



## PROJECT SNAPSHOT

### An Analysis of Student Mobility within Ontario's Northern and Southern Institutions: Phase 2

**Type:** Research

**Project Number:** 2021-33 or R2133

**Project Lead:** Nipissing University

**Principal Investigator:** Dr. David Zarifa

#### Project Summary

A growing area of student mobility research points to the importance of examining regional differences in educational trajectories within Canada. Youth from the northernmost parts of provinces often face significant proximity and socio-demographic barriers to attending postsecondary education (PSE), accessing various types of postsecondary education, and accessing many lucrative fields of study at the university level, such as the STEM fields (Science, Technology, Engineering, and Mathematics). Moreover, there is evidence to suggest that students who resided in Canada's provincial north are more likely to enter a college program before heading to university. However, prior to 2020, no existing academic or policy reports investigated the types of students who transfer in Ontario colleges and universities, nor did they take a closer look at patterns among northern and southern institutions.

Year 1 of this research project utilized Statistics Canada's Postsecondary Student Information System (PSIS) to analyze four basic questions pertaining to transfer prevalence and predictors of transfer through an explicitly regional lens, differentiating it from other work recently funded by ONCAT (e.g., Finnie et al., 2020; forthcoming):

1. Transfer Prevalence: What is the overall magnitude of postsecondary transfer types (across institutions and regions) among colleges and universities in Northern Ontario? (Analysis: descriptives)

2. Characteristics of those Who Transfer: What are the socio-demographic antecedents of the various types of postsecondary pathways? That is, what are the characteristics of youth who transfer from college to university, college to university, college to college, and

university to university? (Analysis: cross-tabulations; pooled multinomial logistic regressions)

3. Northern and Southern Differences: Do the characteristics of youth who transfer vary regionally in Ontario (northern and southern institutions)? (Analysis: cross-tabulations; northern and southern multinomial logistic regressions)

4. Regional Flows: What are the socio-demographic characteristics of those who relocate across regions when transferring? That is, what are the characteristics of youth who transfer locally (i.e., across institutions within Northern Ontario)? And, what are the characteristics of youth who transfer from northern to southern institutions and vice versa? (Analysis: cross-tabulations; multinomial logistic regressions)

This work produced new insights into the transfer patterns of students in northern institutions, as well as other regions in Ontario. PSIS administrative data allowed us to overcome a number of limitations to using other nationally-representative survey data to examine PSE pathways in Northern Ontario. First, small sample sizes prevent use of Statistics Canada's Youth in Transition Survey (YITS) to parse out the Ontario case. Wave attrition further complicates analyses with YITS, and data on more recent cohorts are no longer collected. Most importantly, neither the YITS nor another nationally-representative survey, the NGS (National Graduates Survey), contain institutional identifiers to create "Northern" and "Southern" groupings. Year 2 aims to build on this existing work in two important ways:

- 1) Expediently replicating existing analyses utilizing PSIS files that have been updated since the execution of our analysis. Statistics Canada has updated these files to now report non-imputed Ontario college sector data beginning in 2013-14. Specifically, we propose to update descriptive Tables 1 (Ontario Transfer Rates and Transfer Rates by Ontario Regions) from Research Briefs 1 & 2 produced in Year 1.
- 2) Novel analysis of disparities in direct entry/transfer students' academic outcomes using a series of metrics, including graduation rates, access to STEM fields, and timely completion. These metrics have been identified in collaboration with ONCAT's research team, and reflect priorities set out in the organization's Northern research plan.

Research Questions:

This research will explore the following three sets of research questions:

1. Graduation Rates: To what extent are transfer students graduating at different rates than their non-transfer counterparts? Do transfer students in Northern and Southern Ontario graduate at different rates?
2. Access to STEM fields: To what extent are transfer students graduating from degrees and diplomas in the STEM fields? Are transfer students in Northern and Southern Ontario graduating from STEM fields at the same rates?
3. Timely Completion: What are the characteristics of transfer students who complete their programs on time? Are their regional differences (Northern and Southern Ontario) in students' likelihood of completing their programs on-time?

## Project Rationale

A growing area of student mobility research points to the importance of examining regional differences in educational trajectories within Canada. Youth from the northernmost parts of provinces often face significant proximity and socio-demographic barriers to attending postsecondary education (PSE), accessing various types of postsecondary education, and

accessing many lucrative fields of study at the university level, such as the STEM fields (Science, Technology, Engineering, and Mathematics). Moreover, there is evidence to suggest that students who resided in Canada's provincial north are more likely to enter a college program before heading to university. However, prior to 2020, no existing academic or policy reports investigated the types of students who transfer in Ontario colleges and universities, nor did they take a closer look at patterns among northern and southern institutions.

This study extends our work from 2020-21 and similarly draws upon several administrative data sources included in Statistics Canada's ELMLP (Education and Labour Market Longitudinal Platform). Specifically, we use the 2009 to 2017 years of the Postsecondary Student Information System (PSIS) (for further details, see Statistics Canada, 2018) as well as family tax data from the T1 Family Files. These data provide the optimal source for examining regional differences in the following three key educational outcomes for transfer students in Ontario's college and university sectors: 1) access to the STEM fields, 2) university graduation and timely completion, and 3) college graduation and timely completion.

## Methods

Quantitative research methods were used in this report. Our analyses included descriptive statistics as well as multivariate regression models (binary and multinomial logistic regression) and predicted probabilities.

## Main Collaborators

Nipissing University was responsible for 100% of the project. The reports were completed in collaboration by Dr. David Zarifa (Professor and Canada Research Chair), Dr. Yujiro Sano (Postdoctoral Research Fellow), and Avery Beall (Project Facilitator and Research Assistant).

## Research Findings

### Part 1: Access to STEM Fields

Overall, 28.26% of students in Ontario colleges and universities major in STEM fields. While 28.67% of students in Southern Ontario major in STEM fields, only 20.21% of students in Northern Ontario institutions do the same.

In Southern Ontario, students in non-transfer college (NTC), university to university (UU), university to college (UC), college to university (CU), college to college (CC), and swirler pathways are all significantly less likely to major in STEM fields in comparison to non-transfer university students.

For Southern Ontario, NTU shows the highest probability (0.3163), followed by UU (0.2883), UC (0.2510), swirlers (0.2375), NTC (0.2074), CC (0.1336), and CU (0.714).

For Northern Ontario students, only those taking NTC, UU, CU, and CC pathways show significantly lower odds of majoring in STEM fields compared to NTU students.

In Northern Ontario, however, the ordering is slightly different than what we observe in Southern Ontario. In the North, the UC pathway (0.2510) shows the highest probability of entering STEM, followed by swirlers (0.2236), NTU (0.2163), UU (0.1773), NTC (0.1602), CC (0.1332) and CU (0.1190).

### Part 2: University Graduation and Timely Completion

About 32.9% of students in Ontario colleges and universities do not graduate from university within six years, while 36.8% and 30.3% do so within four and six years.

The proportion of students who graduate from university within four years is similar between northern (35.2%) and southern students (36.9%); however, the prevalence of graduating from university within six years is much lower among northern students (24.4%) than southern students (30.6%).

For Southern Ontario, in comparison to non-transfer students, transfer students show higher probabilities of taking six years to complete their degrees (0.3882 vs. 0.3023) as well as not complete their degrees (0.4360 vs. 0.3199), and are over half as likely to complete their degrees in four years (0.3778 vs. 0.1758).

At Northern Ontario institutions, the predicted probabilities of not completing university are substantially higher than those from Southern Ontario institutions for both transfer and non-transfer students, as transfer students in Northern Ontario are 52.37% likely to not complete their degrees, while their counterparts in Southern Ontario were 43.60% likely to not complete their degrees.

Interestingly, the probabilities for completing degrees on time (in four years), were slightly higher among Northern Ontario non-transfer students (0.3778 vs. 0.3805) and lower among transfer students (0.1758 vs. 0.1145). In terms of six-year completion, transfer students (0.3619) had significantly higher probabilities of completing in this time frame than non-transfer students (0.2282).

### Part 3: College Graduation and Timely Completion

Overall, 61.9% of students in Ontario colleges graduate within three years of starting their programs.

For Ontario as a whole, transfer students show a significantly lower probability of completing their college programs within three years (0.4109 vs. 0.6395).

Comparing regions, our results indicate that 70.5% of students in Northern Ontario graduate from college within three years compared to only 61.1% in Southern Ontario. In both Southern and Northern Ontario institutions, transfer students are less likely to graduate from college within three years than non-transfer students.

In Southern Ontario institutions, transfer students show considerably lower probabilities (0.4045) of completing their programs compared to non-transfer students (0.6309).

For Northern Ontario, both transfer (0.4735) and non-transfer students (0.7265) have higher probabilities of completing their college programs compared to those at Southern colleges (0.4045 and 0.6309 respectively).

## Future Research

Future research that explores and compares the labour market outcomes of Northern and Southern Ontario transfer students is highly warranted.

## Student Outcomes

This project uncovers some of the difficulties facing transfer students as they seek access to STEM fields and do their best to complete their postsecondary programs in a timely fashion. By highlighting these difficulties for policy makers, it is our hope that this research will have a real impact on the development of articulated pathways and student supports that would help students achieve these goals.

## Institutional Outcomes

Our comparisons across Northern and Southern Ontario colleges and universities have several key implications for policymakers, education administrators, and other relevant stakeholders in Ontario's higher education sector who may be concerned with the educational performance of

transfer students.

In terms of STEM access, our findings above underscore the need for monitoring the rate of STEM field entry among transfer students. It is clear that direct-entry students are entering into these more lucrative streams at higher rates than their non-transfer counterparts, and there is a need to enhance access to the STEMs for transfer students, especially those transfer students who transfer college to college and college to university. Moreover, this unequal access to the STEMs was even more apparent among our Northern Ontario institutions, suggesting enhanced supports to open up access for students in these pathways may be needed. Certainly, part of these regional differences may be explained by relatively fewer STEM field opportunities currently available among northern institutions, as they typically house a smaller array of programs and fields of study (Hango et al., 2019). At the same time, it would be important to ensure that the postsecondary pathways for students leading into those new programs are fully articulated. While our findings here speak to the necessity of increasing access to the STEMs for transfer students, other research has shown that concerted efforts may be required to further support transfer students who do enter the STEMs, and in particular, those with certain socio-demographic characteristics (e.g., women, lower SES, visible minorities) (Starobin, 2016; Myers et al., 2015; Reyes, 2011). Researchers have pointed to a whole host of factors that might enhance success in STEM completion for transfer students (e.g., academic support services, mentoring, internships, increased interactions with faculty, faculty support; peer support; extracurricular activities), with many emphasizing on the necessity of offering these additional supports for particular “at risk” groups (e.g., women, lower SES) (Dinh & Zhang, 2020; Elliot & Lakin 2020a, 2020b; Lopez & Jones, 2017; Starobin, 2016; Jackson & Laanan, 2015; Myers et al., 2015; Reyes, 2011).

Our graduation and timely completion results revealed that both university and college transfer students in Ontario are taking longer to complete their programs than their non-transfer peers. While testament to a broader trend of lengthier times to PSE completion (see Zarifa et al., 2018), these delays in completion increase costs for students and institutions (Korn, 2015; Carlozo, 2012; Knight, 2004; Pitter et al., 1996), put pressure on the availability of sufficient resources per student (Jenkins & Rodriguez, 2013; Hakkinen & Uusitalo, 2003), and ultimately lead to greater student debt and fewer years in the labour market to contribute to repayment, savings, and pensions (Volkwein & Lorang, 1996). Moreover, when we considered university graduates, retention of transfer students remains a concern. Not only were transfer students overrepresented among those who take longer to complete their degrees (six years), but what is perhaps more troubling is the fact that transfer students were overrepresented among those who do not complete their degrees. For Northern Ontario institutions, these trends were particularly evident, suggesting that while new policies to enhance the timely completion of transfer university graduates in Ontario are highly warranted, they are especially needed in Northern Ontario.

For transfer students who graduate from college, timely completion also remains an issue of concern. Our findings certainly suggest that Ontario colleges may be in need of implementing additional measures to ensure more timely completion of diploma programs by transfer students. Yet, contrary to what we observed for university completion, the story on the timely completion of college programs is more positive in Northern Ontario than it is in Southern Ontario. That is, the timely completion of students (both transfer and non-transfer) was more prevalent at Northern Ontario institutions. Further investigation into the potential mechanisms behind these regional differences would certainly be beneficial for informing policies to ensure timely completion of programs. Certainly, for bachelor’s degree completion, researchers consistently report more timely completion among those who begin their studies at university

instead of college, being a woman, non-visible minority, and coming from a family within a higher income bracket (Zhu, 2021; Saw, 2019; Chen et al., 2019; Xu et al., 2018; Shapiro et al., 2017; Nutting, 2011; Wang, 2009). As such, future research that seeks to identify the socio-demographic, academic, and institutional characteristics of transfer students who take longer to complete their college and university programs is warranted.

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Ontario Council on Articulation and Transfer || 180 Dundas St W Suite 1902, Toronto, ON M5G 1Z8

