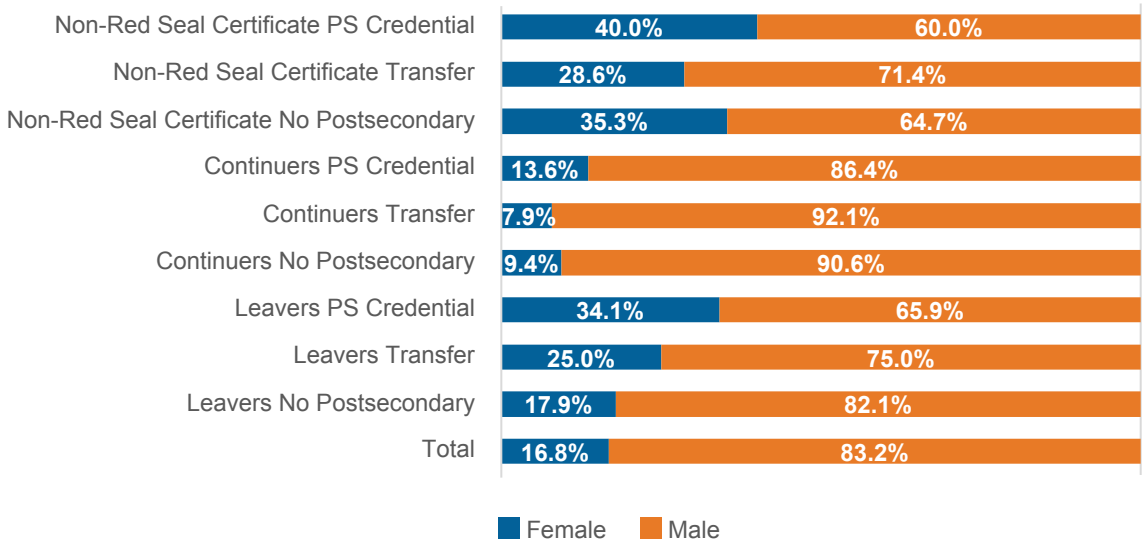
Disability and apprenticeship program outcomes. Disability was determined based on special education records from the TDSB. For all TDSB students, 15.2% were identified as having a disability (Figure 1). For students pursuing apprenticeship programs, this proportion almost doubled (1.8x) for an overall proportion of 27%. For students who were either continuing in or had left their apprenticeship program and had not enrolled in an alternate college or university program, a third of more were identified as having a disability. For transfer students who had left or were continuing in their apprenticeship program, close to a quarter were identified as having a disability. All groups that had secured either a Red Seal or non-Red Seal certificate had lower proportions of disabled students, with transfer students who also had a Red Seal certificate having the lowest proportion (18%).

FIGURE 1
Disability



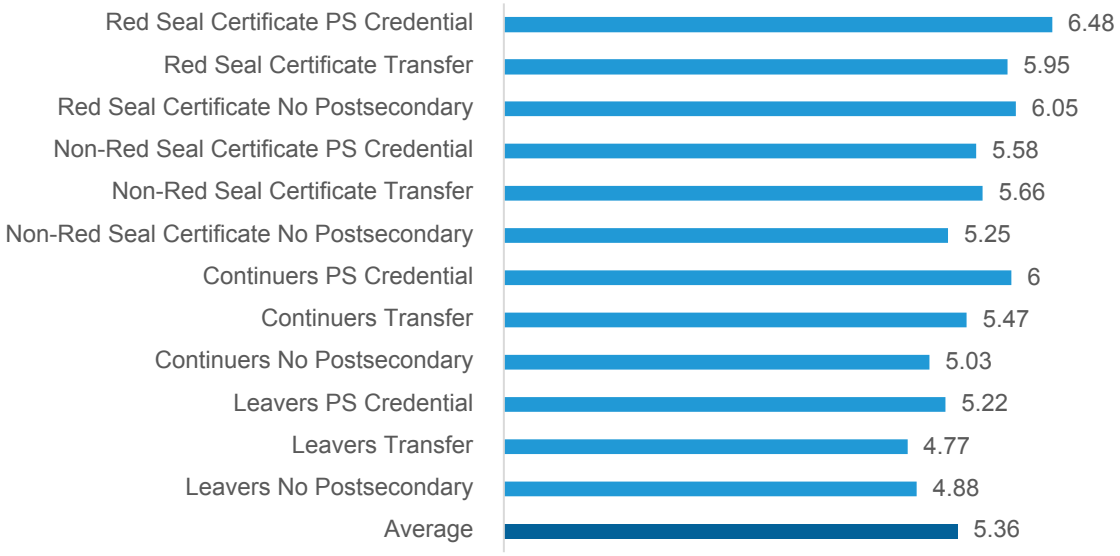
Gender and apprenticeship program outcomes. When we examined overall outcomes, including apprenticeship, college, and university, gender was largely split 48% female and 52% male. However, when drawing on apprenticeship program participation only, it was difficult to ignore the skewed gender trend with an overall gender split of 17% female students and 83% male. In fact, the gender imbalance was so profound among students who had acquired a Red Seal certificate that numbers had to be suppressed. For categories of students continuing in their apprenticeship programs who either had or had not enrolled in an alternate college or university program, male students made up over 90%. There was greater gender balance for students who had secured a non-Red Seal certificate, where proportions reached 35% female for students who had no alternate postsecondary credential (Figure 2).

FIGURE 2
Gender



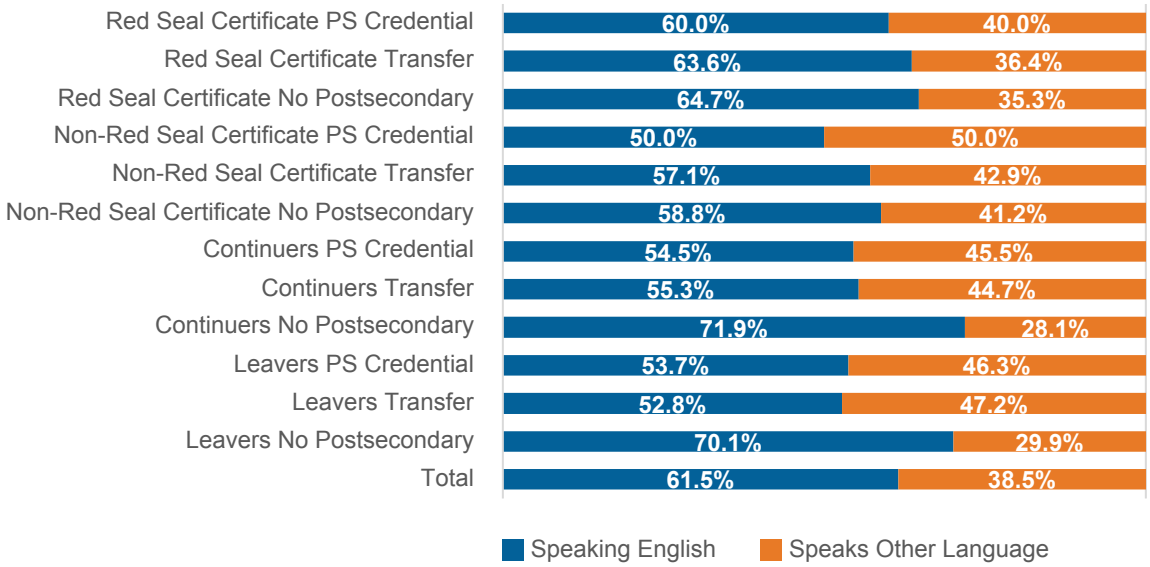
Income and apprenticeship program outcomes. In the overall analysis of income and postsecondary education pathways, it was noted that students who had secured a Red Seal certificate and students who had graduated university shared similar income trends. Examining apprenticeship outcomes revealed that the mean income decile, overall, was 5.4. With the exception of students who had acquired a non-Red Seal certificate and had not enrolled in an alternate postsecondary program, all apprenticeship certificate holder categories were above the average mean decile of income (range of 5.6-6.5). Of the categories of students who had not yet secured an apprenticeship certificate, were either continuing in or had left their program, only those who were continuing and were also transfer students or had completed a postsecondary credential were above the average mean decile of income (range 5.5-6), all other categories fell below (range 4.8-5.3) (Figure 3).

FIGURE 3
Means of Deciles of Income



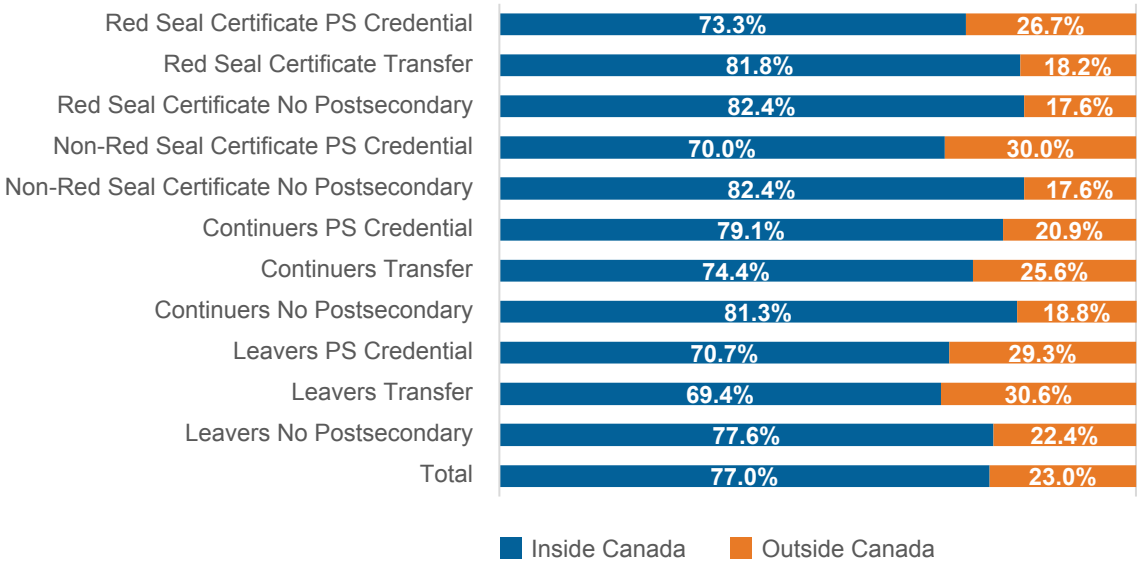
Language and apprenticeship program outcomes. Students pursuing apprenticeship programs, overall, were more likely to speak only English. Compared to the overall education landscape, where 48.2% of students spoke only English, this was true for 61.5% of students enrolled in apprenticeship programs. Students who had not enrolled in either college or university and were either continuing in (72%) or had left their apprenticeship programs (70%) were more likely to speak only English. Students who had acquired a non-Red Seal certificate and a postsecondary credential (50%) as well as transfer students who had left their apprenticeship program (47%) were more likely to speak languages other than English (Figure 4).

FIGURE 4
Speaking English



Students' place of birth and apprenticeship program outcomes. When examining the overall education terrain, close to a third of students (32.7%) were born outside of Canada, and 67% inside of Canada. Specifically examining apprenticeship programs, the proportion of students born in Canada rose to 77%, with 23% being born outside the country. The proportion of students being born in Canada rose for students who had secured a Red Seal or non-Red Seal certificate as well as those continuing in their apprenticeship program with no alternate postsecondary education. This was also the case for students who had secured a Red Seal certificate and had enrolled in a college or university program. Students who had left their apprenticeship program and had either secured an alternate postsecondary credential or had enrolled in a university or college were more likely to have been born outside of Canada. This is similar for students who had secured both a non-Red Seal certificate and a college or university credential. The figures for transfer students who had secured a non-Red Seal certificate had to be suppressed due to the low numbers. Transfer students who were continuing their apprenticeship program were slightly more likely to have been born outside of Canada (26%).

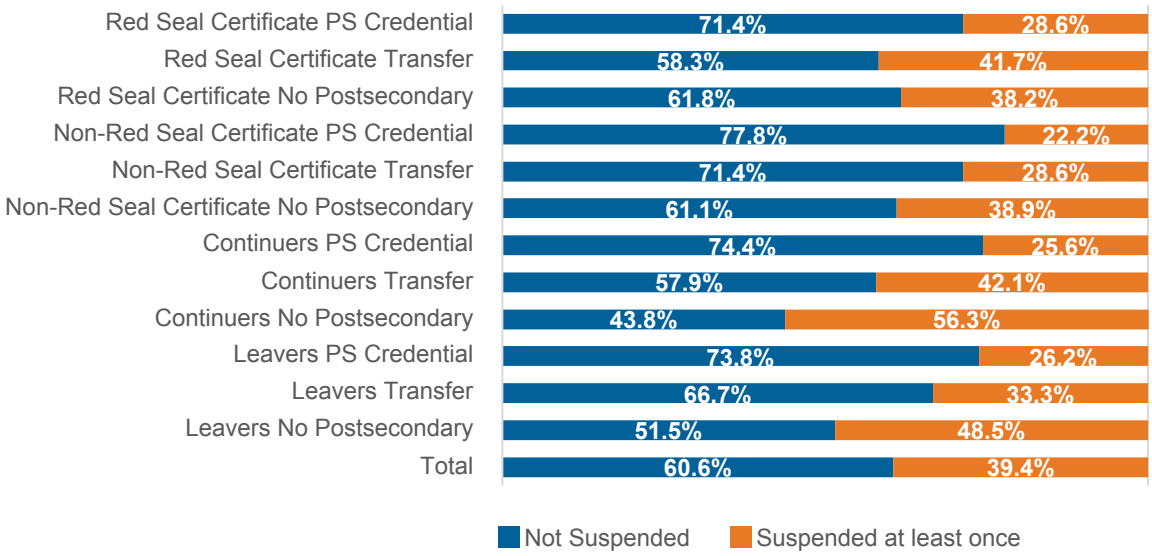
FIGURE 5
Born Inside or Outside of Canada



School-Based experiences

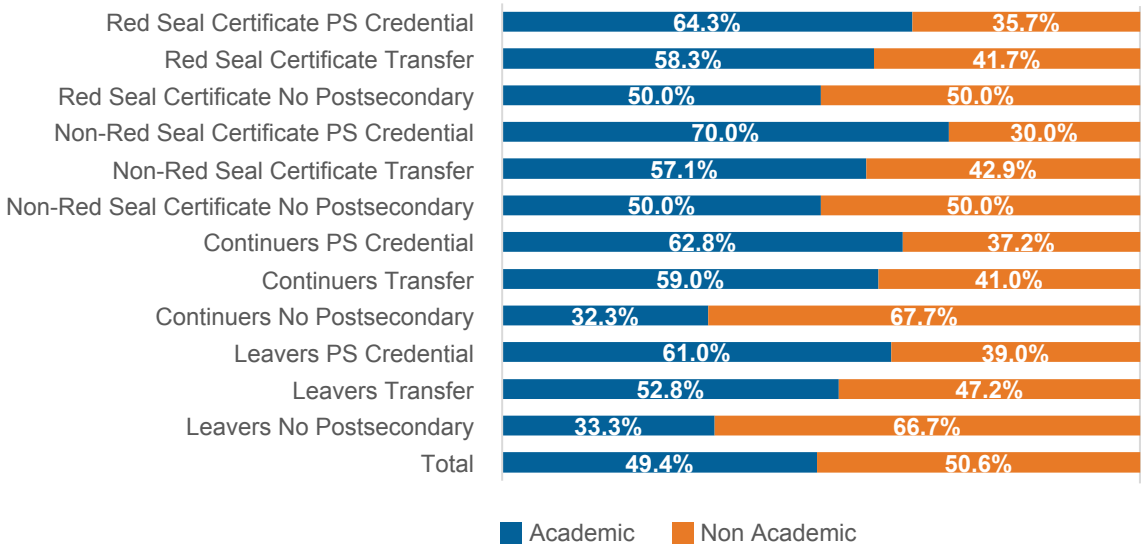
Suspensions and apprenticeship program outcomes. The rate of students who had been suspended at least once during their public school education almost doubled for students pursuing apprenticeships (39%) compared to the education field overall (22%). Close to half of students who ended up leaving their apprenticeship program with no enrollment in an alternate college or university program had been suspended (49%). The results for transfer students were mixed with categories of students who had secured a Red Seal certificate and students who were continuing in their program having been suspended at rates of over 40%, whereas categories of students who had obtained a non-Red Seal certificate (22%) or who had left their apprenticeship program (33%) were less likely to have been suspended compared to the average. Apprenticeship categories where students had acquired a postsecondary credential were the least likely to have experienced suspension in school (Figure 6).

FIGURE 6
Suspensions



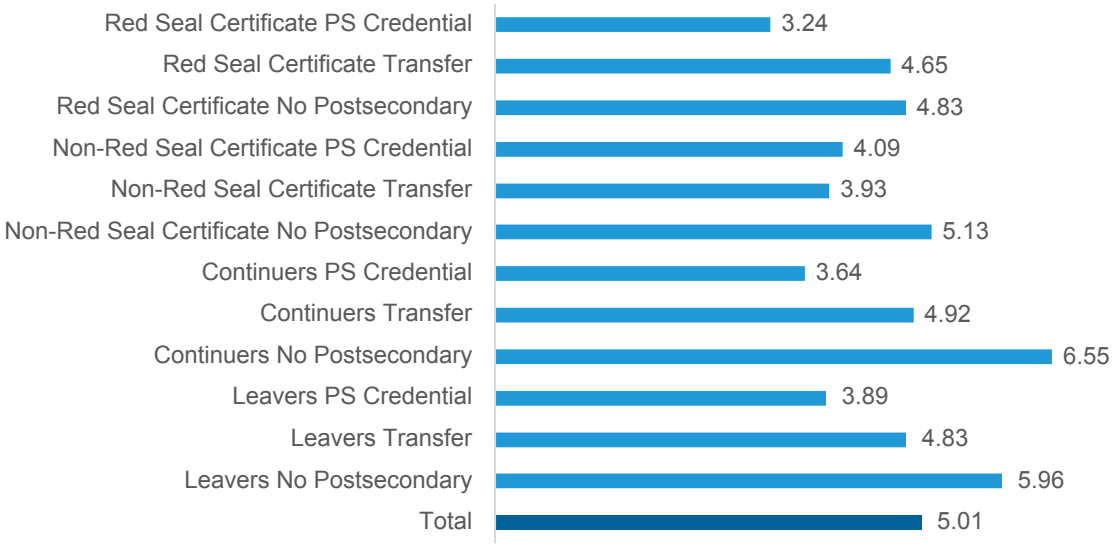
Program of study and apprenticeship program outcomes. Up until Fall 2021, Ontario offered core course options in Grade 9 at multiple academic levels, with Academic being the most intensive and leading to more postsecondary opportunities. When examining all outcomes, including apprenticeship, college, and university, 27% of students had taken the majority of their courses at a non-Academic level. This figure close to doubled (51%) when exploring only students enrolled in apprenticeship programs. Of all students enrolled in an apprenticeship programs, 49% took the majority of their Grade 9 courses at the Academic level (Figure 7). It appeared that the relationship between acquiring a college and university credential remained strong, with all four categories in which students had completed a postsecondary credential in addition to their apprenticeship studies having the four highest rates of students who took the majority of their Grade 9 courses at the Academic level. Conversely, the four categories associated with no college or university credential had the least likelihood. For categories that included transfer, compared to the average, students were more likely to have taken the majority of their Grade 9 courses at the Academic level (Figure 7).

FIGURE 7
Grade 9 Academic Program of Study



Grade 9 absenteeism and apprenticeship program outcomes. Interestingly, there was not a notable difference in the mean of Grade 9 absenteeism when looking at all outcomes (4.8%) and specifically at apprenticeship programs (5%). However, there were important differences between apprenticeship categories. For instance, students who had acquired both a Red Seal certificate and a postsecondary credential had a lower mean absenteeism rate (3.2%) compared to students who were both continuing in (6.6%) or had left (6%) their apprenticeship program with no alternate postsecondary enrollment (Figure 8).

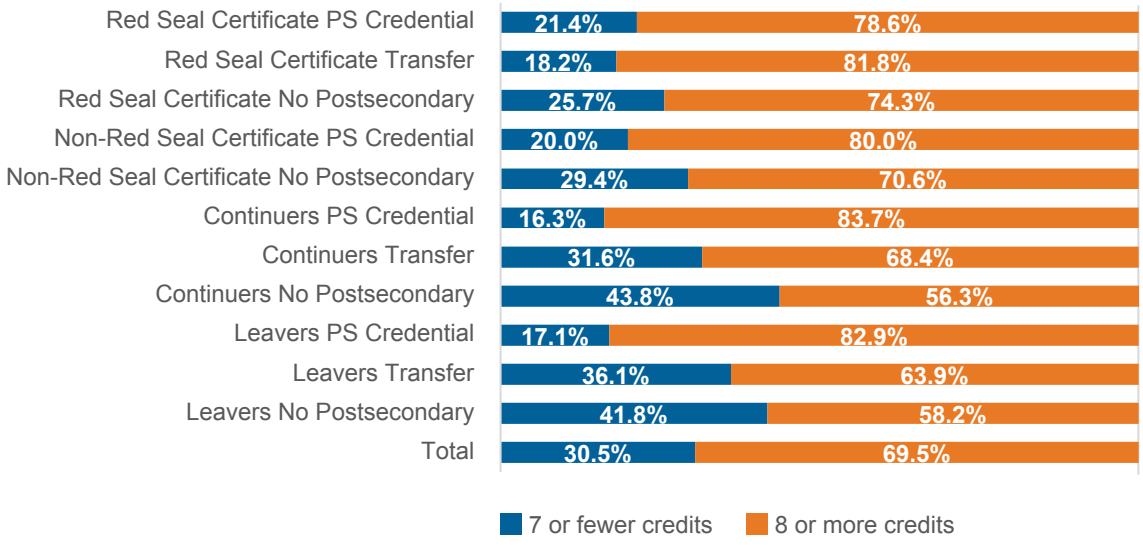
FIGURE 8
Means of Grade 9 Absenteeism



Achievement Variables

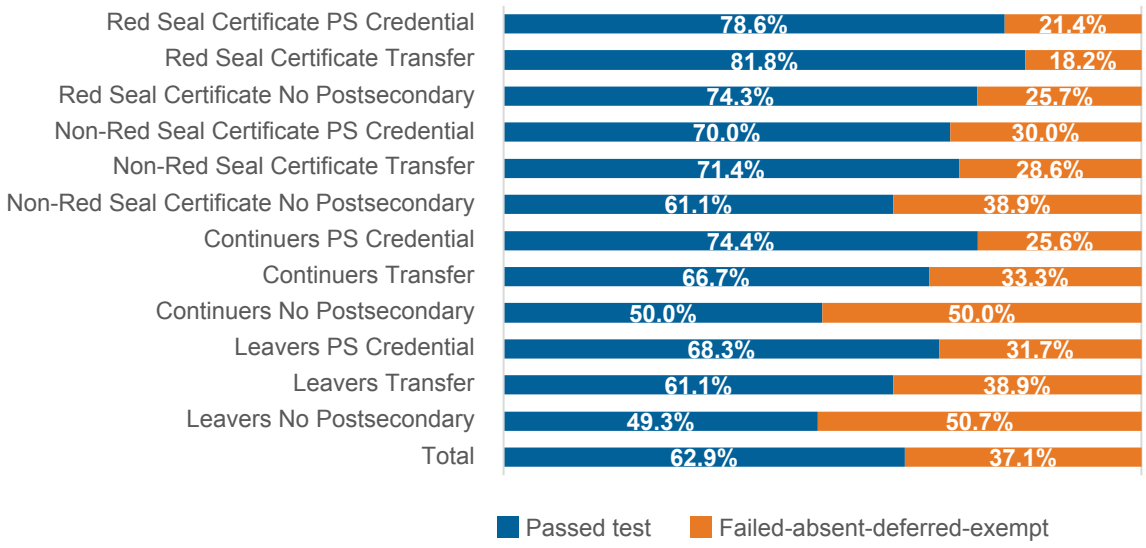
Grade 9 credit accumulation and apprenticeship program outcomes. As noted earlier, in Ontario, students are expected to acquire eight high school credits by the end of Grade 9, with a total expected credit accumulation of 30 over a student's high school tenure. There is some variation between Grade 9 credit accumulation for all TDSB students and specific apprenticeship programs. Approximately 31% of students in apprenticeship programs and 22% of all TDSB students overall achieved seven or fewer credits by the end of Grade 9. For students who enrolled in an apprenticeship program, close to 70% acquired eight high school credits or more by end of Grade 9, compared to roughly 78% of all TDSB students students. Aside from the category of students who had acquired a Red Seal certificate and a postsecondary credential, all apprenticeship categories that included the successful acquisition of a college or university credential had an 80% or higher completion rate of the expected eight high school credits by end of Grade 9. Conversely, categories that included students who were either continuing in or had left their apprenticeship program with no enrollment in an alternate college or university program had a completion rate of less than 60% of the eight expected Grade 9 credits. Interestingly, students who had acquired a Red Seal certificate and were currently enrolled in a college or university program were the most likely of all Red Seal acquisition categories to have earned eight or more credits (Figure 9).

FIGURE 9
Grade 9 Credit Accumulation



Grade 10 literacy test and apprenticeship program outcomes. Compared to overall education students, students pursuing apprenticeship programs were 1.7 times as likely to not have passed the Ontario Secondary School Literacy Test (OSSLT) on their first try. The overall pass rate for all students was 78% compared to 63% for students pursuing apprenticeship programs. Aside from the category of non-Red Seal certificate/no postsecondary group, all categories of students who had successfully acquired an apprenticeship certificate (Red Seal and non-Red Seal) were more likely than the average to have passed the Grade 10 OSSLT on their first try, with the category of transfer students who had a Red Seal certificate being the most likely. Students who were either continuing in or who had left their apprenticeship program with no alternate postsecondary education enrollment were the least likely (Figure 10).

FIGURE 10
First Time Eligible Grade 10 Ontario Secondary School Literacy Test



Average Grade 9 marks and apprenticeship program outcomes. The mean of Grade 9 marks for overall outcomes was 70 (Table 2), compared to 65 for students pursuing apprenticeships. However, all four apprenticeship categories where students had also secured a postsecondary credential were approximately 69. Transfer students who had also acquired an apprenticeship certificate had averages between 67 and 68. Students who were continuing in or who had left their apprenticeship programs with no alternate postsecondary enrollment had the lowest average Grade 9 marks (60-62).

TABLE 2
Means of Grade 9 Average Mark

	Mean
Red Seal Certificate PS Credential	68.71
Red Seal Certificate Transfer	68.02
Red Seal Certificate No Postsecondary	65.94
NoN-Red Seal Certificate PS Credential	69.02
NoN-Red Seal Certificate Transfer	67.25
NoN-Red Seal Certificate No Postsecondary	64.92
Continuers PS Credential	69.06
Continuers Transfer	63.41
Continuers No Postsecondary	59.99
Leavers PS Credential	68.76
Leavers Transfer	63.72
Leavers No Postsecondary	61.65
Total	64.60

Section 2: The Impact of Other Postsecondary Experience and Disability, Among Those who Participated in a Trade Program

The purpose of the following analysis is to assess the extent to which completing other postsecondary schooling or *transferring* from other postsecondary programs to an apprenticeship program had an impact on the earnings of students who took apprenticeship programs. Thus, these analyses do not include observations without apprenticeship schooling.

Variables

Dependent. As in the analysis for Report 1, the dependent variable for this study was the natural log of the total income, which was obtained from the individual's income tax record, averaged over the years 2017, 2018, 2019, and 2020, and adjusted for inflation to 2020 dollars.

Independent. As was described above, the first key independent variable for this analysis is students' postsecondary education or training pathway among only those individuals who had some level of trades participation. This variable was created from a combination of the PSIS and RAIS data and has 12 categories, which indicate both the type of trades program experience and any other postsecondary experience. The category and the descriptions are provided again in Table 3.

TABLE 3
Variable Descriptions

Category Descriptor	Type of Trades Program Experience	Type of Other Postsecondary Experience (College or University)
Red Seal, PS Credential	Graduate of a Red Seal trades program	Completed another postsecondary credential
Red Seal, Transfer	Graduate of a Red Seal trades program	Started another postsecondary program but then transferred to the trades program before completing that program
Red Seal, No PS	Graduate of a Red Seal trades program	Does not have any other postsecondary experience
Non-Red Seal, PS Credential	Graduate of a non-Red Seal trades program	Completed another postsecondary credential
Non-Red Seal, Transfer	Graduate of a non-Red Seal trades program	Started a postsecondary program but then transferred to the trades program before completing that program
Non-Red Seal, No PS	Graduate of a non-Red Seal trades program	Does not have any other postsecondary experience
Trades continuer, PS Credential	Currently enrolled in an apprenticeship program	Completed another postsecondary credential
Trades continuer, Transfer	Currently enrolled in an apprenticeship program	Started a postsecondary program but then transferred to the trades program before completing that program

Category Descriptor	Type of Trades Program Experience	Type of Other Postsecondary Experience (College or University)
Trades continuer, No PS	Currently enrolled in an apprenticeship program	Does not have any other postsecondary experience
Trades Leaver, PS Credential	Began an apprenticeship program but left before completing it	Completed another postsecondary credential
Trades Leaver, Transfer	Began an apprenticeship program but left before completing it	Started a postsecondary program but then transferred to the trades program before completing that program
Trades Leaver, No PS	Began an apprenticeship program but left before completing it	Does not have any other postsecondary experience

The disability status variable is identical to that used in the first analysis, so we will not discuss it here. Likewise, the demographic and control variables are identical to those used in the first set of analyses, so we will not describe them again. As in the previous analysis, these variables are included in stages, with the general sociodemographic variables added first, followed by the high school performance variables. Please see the “Methods” section for additional details on these variables and the modelling procedure.

Results

Similar to the analysis above, we followed standard practice in econometrics literacy by estimating a series of least squares regression models predicting the natural log of income. This was done to reduce the impact of outliers and to normalize the distribution of the dependent variable.

Table 4 shows the results of the least squares regression models examining the impact of having previous postsecondary (college or university) experience and disability on the natural logarithm of income, among individuals who have participated in a trades program. The estimates in **Model 1** reveal that graduates of Red Seal trades programs who have also completed another postsecondary credential, have significantly higher incomes than any of those who earned a non-Red Seal trades certificate, trades program continuers, and trades program early leavers, regardless of whether any of these groups also had another postsecondary credential or experience. There was no significant difference in the dependent variable among the three groups of Red Seal trades graduates.

This overall pattern was still statistically significant in **Model 2,** which also includes the disability variable along with the other sociodemographic controls. However, in this model the non-Red Seal graduates with any amount of postsecondary experience (PS Cred or Transfer) were found to be not statistically significantly different from the reference group. The estimates for the disability variable reveal that individuals with disabilities earned less than their peers who did not have a disability ($p < 0.01$). Similar to our previous analysis, the estimates for the sociodemographic controls, which have previously been identified as important predictors of earnings, can be found in Table 4. In **Model 3,** which adds the secondary school controls, the effects of the trades and postsecondary pathways from Model 2 remain consistent, while the disability variable was no longer statistically significant.

Finally, **Model 4** includes the interaction between the trades/other postsecondary experience pathways, with disability status. The overall pattern from Models 2 and 3 holds, where those with a trades credential (whether Red Seal or non-Red Seal) earn more than those who do not hold a trades credential, regardless of the level of other postsecondary experience, and regardless of their disability status.

TABLE 4

Ordinary Least Square Regression Predicting the Natural Log of Income Based on Type of Postsecondary Credential Attained for Trades Participants Only, With and Without Controls (n = 3835)

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, PS Cred (ref)	-	-	-	-	-	-	-	-	-			
Red Seal, Transfer	.137	.096	n.s.	.141	.095	n.s.	.139	.094	n.s			
Red Seal, No PS	.110	.076	n.s	.107	.075	n.s.	.118	.075	n.s			
Non-Red Seal, PS Cred	-.226	.101	*	-.082	.100	n.s.	-.078	.100	n.s.			
Non-Red Seal, Transfer	-.314	.113	**	-.201	.111	n.s.	-.192	.111	n.s.			
Non-Red Seal, No PS	-.427	.086	***	-.290	.086	**	-.260	.086	**			
Trades continuer, PS Cred	-.356	.074	***	-.318	.073	***	-.315	.072	***			
Trades continuer, Transfer	-.533	.075	***	-.502	.074	***	-.473	.074	***			
Trades continuer, No PS	-.472	.071	***	-.428	.070	***	-.371	.071	***			
Trades leaver, PS Cred	-.573	.074	***	-.446	.074	***	-.440	.074	***			
Trades leaver, Transfer	-.651	.076	***	-.552	.075	***	-.520	.075	***			
Trades leaver, No PS	-.669	.070	***	-.588	.070	***	-.538	.070	***			
Disability												
Without disability (ref)				-	-	-	-	-	-			
Disability				-.081	.028	**	-.045	.030	n.s.			
Languages												
English speaking only				-	-	-	-	-	-	-	-	-
Speaks another language				-.003	.028	n.s.	-.005	.028	n.s.	-.005	.028	n.s.
Country of Birth												
Not born in Canada (ref)				-	-	-	-	-	-	-	-	-
Born in Canada				.034	.033	n.s.	.005	.033	n.s.	.006	.033	n.s.
Gender												
Female (ref)				-	-	-	-	-	-	-	-	-
Male				.384	.034	***	.386	.035	***	.387	.035	***
Age Starting Grade 9												
14 or younger (ref)				-	-	-	-	-	-	-	-	-
15 or older				-.062	.057	n.s.	-.039	.057	n.s.	-.042	.057	n.s.
Income Decile												
				.009	.081	n.s.	.005	.004	n.s.	.005	.005	n.s.
Suspended in School												
Never suspended							-	-	-	-	-	-
Suspended at least once							.006	.027	n.s.	.006	.027	n.s.

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
First Attempt OSSLT												
Passed							-	-	-	-	-	-
Did not pass							-.118	.030	***	-.116	.030	***
Grade 9 Credit Accumulation												
7 or fewer credits							-	-	-	-	-	-
8 credits							.071	.035	*	.072	.036	*
9 or more credits							.028	.069	n.s.	.029	.069	n.s.
Academic Level in Grade 9												
Academic POS (ref)							-	-	-	-	-	-
Non-academic POS							.003	.029	n.s.	.002	.029	n.s.
Percent Absent in Grade 9							.001	.002	n.s.	.001	.012	n.s.
Grade 9 Average Mark							.002	.002	***	.002	.002	n.s.
PSE Group x Disability												
Red Seal, PS Cred x No Disability (ref)										-	-	-
Red Seal, PS Cred x Disability										-.043	.156	n.s.
Red Seal, Transfer x No Disability										.121	.105	n.s.
Red Seal, Transfer x Disability										.171	.175	n.s.
Red Seal, No PS x No Disability										.125	.085	n.s.
Red Seal, No PS x Disability										.054	.106	n.s.
Non-Red Seal, PS Cred x No Disability										-.087	.111	n.s.
Non-Red Seal, PS Cred x Disability										-.081	.191	n.s.
Non-Red Seal, Transfer x No Disability										-.170	.121	n.s.
Non-Red Seal, Transfer x Disability										-.375	.260	n.s.
Non-Red Seal, No PS x No Disability										-.274	.096	**
Non-Red Seal, No PS x Disability										-.253	.139	n.s.
Trades continuer, PS Cred x No Disability										-.329	.081	***
Trades continuer, PS Cred x Disability										-.309	.106	**
Trades continuer, Transfer x No Disability										-.484	.083	***
Trades continuer, Transfer x Disability										-.483	.105	***
Trades continuer, No PS x No Disability										-.357	.080	***

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
Trades continuer, No PS x Disability										-.442	.089	***
Trades leaver, PS Cred x No Disability										-.426	.082	***
Trades early leaver, PS Cred x Disability										-.537	.109	***
Trades early leaver, Transfer x No Disability										-.506	.085	***
Trades early leaver, Transfer x Disability										-.599	.106	***
Trades early leaver, No PS x No Disability										-.549	.080	***
Trades early leaver, No PS x Disability										-.564	.087	***
Constant												

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

As was done above, for ease of interpretation, the predicted log income values have been exponentiated to provide an estimate of the average predicted earnings in 2020 dollars for each group[2]. The predicted incomes obtained from the regression models, along with their corresponding 95% confidence intervals are provided in **Table 5** and plotted in **Figure 11.** The predicted earnings based on the estimates in Models 2 and 3 are calculated holding the control variables constant at typical values[3]. The overall pattern of earnings is quite similar across all three models, so we will only interpret the estimates obtained from **Model 3.** The estimates are rounded to the nearest hundred.

As evidenced below, graduates of Red Seal trades programs who had previously started a postsecondary credential but did not finish it (transfer group) made the most ($61,600), followed by Red Seal graduates who had no other postsecondary experience ($60,300), and then Red Seal graduates who also held another postsecondary credential ($53,600). Non-Red Seal trades graduates with a postsecondary credential made the most among the non-Red Seal group ($49,600), followed by those with some other postsecondary experience ($44,200), and then those with no postsecondary experience ($41,300). There is not much difference among those with some trades training but who have not graduated (continuers and early leavers), but interesting patterns exist among the other groups. For example, having a postsecondary credential is beneficial in terms of earnings for both continuers ($39,100) and early leavers ($34,500); however, transferring from PS has a negative effect for continuers but not early leavers **(continuers: no postsecondary at $37,000; early leavers: transfer at $31,900; continuers: transfer at $33,400; early leavers: no postsecondary at $31,300).**

2 As was mentioned in the previous analyses, the 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.

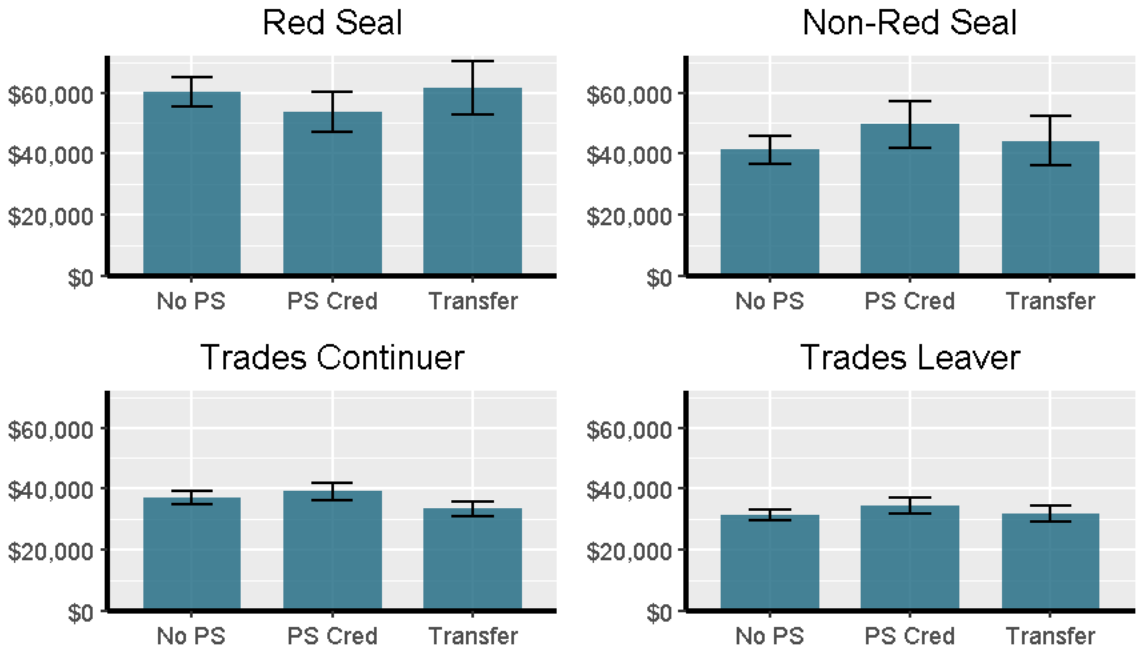
3 Means are used for quantitative variables (i.e., neighbourhood income) and proportions are used for categorical variables.

TABLE 5

Predicted Mean Income Based on Trades Participation and Type of Other Postsecondary Education Experience (n = 3835)

	Model 1			Model 2			Model 3		
	Margins	**95% CI**		**Margins**	**95% CI**		**Margins**		**95% CI**
Red Seal, PS Cred	58719.67	51806.97	66554.74	55103.58	48685.67	62368.15	53601.91	47358.42	60668.51
Red Seal, Transfer	67335.31	58485.84	77523.00	63466.02	55237.65	72919.40	61586.01	53614.24	70743.08
Red Seal, No PS	65521.92	60431.76	71040.83	61319.31	56586.18	66448.33	60317.65	55670.74	65353.09
Non-Red Seal, PS Cred	46827.69	40189.46	54561.84	50785.19	43656.17	59078.36	49597.71	42646.05	57682.55
Non-Red Seal, Transfer	42879.11	35757.31	51419.36	45067.20	37677.18	53906.70	44247.32	37016.17	52891.08
Non-Red Seal, No PS	38328.92	34214.68	42937.46	41249.74	36861.39	46160.97	41348.85	36965.86	46251.54
Trades continuer, PS Cred	41138.10	38274.92	44215.91	40105.15	37342.60	43072.07	39102.04	36386.02	42020.80
Trades continuer, Transfer	34452.95	31923.89	37182.00	33367.24	30950.67	35972.50	33401.96	30986.29	36005.97
Trades continuer, No PS	36609.39	34512.61	38833.17	35911.76	33868.82	38077.93	36980.28	34840.65	39251.70
Trades Leaver, PS Cred	33099.05	30741.84	35636.65	35289.12	32781.51	37988.17	34527.45	32061.14	37183.49
Trades Leaver, Transfer	30632.29	28304.04	33151.72	31713.57	29330.41	34290.03	31883.38	29493.94	34466.74
Trades Leaver, No PS	30079.83	28385.11	31875.72	30602.90	28888.53	32419.00	31287.06	29523.45	33156.37

FIGURE 11
Predicted Earnings of Apprentices according to Transfer Status (n = 3835)

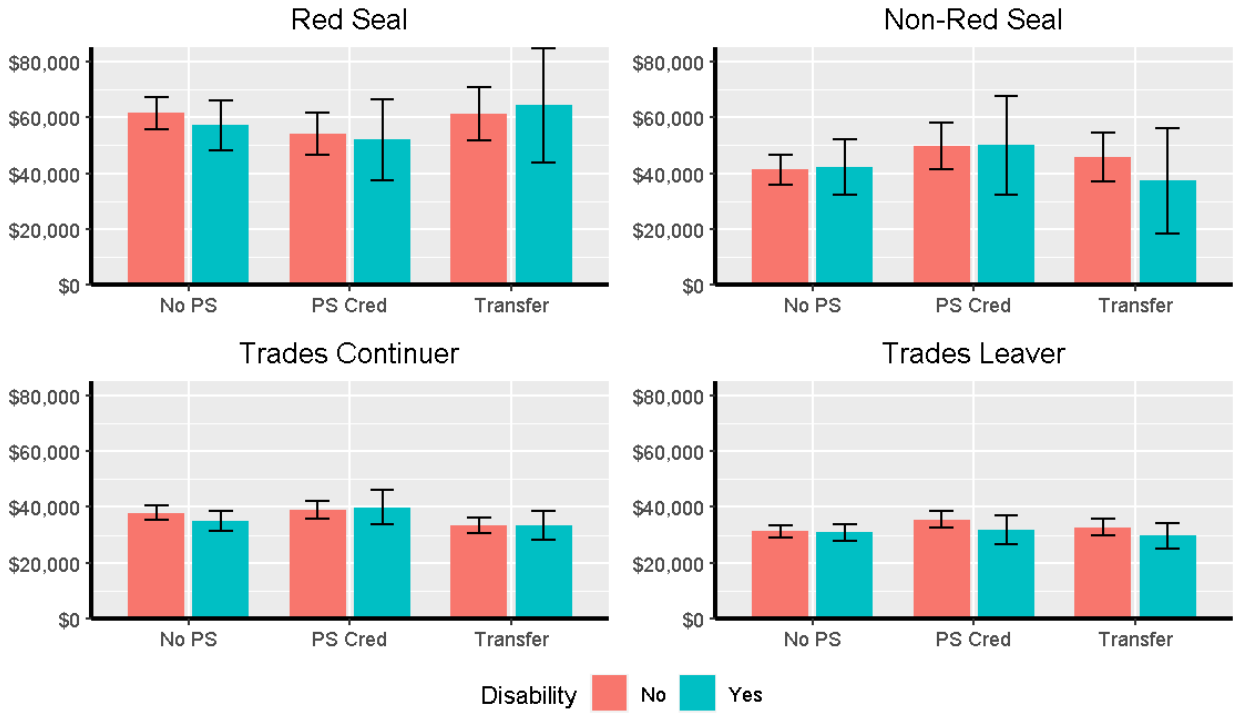


Finally, the predicted average incomes and corresponding 95% confidence intervals for trades and postsecondary pathway by disability status are displayed in Table 6 and Figure 12. They are based on the regression estimates for the interaction between pathway and disability status in Model 4 and are calculated holding the control variables constant at typical values. The key finding in Figure 12, which is evidenced by the overlapping confidence intervals, is that there is no significant difference in earnings among those with and without a disability, across any of the categories of trades and postsecondary experience. Due to the relatively small sample sizes for each of these categories, the confidence intervals (particularly for the graduates of trades programs) are quite large, indicating considerable variability in earnings outcomes for those in these categories. Otherwise, the pattern of earnings in Model 4 follows the same pattern observed in Model 3.

TABLE 6
Predicted Mean Income Based on Trades Participation and Type of Other Postsecondary Education Experience, and Disability Status (n = 3835)

	Model 4		
	Margins	**95% CI**	
Red Seal, PS Cred x No Disability (ref)	54235.99	47205.23	62314.54
Red Seal, PS Cred x Disability	51963.66	39536.52	68297.61
Red Seal, Transfer x No Disability	61182.10	52415.62	71414.06
Red Seal, Transfer x Disability	64333.77	47028.54	88006.86
Red Seal, No PS x No Disability	61475.87	55990.09	67499.13
Red Seal, No PS x Disability	57263.57	49041.88	66864.27
Non-Red Seal, PS Cred x No Disability	49738.27	42024.16	58867.83
Non-Red Seal, PS Cred x Disability	50006.59	35353.76	70733.18
Non-Red Seal, Transfer x No Disability	45751.51	37761.68	55431.32
Non-Red Seal, Transfer x Disability	37276.93	22842.77	60832.53
Non-Red Seal, No PS x No Disability	41239.84	36293.36	46860.48
Non-Red Seal, No PS x Disability	42094.82	33334.23	53157.26
Trades continuer, PS Cred x No Disability	39042.26	35981.13	42364.24
Trades continuer, PS Cred x Disability	39792.35	34093.09	46444.35
Trades continuer, Transfer x No Disability	33432.71	30631.37	36490.60
Trades continuer, Transfer x Disability	33446.08	28745.03	38916.36
Trades continuer, No PS x No Disability	37954.37	35300.77	40807.04
Trades continuer, No PS x Disability	34845.87	31442.63	38617.85
Trades leaver, PS Cred x No Disability	35436.94	32588.02	38535.30
Trades early leaver, PS Cred x Disability	31698.04	26978.08	37243.77
Trades early leaver, Transfer x No Disability	32692.14	29845.22	35810.27
Trades early leaver, Transfer x Disability	29784.10	25574.22	34686.99
Trades early leaver, No PS x No Disability	31329.02	29144.17	33677.32
Trades early leaver, No PS x Disability	30850.86	28015.41	33973.63

FIGURE 12
Predicted Earnings of Apprentices by Transfer and Disability Status (n = 3835)



Discussion

With a focus on transfer, it was interesting that almost a quarter of students pursuing an apprenticeship program could also be characterized as transfer students. When connecting transfer to disability, we found that close to a quarter of transfer students were identified as having a disability. Students who had achieved a Red Seal or non-Red Seal certificate were less likely to be identified as disabled, with 18% of transfer students who also had a Red Seal certificate identified as having a disability. Although there seems to be a strong relationship between gender and the apprenticeship pathway, the relationship between gender and the transfer program is less apparent. As with the entirety of the apprenticeship field, males were disproportionately overrepresented in transfer programs. Similarly, income was also more strongly related to pathway than to transfer, with transfer students who had left their apprenticeship program earning the least and transfer students who had acquired a Red Seal certificate earning the most among all transfer pathways. The proportion of students speaking another language other than English was also notably related to pathways other than the transfer pathway, meaning these were more closely tied to obtaining a Red Seal or non-Red Seal certificate, continuing in or leaving the apprenticeship program, rather than directly to the transfer pathway.

In terms of school-based experiences, suspension was closely tied to program completion. Students who completed either an apprenticeship or PSE credential had the lowest rate of school suspension. Aside from Red Seal certificate holders, transfer students were less likely across apprenticeship pathways to experience school suspension. Academic program of study and absenteeism followed roughly the same pattern across all apprenticeship pathways.

Transfer students were less likely to have pursued Academic courses in Grades 9 and 10 and were more likely to have had a higher rate of absenteeism, compared to students who had completed a postsecondary credential.

A similar pattern exists for students' mean Grade 9 marks, with transfer students having a lower Grade 9 average across every apprenticeship pathway compared to students who had acquired a PSE credential, and higher Grade 9 average than students who had not pursued college or university. However, the results were mixed for apprenticeship certificate holders for both Grade 9 credit accumulation and Grade 10 literacy test results, where the overall pattern only held true for students who were either continuing in or had left their apprenticeship program.

Overall, our results reveal that having other postsecondary credential/experience is generally beneficial for non-Red Seal graduates but not for those with Red Seal certificates. The lower relative earnings of those who completed a Red Seal trades certificate in addition to a college or university education is probably attributable to the extra time spent to acquire the additional schooling at the expense of labour market experience. A longer follow-up period is needed to confirm this explanation.

Our analyses involving transfers among students pursuing apprenticeships also did not reveal any meaningful or statistically significant differences in earnings between those with and without disabilities, regardless of whether they completed or transferred from other postsecondary programs. This is consistent with the findings from Report 1, where we found no difference between those with and without a disability among trades graduates, whereas those with a disability consistently earned less than their counterparts without a disability who completed college or university programs. We query whether the lack of significant differences in earnings related to transfer and disability is perhaps lost due to the powerful predictor of the outcome pathway itself. For instance, each outcome pathway appears to amass students who share similar demographics, school-based experiences, and achievement levels. Therefore, the factors within apprenticeship pathways (PSE credential, no PSE, or transfer) do not appear to play as big a role as completing or leaving an apprenticeship program. It also appears that Red Seal and non-Red Seal programs might potentially be designed to cater/support/nurture a particular kind of student/apprentice (e.g., male [Laporte & Mueller, 2011], more academic and fewer negative school experiences [Hansen & Hondzel, 2015; Laporte & Mueller, 2011; Refling & Dion, 2015], more economically well-off, more likely to speak English, born in Canada). As noted in the literature review in Report 1, being a woman, a racial minority, an immigrant, or having a disability status and having a lower academic achievement are all tied to poorer outcomes from apprenticeship programs (Dostie, 2010; Laporte & Mueller, 2011; MacDonald-Jenkins & Cornish, 2015; Refling & Dion, 2015; Taylor & Watt-Malcolm, 2007).

There are a few possible reasons we can put forward to help understand these findings. First, we do not have enough information to distinguish among different types of disabilities (e.g., mental health vs. learning disabilities vs. physical disabilities) or degree of disability. There could be differences in both the types and extent of impairment among students who select trades, college, and university programs as well as the willingness of each institution to accommodate and support disabled students. For example, students who take trades programs may be self-selecting into programs/career paths where they are best accommodated and enabled to better showcase their strengths and talents. Interestingly, research shows that apprentices "needed

more accommodations during technical training than at the workplace…If they did need an accommodation at the workplace, they usually spoke to their employer about it and the process was informal" (Canadian Apprenticeship Forum, 2009, p. 40). Despite the obligation for educators and employers to accommodate disabled students and apprentices, "studies, in fact, show that persons with disabilities often leave their jobs because they do not want to ask for accommodations" (Canadian Apprenticeship Forum, 2009, p. 41).

Second, universities and colleges, which typically have entire offices and multiple staff members devoted to providing supports for students with disabilities, may be more effective at accommodating students through their programs, compared to apprenticeship programs. However, when students with disabilities complete their college and university programs they may struggle when transitioning to the labour market if these accommodations are removed. In contrast, apprenticeship programs typically involve an extensive amount of work-integrated learning, which may potentially ease the transition into the labour market for students with disabilities. This, in turn, may help explain the more equitable outcomes.

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