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Data Infrastructure for Studying Equity of Access to Postsecondary Education in Ontario

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Executive Summary

Access to postsecondary education is a key national and international measure of equity within societies. The Government of Ontario is justifiably proud of the high proportion of Ontarians with postsecondary credentials — 66% in 2014, higher than any OECD country.

Yet, decades of research has clearly demonstrated that certain groups of students are far less likely to begin and complete postsecondary education. Although Ontario's government has introduced a range of policies and programs to try to close gaps in participation by underrepresented groups — students who are first in their family to attend postsecondary education, students from low-income backgrounds, Indigenous students, and francophone students — the research base behind an equity of access agenda remains incomplete and disconnected.

To support an education system based on equitable participation in postsecondary opportunity, we need an improved understanding of the students who do and do not follow a path to PSE, as well as what that path looks like for various subgroups of students. Where there are problems, they need to be better understood, and proposed solutions should draw on the best available evidence as well as be subject to evaluation for efficacy and effectiveness. Where students appear to be succeeding it is important that we understand the factors and supports contributing to their success. Research that helps inform this understanding will, in turn, serve to inform evidence-based decision-making toward improved student outcomes at all stages along education pathways and ensure that secondary students have the supports they need to make the transition to postsecondary.

The report is framed around three broad questions:

1. What do we know now about equity of postsecondary access in Ontario and what are the key data sources that contribute to that understanding?
2. What do we need to know in order to design policies and programs that effectively address access-related issues?
3. What are the relevant criteria for effective data infrastructure and models to which Ontario can look in order to expand policy-relevant knowledge about equity of access?

This project was based on 35 in-depth interviews with leading researchers, institutional stakeholders, and policy actors, as well as an extensive literature review.

Findings

Key sources and priorities for data

Currently, the most significant source of data on postsecondary access remains Statistics Canada's Youth in Transitions Survey (YITS), which provided detailed longitudinal information about students' pathways, experiences and attitudes towards PSE. Combined with a substantial program to promote analysis of the rich data, YITS led to major findings on the determinants of PSE access, the impact of tuition fee changes, strong outcomes for immigrant students, and many other topics. The last round of data collection for YITS was 2010.

Despite the importance of YITS and the fact that most comparable countries have similar longitudinal cohort studies of youth transitions, none of my informants viewed renewing the survey as a priority of data infrastructure. Instead, most researchers and institutional stakeholders emphasized the untapped potential of administrative data and, in particular, the Ontario Education Number (OEN), which theoretically allows depersonalized linkage of longitudinal data about programs and progress for students throughout K-12 and PSE. Unfortunately, while data are collected using the OEN, there is limited linkage of the data between K-12 and PSE, between institutions, and between student outcomes and programs or resources. Indeed, the Ontario Student Information System, OnSIS, systematically strips data that would allow student-level analysis. Access to depersonalized, OEN-linked data is limited and highly discretionary. Different educational agencies with key information have quite different patterns of response to data requests.

Key data needs

The key lenses that should inform the assessment of data infrastructure required for a solid research base on equity of access to postsecondary are:

- Who is going where?
- What are the influences on access to postsecondary?
- What is the impact of change in the access environment: policy, context and programs?

Who is going where?

Currently there is very little demographic data collection across Ontario (with the notable exception of the Toronto District School Board), despite ongoing calls from the Ontario Human Rights Commission and, more recently, the Truth and Reconciliation Commission to ensure there is adequate data collection to monitor risks of systemic discrimination and relative outcomes for Indigenous peoples and for other historically disadvantaged groups.

In terms of where students are going, there is a considerable gap in the data on the 15% of students who opt out of education even before reaching postsecondary and those who move away from PSE; for this group it is important to go beyond administrative data to consider in-depth survey or qualitative data to holistically understand their experiences, barriers and challenges. Students in apprenticeship and private career colleges make up a considerable group of those postsecondary students. Those students are not issued an OEN and it is difficult to track their pathways, resulting in an incomplete picture of the postsecondary ecosystem. Available data suggest that low-income and new immigrant students are more likely to attend private career colleges, which sharpens the significance of this gap from an equity perspective. A related concern is how students' social backgrounds (including education, income and culture) determine their choice of institution, and how these choices reflect and create social stratification. Persistence data are critical to ensure questions about access are not disconnected from success within postsecondary. As more and more students enter postsecondary, the need to track patterns of access to advanced education (graduate or professional school) is likely to increase.

Influences

In order to support equity of access, it is important that data not merely report on headcounts or outcomes but that there is sufficient data in place to help support evidence-based policy making based on well-informed theories of action about what contributes to better outcomes for different groups. This implies building a body of evidence around factors that have been recognized as important for access — from family and community supports to K-12 policies and practices, through the transition into PSE — and to understand what supports make a difference for those whose pathway is not direct, both at the point of entry and throughout the PSE experience.

Key changes

Data infrastructure to support an equity of access research agenda must be able to track and understand the impact of social, policy and program changes. Key changes that are likely to affect the nature of access issues include fast-changing technology, particularly new online and blended learning environments, and even more broadly, issues relating to generational change. It is easy to rely on anecdote and mythology. Cohort-based data on underlying demographic, health and educational patterns are a prerequisite to moving beyond them. On the policy front, understanding the broad impact of “massification” of postsecondary and tracking the effects of changes in student financial assistance with the introduction of the new Ontario Student Grant as well as K-12 changes were all identified as priorities for research.

Recommendations

The key elements of effective data infrastructure to support a research agenda around equity of access are high quality, comparable, linked data about students and programs, which would be available to the research and policy community and for use by postsecondary institutions. At least some of the most critical data must be longitudinal to understand changes over time and to support causal arguments about the impact of policy changes or interventions. It is impossible to study equity of access effectively without demographic data. A strong data infrastructure requires emphasis on greater accessibility and use of data, secure and durable linkages, and the robust protection of privacy through mechanisms that have proven successful in other environments such as health.

To achieve a data infrastructure capable of supporting a growing research base on equity of access, Ontario should:

- 1) Ensure a continuity of student records between the early years, K-12 and the postsecondary system, including apprenticeships and private career colleges.
- 2) Link individual student data to administrative data about programs (collected and stored through OnSIS) and outcomes (that is graduation or dropout rates, postsecondary access and persistence).
 - Track student enrollment and program participation
 - It should be possible to examine student achievement measures (province-wide test results, courses completed, grades and/or proposed postsecondary outcome measures) in relation to program factors (for example, students' access to opportunities, program of study, supports)
- 3) Reflecting the advice of the Ontario Human Rights Commission and the Truth and Reconciliation Commission, the province should routinely collect individual-level information on student demographics.
 - Demographic information should be based on standard questions across institutions and levels (K-12, PSE) and should allow identification of the most vulnerable groups (based on race, Indigenous identity, disability, and sexual orientation/identification in addition to immigrant/visible minority, first generation)
 - These data should be collected on the basis of informed consent and should be attached to the OEN

In order to ensure public confidence, there must be regular data audits to assess the quality, validity and reliability of data and to ensure there are robust privacy protections.

To ensure the public value of the data is maximized, the enhanced infrastructure outlined above must incorporate governance structures to allow use of linked data sets by stakeholders (institutions, school boards, Ontario government ministries and partners) and the broader research community. Ideally, the structure would permit data linkages within and across ministries to ensure the educational impacts of related programs are understood and tracked.

Finally, it is important to recognize that administrative data — however critical — cannot be the only major data informing government policy. There is a continuing need for targeted survey and qualitative data, particularly directed to understanding groups facing complex barriers to postsecondary. And there is a need for a larger body of experimental research to test and refine hypotheses about potentially significant interventions.

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1. Introduction

Access to postsecondary education is a key national and international measure of equity within societies (Finnie & Pavlic, 2013). For individuals, postsecondary education has been linked to a greater likelihood of employment and higher earnings as well as better health outcomes and higher rates of civic participation (Chief Public Health Officer, 2008; Organization for Economic Cooperation and Development (OECD), 2013; Turcotte, 2015). It is estimated that more than 70% of future jobs will require postsecondary education.

The Government of Ontario is justifiably proud of the high proportion of Ontarians with postsecondary credentials — 66% in 2014, higher than any OECD country. This trend reflects a steady growth in enrollment, 40% over the past 12 years (Government of Ontario, 2016, p. 99, 101). Postsecondary access has been a major government priority in the province for over 15 years; the province has set a goal of having 70% of the population with a postsecondary credential by 2020.¹

Yet, decades of research has clearly demonstrated that certain groups of students are far less likely to begin and complete postsecondary education (Finnie, Sweetman, & Usher, 2008b). Looking at the case of women, for example, access to and persistence in postsecondary education has been an essential element of social mobility, as well as a means of creating opportunities that transform individual lives. As part of its overall access agenda, Ontario's government has introduced a range of policies and programs to try to close the gaps in participation by select groups. Following recommendations contained in Bob Rae's postsecondary system review, *Ontario: A Leader in Learning*, there has been a particular emphasis on programs to promote access for students who are the first in their family to attend postsecondary education (first-generation students), students from low-income backgrounds, Indigenous students, some racial minority students and francophone students (Rae, 2005, p. 11-12).

When the Higher Education Quality Council of Ontario (HEQCO) was established by legislation in 2005, its object was to assist the minister in improving all aspects of postsecondary education, including quality, access and accountability; its legislative functions are to make recommendations, conduct research, and evaluate the postsecondary sector. HEQCO has commissioned significant work, drawing on a range of research sources, exploring underlying trends in postsecondary access in Ontario across institution types (Finnie, Childs, & Qiu, 2012; Finnie, Childs, & Wismer, 2011a, 2011b; Finnie & Pavlic, 2013; Gorman, Tieu, & Cook, 2013; Milian & Hicks, 2014; Refling & Dion, 2015). HEQCO has also commissioned research examining the scope of initiatives in place at colleges and universities to promote access (Doran et al., 2015; Stonefish, Craig, & O'Neil, 2015) and policies that may or may not affect patterns of access and persistence (Dooley, Payne, & Robb, 2013; Hicks & Jonker, 2016).

1 This goal was set by the Ontario Government in 2010: http://www.fin.gov.on.ca/en/budget/ontariobudgets/2010/papers_all.pdf.

HEQCO's public interest mandate requires data infrastructure to ensure that comparable, compatible and accessible information is available for policy-oriented research and analysis. Effective data systems are a prerequisite to understanding and tracking issues of postsecondary access and outcomes with a particular emphasis on equity. Unfortunately, as at least one recent review and numerous informants have noted, the current data infrastructure is not sufficient to fulfill this mandate:

As matters stand, it will not be possible to track how PSE participation patterns evolve over time, and thus to evaluate the effects of policies aimed at reducing and eventually eliminating PSE participation rate disparities. (Norrie & Zhao, 2011, p. 34)

The purpose of this report is to examine what is needed in terms of data infrastructure to better understand and measure progress in the area of equity of postsecondary access.

The report is framed around three broad questions:

1. What are the key data sources that contribute to what we know now about access to postsecondary education in Ontario?
2. What do we need to know in order to design policies and programs that effectively address access-related issues?
3. What are the relevant criteria for building effective data infrastructure, and what are the models to which Ontario can look in order to expand policy-relevant knowledge about equity of access?

This report uses these three questions to arrive at a set of recommendations aimed at building a data infrastructure for measuring and improving equity of access to postsecondary education in Ontario.

2. Methodology

Three interconnected processes informed this report:

- Consultation with the Higher Education Quality Council of Ontario to establish the scope of the review and key areas of inquiry, including framing broad questions and an agreed-upon list of key informants;
- A thorough search of published and unpublished Ontario and comparative literature on policy issues relating to postsecondary access; and,
- Key informant interviews (35) to identify diverse priorities for research to inform policy and their perceptions of what data needs flow from those priorities.

The process was highly recursive. Key informants provided leads pointing toward additional research and recommended colleagues they felt were well situated to comment on the issues. Through regular communication with HEQCO, the scope of the project evolved in light of key messages from the literature and, in particular, emerging and relatively consistent priorities expressed by key informants both in research and institutional roles.

The subject of postsecondary access has generated considerable literature, both published and unpublished. Search strategies included keyword searches in global databases and a comprehensive review of reports from key institutional sources (Statistics Canada; Measuring the Effectiveness of Student Aid Project; Higher Education Quality Council of Ontario). Key informants were particularly useful in identifying important comparative research and models.

Key informants included stakeholders in government (K-12 and higher education); postsecondary education sector representatives; Statistics Canada; university-based researchers from education, sociology, economics, and public policy; consultants working on issues of educational policy and evaluation; and foundations working on issues of postsecondary access and educational opportunity. Many informants were from other Canadian jurisdictions.

Interviews were conducted on the basis of limited confidentiality: opinions expressed are not attributed to individuals.

3. Goals for data infrastructure for postsecondary access

“No data, no problem ... no solution.”

Michael Coteau, Minister Responsible for Anti-Racism, Government of Ontario

“The whole reason you need a data infrastructure, is so you can say definitively — the vast majority [of students] are non-traditional students taking non-traditional pathways. So we need a system that responds to that. We need to know what we are dealing with.”

Academic researcher

The Government of Ontario has set a goal of having 70% participation in postsecondary education and it is committed to supporting equity and social mobility through education. To design an education system (preK to PSE) that supports that goal, to identify persistent barriers, and select programs and interventions that facilitate global leadership in postsecondary access, we need a strong research base. This research base must provide an improved understanding of the students who do and do not follow a path to postsecondary education, as well as what that path looks like for various subgroups of students. Where there are problems, they need to be better understood, and proposed solutions should draw on the best available evidence as well as be subject to evaluation for efficacy and effectiveness. In cases where students appear to be

succeeding — particularly those who do so against the odds — it is important that we understand the factors and supports that are contributing to their success. This understanding will, in turn, serve to inform evidence-based decision-making regarding improved student outcomes at all stages along education pathways, and ensure that secondary students have the supports they need.

The key elements of that data infrastructure are high-quality, comparable, linked data about students and programs, publicly available to the research and policy community and for use by postsecondary institutions. At least some of the most critical data must be longitudinal to understand changes over time and to identify causal relationships between policy changes or interventions and student outcomes. A strong data infrastructure requires emphasis on both greater accessibility and use of data, secure and durable linkages, and the robust protection of privacy through mechanisms that have proven successful in other environments such as health.

A response to the question, what do we need to know, gives rise to three lenses, or groups of questions, about access.

- Who is going where?
- What are the influences on access?
- What are the impacts of changes in policy, practice or context?

Most researchers and stakeholders identified a central need for descriptive data that can be used to measure progress. For an equity of access agenda, there is a fundamental need to know who is going where both at the sector level (college, university, apprenticeship, workplace, unemployment) and at the institutional level to begin to understand similarities and differences between patterns. The question on influences looks at students' pathways toward — or away from — access and success in postsecondary. This discussion is structured through a life-course lens, looking at the different (actual or potential) points of influence on access decision-making and opportunities as students age. The final question focuses on issues of change, both at the macro level — in terms of the impact of larger social trends which may be (re)shaping our understanding of access patterns — and at the meso- or micro-level, to understand the impact of more specific, intentional changes. Thus, the question of change also includes the question of whether broad policy tools or specific programs are having the intended effect. While the focus of these questions is different, what they have in common is the need for longitudinal data, likely across cohorts.

First, however, it is important to look at existing data. This discussion is organized by the major data sources that have contributed to the body of Canadian research; the three lenses on what we need to know are referenced throughout. Those more familiar with existing data sources or wishing to focus on prospective data needs may wish to proceed to Section 5.

4. What we know: Key data sources and findings to date

There are a number of important data sources that inform our current understanding of equity of postsecondary access in Ontario. Perhaps the most significant among them is Statistics Canada’s Youth in Transition Survey (YITS). YITS is particularly useful because the data are longitudinal, comparable across institutions and provinces, and contain information about both students’ actual pathways as well as their underlying attitudes. Statistics Canada has several other data sets that contribute important — but partial — information to our capacity to study access issues, including both national surveys and administrative data sets shared by Canadian provinces. The provincial government and some of its agencies have a very rich collection of individualized records including a depersonalized Ontario Education Number, which has considerable potential as a research tool. Ontario’s universities and colleges have their own institutional research, some of which is comparable across institutions and relates to access issues. Within Ontario, there are a number of more localized initiatives or research centres that use administrative and survey data to examine questions of access and outcomes. Finally, there are a very small handful of Canadian experimental or quasi-experimental studies looking at the impact of targeted interventions to boost access, ranging from guidance information sessions to grants and help with applications.

4.1 Youth in Transition Survey

The Youth in Transition Survey was an ambitious, national, longitudinal survey designed to develop policy-relevant information about the patterns and major transitions in young people's lives and what influences them, particularly with respect to education, training and work (for an overview, see Motte, Qiu, Zhang, & Bussiere, 2008). There were two cohorts of students who participated in the first cycle of YITS starting in 1999: a group of 15 year-olds and a group of 18-to-20 year-olds. The survey ran for five cycles. The 15-year-old sample (YITS-A) was stratified by high school to allow for examination of school effects. For that group, researchers also used a parent- and school-level questionnaire in 1999 to add an extra richness to the data set. The older sample (YITS-B) was selected from the Labour Force Survey panel. YITS was designed to produce data on demographic and family characteristics; high school experience and achievement (participating students were also part of the Programme for International Student Assessment, or PISA); postsecondary education and labour market activities; and PSE financial factors.

YITS was described as providing an “unprecedented richness of data” and “opening up new opportunities” for understanding student transitions, and, in particular, issues of access and persistence (Finnie, Sweetman, & Usher, 2008a, p. 9). In addition to the rich data, there was also a significant investment in analysis of the data through the *Measuring the Effectiveness of Student Aid* (MESA) project. As one informant noted, given the complexity of longitudinal data sets, it is essential, as a core aspect of data infrastructure, “to ensure there is a community of users ... to think about what kind of tools do you need to provide.” That informant highlighted the importance of a well-designed, publicly available data dictionary and “a team of research assistants that know the data inside out, who can point researchers with a particular interest to key variables and provide support in the analysis.”

Between the richness of the YITS data and the MESA project, there was a substantial body of studies that resulted from the five cycles of data, resulting in a significant new understanding of student pathways through high school into postsecondary and the workforce. The outcomes included almost 30 Statistics Canada reports on a wide array of themes, looking at the relative importance of family, educational and cultural backgrounds relative to income, issues of gender, the relationship between early achievement and PSE participation, a comparative analysis of the impact of tuition policy, Aboriginal education, second-chance pathways, and career trajectories within particular fields. In addition, the data were used to produce two books — *Who goes? Who stays? What matters? Accessing and Persisting in Postsecondary Education in Canada* (Finnie et al., 2008b) and *Pursuing Higher Education in Canada: Economic, Social and Policy Dimensions* (Finnie, Frenette, Mueller, & Sweetman, 2010) — and numerous other studies by independent researchers (see Appendix 1 and bibliography).

The YITS data, while unusually broad and rich, also contained considerable limitations, which were raised by numerous interviewees. Among the key limitations were the variables of “visible minority” and “immigrant” used in the survey. These categories are extremely broad and include demographic subgroups with very divergent patterns of access. Statistics on “average” access to postsecondary of visible minority students understate both successes and problems. This “race-blindness” may have resulted in a failure to tailor appropriate policies for certain significantly underrepresented groups. Furthermore, the survey did not include on-reserve Indigenous youth or those who live in Canadian territories, two of the most marginalized subgroups in the population in terms of postsecondary access.

4.1.1 A renewed longitudinal survey program?

The last round of data collection for YITS occurred in 2010, when funding for the program was cut by the federal government. Most comparable jurisdictions have major, multi-cohort longitudinal studies. For example, by 2010 the Youth Cohort Study in England and Wales had tracked 13 cohorts of young people from the time they left school until four years post-graduation. The data have been integrated with the Longitudinal Study of Young People in England, which is in turn linked to administrative data to track students’ progress through school. The Longitudinal Study of Australian Youth has tracked six cohorts of 15-year-olds annually for 10 years, incorporating extensive administrative data and school information. In the United States the National Center for Education Statistics has a series of longitudinal studies looking at transitions from secondary to postsecondary and the workforce, most recently the High School Longitudinal Study which commenced in 2009 with a cohort of students in Grade 9. Without multiple cohorts of comparable, longitudinal data, it is difficult to understand the impact of policy changes and, indeed, stability and change in society as a whole (see Schuller, Wadsworth, Bynner, & Goldstein, 2012).

In the years since the end of the Youth in Transition Survey, there have been significant changes in the postsecondary system across Canada. The absence of a survey or other longitudinal data leaves numerous unanswered questions: How is generational change playing out? Are millennials taking different educational pathways? What’s the impact of growing immigrant and Indigenous populations, and the greater

identification of students with special education needs? What, indeed, are the impacts of the considerable overall increase in postsecondary enrollment and changing employment opportunities beyond school?

Many informants talked about the usefulness of the YITS program for research and many regretted the loss of a key data source that provided a population-level study of both those who enter publicly funded postsecondary institutions and those who don't. Surprisingly, almost no one interviewed for this study considered the development of another longitudinal survey — particularly one focused on Ontario alone — as a major priority for data infrastructure to study postsecondary access.

There were an array of reasons given for the low priority attached to a new longitudinal study. Key concerns raised included cost in the context of overall budget constraints and the lengthy timeframe between launching the survey and the development of longitudinal data sets. There was also a concern that a population-wide survey would not necessarily allow adequate depth of sampling among groups with the greatest equity challenges, making it potentially less useful than it could be for understanding the issues of improving access for underrepresented groups.

Above all, this consensus reflects the view that the last decade has seen considerable advances in the availability of administrative data, which could be used much more effectively to address key questions about who goes where, who stays, and what happens in terms of both institutional and post-school outcomes. There are a number of limitations to administrative data sets as they presently exist (see section on administrative data below), but the widely held opinion was that the key priority in terms of data infrastructure should be to improve access to and use of these data for research purposes.

4.2 Other surveys from Statistics Canada

Statistics Canada has conducted a number of cross-sectional surveys on issues relating to postsecondary access. The Postsecondary Education Participation Survey (PEPS) was a cross-sectional, one-time (2002) survey of 17-to-24 year-olds that examined access, persistence and postsecondary financing, with some demographic analysis. The study was closely linked to the Canada Student Loans Program. Students who did not continue into PSE, or who left, identified “finances” and “lack of fit” as the biggest barriers to access.

The most detailed information in the survey related to postsecondary expenditures and financing. For example, across Canada, approximately one-third of students had accessed government student loans, with lower-income students more likely to take advantage of (or be burdened by) loans² (Barr-Telford, Cartwright, Prasil, & Shimmons, 2003; Finnie & Laporte, 2007). In 2009, the Access and Support to Education and Training Survey (ASETS) replaced PEPS and integrated this line of inquiry with a survey on adult learning and educational planning; the target population was adults up to age 65. While the study was not

² Current estimates for participation in the Ontario Student Assistance Program are considerably higher, 60% according to one informant. An overview of OSAP grants and amounts is currently under review as part of the government's open-data initiative.

longitudinal, it did reveal changing patterns of how students paid for education, the percentage of students accessing government student loans, and what younger students perceived as barriers. Because of the larger age span, ASETS also identified approximately a third of adults, particularly older adults, with “unmet learning needs.” Older adults face notably different barriers, with far more emphasizing family responsibilities, while cost remained the chief barrier identified by younger adults (Knighton, Hujaleh, Iacampo, & Werkneh, 2009). The National Graduates Survey (NGS) provides information about postsecondary employment earnings, whether graduates have found work in related fields, debt, and debt repayment, but it does not directly touch on questions of access as it is administered approximately three years post-graduation.

Flagship Statistics Canada surveys with a focus beyond education have also contributed to our understanding of trends in postsecondary access. The Survey of Labour and Income Dynamics (SLID), for example, has been used to investigate long-term trends relating to increased university participation over time; and specifically the impact of tuition fees on decisions about postsecondary access (Christofides, Hoy, & Yang, 2009), or to demonstrate some convergence between the percentage of students from the top and bottom quartiles of family income attending postsecondary (Drolet, 2005). The Labour Force Survey (LFS) is extremely useful for tracking current information about the relationship between overall educational attainment and postsecondary employment outcomes (CANSIM, 282-0004). Finally, the census (or, in 2011, the National Household Survey) includes a rich trove of demographic and geographic data on residents, including information about levels of educational attainment of the population from the ages of 25 to 64, and fields of study for those aged 15 to 24, as well as information about occupation, family income, national origin, and visible minority status. Because these are population-based surveys (rather than focusing on youth), and because education is not a primary focus, both sample size and a limited number of education-relevant factors limits exploratory analysis.

4.3 National administrative data sets

4.3.1 *Postsecondary Student Information System*

Statistics Canada has worked with the provinces to develop a national repository of key administrative data, including individual-level records, about the postsecondary system in Canada called the Postsecondary Student Information System (PSIS). This system has faced numerous obstacles in reaching its full potential as jurisdictions and individual institutions in some provinces have resisted and/or had difficulty providing a full range of fields required for a rich analysis. However, there has also been significant progress, and the data in PSIS are much closer to reaching their potential as a backbone of a longitudinal linkage program; for example, there are currently linkages in place with tax files and possible linkages to the socio-economic data in the census are contemplated within the next five to 10 years to be able to better understand both demographic trends and labour market outcomes.

The Maritime provinces have committed to using the PSIS system fully. All institutions in Nova Scotia, New Brunswick and Prince Edward Island contribute to a shared database of 270 fields, which can be used, for

example, to track individual student mobility and persistence between programs and institutions across the provinces (Finnie & Hanquin, 2009). The Maritime provinces have also been able to look at graduate outcomes for successive cohorts of students comparing, for example, first-year earnings or how many graduates are working part-time (Maritime Provinces Higher Education Commission, 2016). PSIS, with the full set of variables and full institutional participation, has also contributed significant contextual and baseline data for high-quality evaluations of postsecondary access interventions (Explore Your Horizons and Learning Accounts) in New Brunswick (Ford & Kwakye, 2016).

There are two major limits on the data available through PSIS for the study of equity of access. First, the PSIS data set is not linked to secondary school information, so it provides very limited information about the transition from high school to postsecondary, and no information about the students who don't go on to PSE. The demographic information collected is also limited. Participating provinces provide data on whether students are “visible minority” or “Aboriginal” (or neither, or unknown); they also provide information on whether a student faces an “activity limitation.”³ These categories are extremely broad and limit the usefulness of the data for tracking, for example, the progress of underrepresented groups, such as racialized minorities or students with special education needs, and how their pathways vary.

Historically, Ontario has had relatively limited participation in PSIS, with universal participation from postsecondary institutions limited to 30 fields, which provides some limited information about key issues of access and persistence (see Educational Policy Institute, 2009). But since 2014 legislative changes permitting the sharing of information (see Section 4.4.1 below), there has been significant movement. At present, the Ministry of Advanced Education and Skills Development directly shares information with Statistics Canada for PSIS rather than having institution-level participation; there is a shared commitment to providing a broader core of 68 data elements for colleges and 80 for universities in a standardized form — including information to identify individual students, their mother tongue, citizenship status, qualifications sought (for example, degree or diploma) and student status.⁴

4.3.2 Registered Apprenticeship Information System

Apprenticeship is a form of postsecondary education and training under the authority of the Ministry of Advanced Education and Skills Development. At this point, apprenticeship records do not include the Ontario Education Number, which makes longitudinal analysis extremely difficult, (for example, are Ontario Youth Apprenticeship Program, or OYAP,⁵ participants more likely to pursue apprenticeships as they reach 25 years of age, or are university and college graduates going onto apprenticeships, and, if so, from which

3 Fields SD4210, SD4215, data elements Postsecondary Student Information System available at http://www23.statcan.gc.ca/imdb-bmdi/document/5017_D2_T3_V6-eng.pdf.

4 University Statistical Enrolment Report (USER) – Summary of Data Elements and Descriptions (2016); College Statistical Enrolment Report (CSER) – Summary of Data Elements and Descriptions (2016).

5 OYAP is a “School to Work program that opens the door for students to explore and work in apprenticeship occupations starting in Grade 11 or Grade 12 through the Cooperative Education program” <http://oyap.com/en/index.cfm>.

programs?) It is also impossible to map at a system level who is going where and to track relative outcomes in the case of programs where students may be able to get a qualification either through apprenticeship or a college diploma (for example, Early Childhood Education).

That said, the Registered Apprenticeship Information System (RAIS) does track registered apprentices taking in-class and on-the-job training in the trades, including trades with voluntary and non-Red Seal Certification. RAIS collects only limited demographic information, including gender and age. It also provides information about different pathways to apprenticeship (for example, finding a sponsor, or the Ontario Youth Apprenticeship Program) and it compiles data on the number of provincial and interprovincial certificates granted to apprentices or trade qualifiers.

Information available through the RAIS highlights some of the distinct issues involved in accessing apprenticeship as a type of postsecondary education. For example, almost two-thirds of those entering apprenticeship are 25 years or older, which has significant implications both for the supports required and for the perception of apprenticeship as a way to enter the workforce for high school graduates (Refling & Dion, 2015).

4.4 Administrative data collected by the provincial government

The Ministry of Advanced Education and Skills Development collects significant data on the postsecondary education system and the Ministry of Education collects even more data on elementary and secondary schools and students. However, there are limits on the availability of that data. Only limited data sets are available through the Open Government platform.⁶

4.4.1 The Ontario Education Number

Data on individual students are linked to a randomly assigned eight-digit Ontario Education Number (OEN). The major advantage to the OEN, and the reason it was initially adopted, is that it depersonalizes data and, therefore, allows students to be tracked through the education system without the need to use identifiable data (subject to suppression rules with small populations). The OEN follows the students through the school system from early years (in licensed programs) onward. Individual data has been collected since 2003 for students in kindergarten to Grade 12 (K-12), including both stable information like name, gender and date of birth, as well as information about student enrolment, achievement, attendance, course choices and special education needs. The data collected by MAESD include the credentials students are pursuing in postsecondary, programs in which they are enrolled, limited information on educational outcomes (for example, year of study, graduation, registrations between institutions), full- or part-time status, information

⁶ For a comprehensive and regularly updated list of provincial data sets that are available, see <https://www.ontario.ca/data/government-wide-data-inventory>. For data available through provincial agencies, by agency, see <https://www.ontario.ca/page/agency-accountability>.

on citizenship and permanent residency, and languages spoken. These data have been collected from all colleges of applied arts and technology as well as publicly assisted universities since 2012. The Ontario Universities' Application Centre and OCAS (formerly the Ontario College Application Service) both track applications using the OEN. Student financial assistance information is not linked to the OEN.

In the postsecondary sector, data linkages using the OEN are now in the 99% accuracy range. At this point, however, almost all analysis and use of student level data are limited to in-house use by government ministries. The Ontario Government has begun to use the data to track movement between institutions and credit transfer, among other things. On a few occasions, researchers working on the evaluation of government-supported projects have obtained access to anonymized versions of these data for their work (see, for example, Ford & Oreopoulos, 2016). The process has involved protracted negotiation on a variable-by-variable basis and highly customized data-sharing agreements. This treasure trove of data is largely unavailable to the broader research community and even to agencies with mandates to inform government.

Under the Ontario Education Act (governing K-12) and the Ministry of Training, Colleges, and Universities Act, which provide for Ontario Education Numbers to be assigned, there is a general requirement that the OEN be treated as private information: "No person shall collect, use, disclose or require the production of another person's Ontario Education Number."⁷ There have been a number of exceptions, notably, for purposes relating to the provision of educational services and for applications for student financial assistance. For greater clarity, the Education Act was amended in 2010 to add a new exception in s. 266 (3): "The Minister and a prescribed person may collect, use or disclose or require the production of Ontario education numbers for purposes related to education administration, funding, planning or research."⁸ In 2014, the Ministry of Training, Colleges and Universities Act, which has parallel provisions to the Education Act, was also amended to provide the minister or a college, university or other postsecondary educational institution with the same exception to share data for research and planning.⁹ This change was a key development in permitting the data to be shared with, for example, Statistics Canada for PSIS, or the Ministry of Finance. But even with new legislative authority, there continues to be very limited data sharing and the data sharing that does occur is limited specifically to educational purposes rather than broader public policy purposes such as research projects involving student well-being, or measuring the effectiveness of anti-poverty initiatives.

4.4.2 Program-level data

In K-12, there is a single, web-based system called the Ontario School Information System (OnSIS) that is used to collect and integrate board, school, student and educator data as well as information about courses taken, test scores, and special education identification and services. After it has been submitted by individual schools and rolled-up at the board levels, OnSIS data are stored and integrated with the

7 Education Act, R.S.O.1990, E.2, as amended by S.O. 2010, c.10, s.266.3.

8 Education Act, R.S.O.1990, E.2, as amended by S.O. 2010, c.10, s.19.

9 Ministry of Training Colleges and Universities Act, R.S.O., 1990, c.M.19, s.15, as amended by 2014, c. 11, Sched. 5, s. 1.

Elementary/Secondary Data Warehouse (ESDW). All provincial level data are stripped of individual-level identifiers, including the depersonalized OEN. The stripping of student-level information makes it very difficult to understand and track the impact of programs and opportunities students may or may not have received. This action limits the utility of the warehouse for the express purpose of supporting analysis, policy development and evidence-based decision-making in the education sector and warrants further review by the Information and Privacy Commissioner of Ontario.

4.4.3 Administrative data held by arms-length agencies and other organizations

Some government data that could be highly relevant to issues of access to postsecondary education are currently held not directly by government, but by arms-length agencies and other organizations. Three are particularly critical: the Education Quality and Accountability Office (EQAO), OCAS (formerly, the Ontario College Application Service), and the Ontario Universities' Application Centre (OUAC).

4.4.3.1 Education Quality and Accountability Office

The Education Quality and Accountability Office (EQAO) has responsibility for administering standardized assessments of students' progress in Grades 3, 6, 9 and 10. As part of its mandate to assess and promote quality and accountability, EQAO also conducts annual surveys of students, teachers and principals thus collecting rich student, school and classroom data on students' attitudes and beliefs, behaviours and learning environments as well as, potentially, teachers' beliefs and expectations. The data are linked to neighbourhood-level socio-economic information from the census and include detailed information about students' special education needs. Because the data are linked to the OEN, EQAO has the capacity to do longitudinal analyses of issues relating to student achievement and, in some cases, significant policy issues relating to gaps in achievement, such as the impact of student course selection in high school (see for example, Education Quality and Accountability Office, 2012). These data could be highly relevant for improving our understanding of access issues, given the importance of students' earlier academic achievement and their understanding of postsecondary access opportunities.

EQAO has a public process in place to share its data with researchers. The leadership and staff believe that the rich data they collect are ripe for analysis and welcome the involvement of external researchers in making full use of it. Eligible researchers may include individual boards or groups of boards, academic or policy researchers. EQAO operates a data portal through which researchers can apply for access to certain data.¹⁰ There is an additional freedom of information process required to obtain certain types of linked data. These requests are routinely granted. Depersonalized but linked data can be obtained by approved researchers, including academic researchers and non-profits working in the field of education.

¹⁰ <http://www.eqao.com/en/research/data-portal>

4.4.3.2 Ontario Universities' Applications Centre and Ontario College Application Service (OCAS)

Ontario has a centralized process of applying to university (through the Ontario Universities' Application Centre, or OUAC) or to college (through OCAS, previously the Ontario College Application Service). OUAC and OCAS collect data in a way that is consistent among public institutions and, as noted above, track applications using the OEN, though demographic data are limited. Both OUAC and OCAS use identical questions to ask about gender, including an option to choose "other gender identity," and "Have either of your parents/guardians attended a university or college?" Both ask students to provide information on their country of birth and whether students identify as Aboriginal — although they use different wording, and it is optional to provide the information to OUAC but not OCAS.¹¹ OUAC and OCAS also collect significant information about students' academic history through transcripts and activities/employment history at the point of application. OCAS and OUAC data can be made available, on application, to researchers beyond government and to institutions including both colleges and school boards. Anecdotally, several researchers have reported experiencing difficulty getting access to OCAS and OUAC data. OCAS reports that its policy on data sharing is not a public, but an internal, document and that it does not track the acceptance rates of applications for use of data.

4.5 College- and university-based surveys

Institutions and, in some cases, organizations representing the college or university sectors, have developed a considerable body of research that speaks to questions of equity of access. Going back more than a decade, Colleges Ontario has produced a number of influential reports based on large-scale surveys and administrative data sets, including *Who doesn't go to postsecondary education*, a report that combined administrative data from K-12 with college and university application centres, plus in-depth interviews (A. J. C. King, Warren, M.A. King, Brook, & Kocher, 2009). Colleges Ontario also developed a series of reports from an extensive survey of 21,000 students graduating from 74 representative high schools across the province, twinned with a longitudinal administrative data set for the "double cohort" of students graduating in 2003 (King & Warren, 2006; Colleges Ontario, 2005). These reports are part of the public domain.

There are a number of major surveys in which a significant number of universities participate as part of their institutional research programs, which provide useful information about who is attending university and which presumably could be analyzed to examine whether there are patterns in students' motivations for choosing university or college, financial situations and experiences by subgroup. However, the data are proprietary and there is limited access to them for the broader purposes of knowledge generation and policy development.

¹¹ OUAC's question reads: "Are you an Aboriginal person? (voluntary declaration) An Aboriginal person is an individual who is First Nations (Status or Non-Status), Métis or Inuit." Applicants can answer "yes" or "no/no declaration." OCAS asks, "Do you consider yourself to be an Aboriginal person, that is, a person related to, or descended from, the original peoples of Canada?" Applicants can answer "yes" or "no" and are required to provide an answer before continuing.

4.5.1 Canadian University Survey Consortium

The Canadian University Survey Consortium (CUSC) includes 34 member universities. The consortium surveys first-year students every third year as part of a three-year survey cycle. Its 2016 sample included approximately 15,000 students. The survey includes detailed information about students' special education needs and general demographic information such as gender, whether students are part of a visible minority or are Aboriginal, and their family educational background. It also contains information about how students are financing their studies. Individual universities own their own data and thus can compare, for example, whether they are making progress on attracting diverse students relative to national averages or past performance. While an aggregate national picture is available, data that would allow for comparison between institutions are not (Prairie Research Associates, 2016).

4.5.2 National Survey of Student Engagement

The National Survey of Student Engagement (NSSE) is a cross-sectional survey distributed on a census basis and is primarily used to track student experiences. It does not include information about students' access decision-making, though it asks about students' experience with other students who are racially/religiously/economically different. It includes a demographic question that allows students to identify their race/ethnicity from a drop-down menu and permits students to make detailed choices about how to describe their identity. Universities receive this detailed information but much of it is not shared or publicized. In 2014 all Ontario universities participated as part of their accountability agreement with the government; most do not participate annually. NSSE has been used in Ontario as part of an effort to identify the impact of a range of initiatives designed to improve student achievement (Conway, 2010). The demographic information has the potential to be used to provide information about efforts that support students' persistence. The Ontario College Student Engagement Survey was discontinued in 2009.

4.5.3 University and College Applicant Study

The University and College Applicant Study (UCAS) is an annual cross-sectional survey conducted since 2008 by Academica, a consulting firm, and which combines previously separate university and college surveys (Academica Group, 2015). UCAS provides colleges and universities with demographic breakdowns including detailed information on race and special education needs, factors affecting students' decisions about which institution they will choose, and student perceptions about financing. UCAS provides a web-link to the survey to all college applicants; in 2015 there was a 23% return rate. Academica also runs two additional commercial surveys: a survey of students who decline acceptances and a study of qualified students who chose to apply to other institutions. These studies serve to guide recruitment and marketing efforts for postsecondary institutions seeking to boost enrollment by focusing on the "needs of students as learners and customers" (Black, 2010, p. 6).

4.5.4 *Individual institutional surveys and reporting*

Institutions also have their own surveys to track, among other things, equity in admissions. For example, Queen's University has had a voluntary Student Applicant Equity Census in place since 1999.¹² The categories are very broad (Aboriginal person; visible minority/racialized person; person with a disability), but the university publicly reports on the extent to which each of these groups are underrepresented at the institution relative to the Canadian population aged 15 to 24; the survey also asks about family income, family educational background and the size of a student's home community. Mohawk College conducted a diversity survey that, in addition to seeking information about students' background as Aboriginal, newcomer and international student, also asked about students' sexual orientation in an effort to build a broader strategy around social inclusion (Social Inclusion Committee, 2012). The University of Toronto has announced that it will conduct a student census with a broader set of racial/ethnic categories for the purposes of equity planning.

Most colleges and universities access funding to improve the recruitment and retention of certain groups, such as first-generation students. As a condition of funding, they are required to report to government on a number of key issues under their Multi-Year Accountability Agreements.¹³ One college, for example, reports on enrolment and basic demographics of first-generation students, the number of first-generation students deemed at-risk based on a GPA cut-off, how many receive targeted supports, student satisfaction, completion of each semester and academic year, and graduation. Definitions of first-generation student, however, vary between institutions and there is considerable variation between how credits are recorded and the definition of types of support services.

A review of the data collected by colleges and universities suggests that at this point, universities and colleges have more data on demographics, student experiences and motivations than is available for use for public policy purposes.

This work that is currently carried out by institutions and groups of institutions could potentially provide important data for understanding equity of access and persistence. Institutions know that they need to understand these factors in order to operate effectively and actively seek it out. But right now there is very little comparability between the questions asked at different institutions, and the data are not aggregated across institutions to look at system-wide patterns. Much of the most detailed — and also comparable — program- and experience-oriented information that is collected is proprietary. The information provided to — or demanded by — government represents a fraction of what could be known about equity of access with a broader pooling of data.

12 <http://www.queensu.ca/equity/educational-equity/student-applicant-equity-census>

13 For a sample agreement and report, see https://uwaterloo.ca/institutional-analysis-planning/sites/ca.institutional-analysis-planning/files/uploads/files/Multi%20Year%20Accountability%20Agreement_0.pdf.

This statement may seem a bit naive and there are, of course, considerable political and technical challenges to be overcome in developing a common and rich set of data. On the technical front, there needs to be work done on how key concepts for access are measured and toward more consistent approaches to data collection, and on how to interpret data that has been collected in different ways. Politically, there is another hurdle. Institutions are concerned about data being used to rank or compare them in ways that may be acontextual or unfair, and worry that such data will be used by government as a tool to assert control. But if equity of access is to be a priority, these data should be collected in comparable ways and made public so that institutions, government and the research community can identify successes and understand what is contributing to them. This key aspect of data infrastructure is an area where the government is currently declining to exercise its authority.

4.6 Research initiatives using administrative and linked survey data for access questions

There are a number of academic and institutional research centres that are doing significant work on questions relating to access, including studies that use linked, longitudinal data from multiple sources: surveys, K-12 achievement and program of study data, university admissions and persistence information, and tax records.

4.6.1 Education Policy Research Initiative

Notable among these research institutes is the Education Policy Research Initiative (EPRI) at the University of Ottawa, which has been pursuing linkages of tax data with records from 14 postsecondary institutions to look at outcomes by program of study (Finnie, Afshar, Bozkurt, Miyairi, & Pavlic, 2016). This study is important from an access perspective since tax files can also be a significant source of information about family income. The matching for this work involved individual partnerships with particular institutions. Students were matched using name, date of birth, postal code and gender.

In the more specific area of access research, EPRI has produced numerous studies,¹⁴ particularly but not exclusively, drawing on the YITS data to look at issues such as non-financial barriers to access (Finnie & Mueller, 2008), and distinct access patterns of first- and second-generation immigrant students — who as a group are more likely to attend PSE even if they come from low-income, low-parental education homes (Childs, Finnie, & Mueller, 2012; Finnie, Mueller, & Wismer, 2012).

4.6.2 Public Economics Data Analysis Laboratory

The Public Economics Data Analysis Laboratory at McMaster University has pursued a number of research projects using linked data throughout formal education, from early childhood to school-age, and K-12 to postsecondary. For example, Card and Payne looked all the way back to elementary school achievement

14 For a full list, see the website: <http://www.epri.ca/>

results to understand patterns of course choices in secondary school as they related to pathways to (or away from) postsecondary (Card & Payne, 2015; Dooley, Payne, & Robb, 2012). They have been able to link data at one or two postsecondary institutions to a larger set of K-12 data using the Ontario Education Number. PEDAL researchers have also linked neighbourhood-level socio-economic status data to questions of access decision-making for marginal students (Foley, 2012).

4.6.3 Large-scale research conducted by and in partnership with school boards

The Toronto District School Board (TDSB) conducts longitudinal research with demographic information-collection through a student census. These data are linked to very complete administrative records that include information about special education status, program of study (academic versus applied), grades, standardized test scores, and university and college admissions data through the application centres. Its significant in-house research and evaluation capacity has led to an extensive series of cohort-based reports (for example, Brown, 2010; Brown & Parekh, 2013; Parekh, 2013; Toronto District School Board, 2012), which have revealed what one observer described as “very disturbing patterns of racial differences in experiences and outcomes,” as well as a range of issues facing students with special education needs.¹⁵ In addition, the TDSB has entered into research partnerships to explore postsecondary access issues through an intersectional, longitudinal lens through the Gateway Cities partnership funded by the Social Sciences and Humanities Research Council. The partnership will allow TDSB to look at Toronto in comparison to Chicago, London and New York City. So far, the research has shown an improvement in outcomes for particularly marginalized students — black male youth, for example — but also outcomes for groups worse than those in other high-immigration “gateway cities” (for example, see Robson, Anisef, Brown, & George, 2016). A handful of other school boards — York Region, Peel, Halton and Hamilton-Wentworth — also conduct some demographic or neighbourhood-based analyses of K-12 programs, such as the Peel Region’s qualitative study on the experiences of black male students, *We Rise Together* (Board, 2016). Not all of these studies are public. And, at this moment, no board other than Toronto systematically collects demographic data. School boards outside major urban centres with smaller student populations collect more limited data and have a more limited capacity for analysis.

4.7 Experimental or quasi-experimental interventions research

There is a consensus both in the literature and in key informant interviews that the research into effective interventions to improve postsecondary access and persistence outcomes is limited, particularly research based on experimental or quasi-experimental methods (Currie, Leonard, Robson, & Hunter, 2013). There is perhaps a larger body of international research that may or may not be transferrable to the Canadian context (see Executive Office of the President, 2014; Gardenshire, Cerna, & Ivey, 2016; Gorard & Torgerson, 2012).

15 There is a very long list of reports available at <http://www.tdsb.on.ca/research/Research.aspx>.

4.7.1 *Social Research and Demonstration Corporation*

Most Canadian experimental research comes from the Social Research and Demonstration Corporation (SRDC). SRDC has conducted a series of long-term evaluation studies tracking the impact of carefully designed interventions to boost postsecondary participation, particularly among groups or schools where participation has been low. Perhaps the most notable finding to date comes from a randomized control experiment using longitudinal data of two interventions to boost postsecondary enrollment and retention in New Brunswick (Ford & Kwakye, 2016). The interventions included a series of after-school career education workshops for students in Grades 10, 11 and 12 called Explore Your Horizons and Learning Accounts, which provided a guarantee of an \$8,000 grant to low-income students to pursue postsecondary education. An additional group received both the workshops and the Learning Accounts. Receiving both interventions had a significant positive impact on postsecondary enrollment, compared to students in the control group. Explore Your Horizons boosted university enrollment by 8% relative to the control group, but did not have a significant effect on college enrollment. Learning Accounts alone boosted college enrollment (7%), although for first-generation students it had a positive effect on both (6% university and 10% college). The authors wrote:

The fact that differences in outcomes between the program and control groups persist six years post-high school is notable. These findings indicate that Explore Your Horizons and Learning Accounts did not just accelerate changes in behaviour that would have happened anyway but produced lasting changes in young people's lives.

Other experimental research by SRDC has been useful in suggesting certain theory-based programs may not necessarily boost college access. For example, the AVID program promotes students in Grade 9 and onward to take harder classes while receiving support. The AVID trial found changes in student engagement, willingness to take hard courses and a decline in boys' drop-out rates, but it did not improve rates of postsecondary applications or enrollment relative to the control group (Ford et al., 2014). An in-school program to teach students about the costs and benefits of postsecondary and provide hands-on support in submitting applications and applying for student aid showed relatively little impact in British Columbia, although a modified version of the program in Ontario had much stronger and more positive results (Ford, Kwakye, Hui, & Oreopoulos, 2016).

Notably, all these longitudinal studies rely on administrative data linkages — in secondary school and into postsecondary — to track what happens (or doesn't) as a result of interventions. Outside British Columbia, these data requests require considerable investments of time on the part of both researchers and ministry staff to provide access to selected variables and establish customized linkages because data sets currently are not systematically linked and linkages are purpose-specific.

4.8 Conclusions on existing data

There is considerably more data collected, some of it highly relevant to questions of equity of access, than is currently used to understand this pressing policy issue. Large, longitudinal survey data are no longer current, although we continue to rely on them for many policy purposes. Other cross-sectional surveys provide useful information to inform our understanding of access but each of these sources is quite limited. The largest untapped resource of equity of access data — student pathways and the educational and program factors that shape those pathways — is administrative data. There are currently issues in terms of researchers being able to access depersonalized data and a lack of linkages, which would allow a better understanding of students' transitions into postsecondary. The most detailed demographic information currently collected is mostly held by universities through proprietary surveys used for marketing and service development. There is limited public and research-community access to these findings. Experimental research in Ontario continues to face significant barriers because of the need to negotiate access to data on a case-by-case basis.

Against this backdrop, it is important to ask what we need to know to help shape priorities in improving data infrastructure. These are important questions from the perspective of providing equal opportunities and ensuring effective public policy. The key questions are: Who is going where? What influences their pathways? What is changing with regard to context, policy and practice?

5. The data we need for an equity of access agenda

5.1 Who is going where?

5.1.1 *Who is facing barriers? The human rights context*

Current university reporting contains basic information about total enrollments and has begun to be able to track students' movements between institutions. Institutions receiving designated funding for access for first-generation or Indigenous students report to the government. But at this point, there are very little public data — let alone comparable, compatible information — available about how particular subgroups of students move through school and into the workforce or postsecondary. To the extent there is a focus on equity of access, it is critical to be able to examine patterns of access and attendance on the basis of group identity. Indeed, if we can't determine who isn't accessing PSE, it poses a fundamental challenge for equity policy.

While equity can be a slippery term, at least one aspect of it implies ensuring that certain groups are not subject to direct or systemic discrimination. Systemic discrimination arises through routine institutional practices that may create barriers without any particular intent to discriminate. The Ontario Human Rights Commission has specifically called for expanded government collection of data including race, Aboriginal status, sexual orientation and disability. In the commission's *Race Policy and Guidelines*, it explains that "data collection is necessary for effectively monitoring discrimination, identifying and removing systemic

barriers, ameliorating historical disadvantage and promoting substantive equality” (Ontario Human Rights Commission, 2005, am. 2009). In the context of disability, the commission has recommended that “in order to make sure that education environments are free from social phenomena widely recognized as discriminatory such as profiling, institutional barriers, socio-economic disadvantage or unequal opportunity on the basis of protected grounds, education providers should collect statistical information for the purposes of monitoring, preventing and ameliorating systemic and adverse discrimination” (Ontario Human Rights Commission, 2004).

Numerous informants pointed to challenges that arise because identity data are not recorded at all or, as one experienced policymaker explained:

There is a blurriness when it comes to definition of groups. We have information mostly for first-generation students and a broad, broad category of marginalized students. It has been very hard to document ... The whole population is vastly invisible ... We don't know what we don't know.

Because each institution uses its own questions to look at issues of discrimination, it can be difficult to look at the equity impacts of, for example, transfer programs between universities and colleges. Staff at the Council of Educators of Toronto, for example, “had a sense” that there was a crossover between first-generation students and those in transfer programs. But information about first-generation status is not shared between institutions, and, even if they had wanted to share it, there were additional obstacles because each institution asked slightly different questions. As one informant noted, having data collected inconsistently and not routinely shared, “makes it hard for institutions to communicate, or learn from each other.”

5.1.2 Demographic and administrative data

Currently, the biggest limitation on the value of administrative data as a tool for researching issues relating to equity of access is the lack of demographic data attached to the files at the postsecondary level. If administrative data are to be a major research tool for understanding equity of access, there should be serious consideration given to attaching basic demographic data including race, indigeneity, disability, sexual orientation/gender identity and special education needs to the OEN for purposes of research into equity of access.

There is considerably more work underway on demographic data collection at the K-12 level. Recently, through the appointment of a special adviser on educator and student data, the Ministry of Education is “exploring the feasibility of the Ministry of Education and school boards collecting additional student-level data to better understand student populations and school communities so that they can help to identify and address barriers to success” (Quan & Anastasakos, 2016). Demographic data collection is not currently on the agenda at the Ministry of Advanced Education and Skills Development. “Never say never,” said one senior official, who identified privacy issues as a major concern in collecting these data. When pushed, the official acknowledged that the biggest barrier was “not a legal concern, but more of a political and

stakeholder management issue.” Another leader in the department, a self-professed “open data person,” was concerned that tracking students’ progress and outcomes across institutions could be perceived as “kind of big-brotherish,” and stressed the need to balance research interests with personal privacy. MAESD appears to have experienced less pressure to collect data from racialized communities than, for example, the Ministry of Education and Children and Youth Services, and police forces. Finally, in the absence of province-wide data, there may also be a perception that race is not a major issue. Notably, the only demographic data that does exist (from the TDSB) suggest considerable disparities in both college and university admissions across racial and ethnic groups (Robson et al., 2016).

Apart from the political and stakeholder management issues, there are a number of complex research issues around identifying relevant subgroups for the purposes of data collection. Currently, funding and mandates around access policies are tied to a few groups: students with disabilities, first-generation students, Indigenous students, and francophone students (for example, Ministry of Training Colleges and Universities, 2015). Certainly, evidence supports the view that these groups have been significantly underrepresented in postsecondary institutions and that they face significant barriers. But there is a real concern that this list may be under-inclusive; determining whether this is the case without data, however, is difficult. Moreover, as one leading advocate for demographic data collection noted, “We are constantly going back to say, ‘Who are the groups now?’” He added, “We even need to disaggregate particular groups, putting everything into a historical context — for example, for black students, how they enter Canada has a big impact on whether and how they access postsecondary.” Finally, issues of intersectionality arise out of the recognition that individuals occupy multiple categories in their identities, including their race(s), ethnicities, family or neighbourhood incomes, gender, abilities and immigrant status. Combinations of characteristics operate together to influence various experiences in life, including educational attainment and social mobility (Collins, 1998; McCall, 2005). Ontario research is beginning to highlight the importance of an intersectional perspective to identify how different aspects of identity may operate together to increase students’ educational barriers or opportunities (Robson et al., 2016).

5.1.3 Indigenous students

For Indigenous students there is a particular pressure — but also challenges — to collect and analyze data that measure students’ progress relative to non-Indigenous Canadians. In 2015, among its calls to action, the Truth and Reconciliation Commission called for the federal government to work with Aboriginal governments to develop a joint strategy to close educational and employment gaps between Aboriginal Canadians and others. It also called for annual reports on the educational attainment of Aboriginal relative to non-Aboriginal Canadians (Truth and Reconciliation Commission, 2015, p. 320). A senior staff member at an Indigenous education organization commented, “Our number one need is data. Every postsecondary institution needs a self-identification policy and needs to publish their data. Right now, Laurentian and Lakehead say we have this many students — but there is no comparator, no information about programs and no success rate information.”

The Council of Ontario Universities conducted an ambitious process of research and consultation (with over 505 participants) and made recommendations about the requirements for a “common self-identification mechanism” for Indigenous students across the province which would appear to provide a very good basis for action (Council of Universities, 2013).

At the K-12 level, there is a process of voluntary self-identification for Indigenous peoples. In 2007, as part of the First Nation, Métis and Inuit Education Policy Framework, the Ministry of Education committed to voluntary Aboriginal self-identification as a strategy to allow the Ministry to track progress in advancing Indigenous student achievement and well-being in K-12. Despite a distressingly slow start (see Auditor General of Ontario, 2012), all school boards now collect data on students’ Indigenous identities using common questions. These data are used by the ministry to plan for and report on progress in students’ achievement (Ministry of Education, 2013b). The data are attached to the OEN. Unfortunately, these data are not used by MAESD, which appears to be acting on a legal opinion that it cannot use data currently held by the Ministry of Education on Indigenous identity since, in most cases, consent to collecting that information came from students’ parents; the ministry is not using that data for any analysis currently.

The underlying concern is that, in the words of one government official, First Nation, Métis and Inuit students are “not just another equity-seeking group — data collection must be managed, understood and controlled through Indigenous folks who are making decisions, in partnership with the ministry.” The ministry is clearly articulating the need to build relationships of trust, and ensuring that data collected are useful, and seen to be useful, to Indigenous communities. These are important preconditions for consent-driven data collection. The experience in K-12 suggests that this process is not fast, even where there is a strong commitment behind it.

5.2 Where are they going?

5.2.1 *Early leavers — moving away from secondary school*

Postsecondary access is perhaps most challenging for those who do not complete, for whatever reason, a secondary school diploma. There has been a steady increase in the percentage of students graduating from secondary school over the past decade; but the challenges facing the remaining 15% of students who do not complete are very significant for an access agenda. The availability and quality of second-chance, adult education and transition-year opportunities are a critical support for postsecondary access for these groups (Anisef, Brown, & Robson, 2013; Statistics Canada, 2010). A number of researchers interviewed for this study talked about the policy need to better understand students’ motivations when they are weighing postsecondary options and deciding to leave. Some raised broader questions about students’ experiences: one researcher commented that a key question in access research should be, “How do we make secondary school more engaging?” There is, of course, a considerable body of literature on making secondary school more engaging, which is not reviewed here (see National Research Council Institute of Medicine, 2003).

A number of interviewees identified two demographic groups that may be particularly vulnerable to not completing high school. One group is new immigrants who arrive during their teens and face challenges of

language or academic deficits, which can make a timely transition at 18 problematic (see also Corak, 2011). The other group is Indigenous youth, many of whom face major challenges in high school and are, therefore, not eligible for direct access to postsecondary and need different supports as mature students. A few commented on the importance of attending to less-visible groups such as low-income, white, young men, whom they see as over-represented among those leaving high school or not going on to postsecondary: “There is a male-female gap, 40–60% participation, and it has just stayed there. What’s going on there, what’s underlying that?” Identifying pathways of key groups with specificity could be accomplished retrospectively with administrative data, if demographic data were collected and attached to the OEN; but administrative data are unlikely to yield information about these students’ decision-making, challenges and assets within the school system for the purposes of policy and program planning.

A top priority for in-depth access research (beyond the use of administrative data) would focus on a broad band of students — those with lower or marginal achievement — who currently don’t complete high school or who choose to end their formal education directly after high school graduation. In the words of one researcher, “From an equity perspective, we need research to understand the students who aren’t getting in — we need to understand that group of students. We really haven’t done much research about that student. Are they forgotten in the high schools? What’s happening?” (one example of this work is James & Taylor, 2008). A number of researchers who did not see the need for a population-based survey of educational transitions pointed to “low and marginal achievers” as warranting an in-depth, representative survey to better understand the determinants of their choices and their secondary and postsecondary experiences. Others suggested more in-depth qualitative research — ethnographies or longitudinal interview research — would be required to get not just a sense of the extent of the issues but also a better understanding of these students’ experiences, trajectories, hopes and concerns.

5.2.2 *Apprenticeship*

Currently, it is difficult to trace the pathways taken by students into and through apprenticeship because there is not the same institutional structure around the apprenticeship system as there is for colleges or universities. There is no centralized application centre and no Ontario Education Number; students enter into apprenticeship agreements with employers, not educational institutions. Moreover, students generally enter apprenticeships much later and after considerable workforce experience; there is little research about why this transition is delayed. Existing data show that there are significant gender issues within apprenticeship. There is no information about family background, race, disability, or Indigenous identity of those accessing apprenticeship programs; so someone attempting to track barriers to Indigenous students’ entering apprenticeships will have a hard time getting evidence that is more than anecdotal.

The Ontario Youth Apprenticeship Program (OYAP) is a relatively well-subscribed high school program (45,000 students in 2014), but it is difficult to assess its impact in directing students to the skilled trades. As one researcher commented:

I've become convinced that the OYAP program ... is actually quite useful, but not for the direct transition to apprenticeship (not too many students did). Rather, many of those students I saw from

one cohort of OYAP students applied to college down the road. As well, there is anecdotal information indicating that other students used the OYAP background to return to apprenticeships at some point years later. But without the ability to connect to apprenticeship information, we can't go beyond the level of anecdotal data.

There is a considerable lack of data to help researchers understand whether apprenticeship should be considered an educational model for non-traditional students, how it functions as an alternative to college in some fields, or whether there are appropriate policy tools to link it more closely to the transition from high school.

5.2.3 *Students' choice of institution*

Underlying questions about how students choose the institution that is the best fit for them, are debates about differentiation of institutional mission versus socio-economic stratification. Students choose between a private career college and a publicly funded college; between a college diploma and university degree; between a college baccalaureate and a university degree (see, for example, Fisher, Rubenson, Jones, & Shanahan, 2009; Grodsky & Jackson, 2009; Lang, 2016).

There are a number of issues relating to institution choice. One university-sector informant asked, "How many students that would be eligible to go to university don't go — and how many go to colleges, and how many don't appear in PSE?" Related issues include how students choose and the longer-term impacts of those choices. Student backgrounds matter for questions of social mobility — are eligible non-attenders of university more likely to be members of historically disadvantaged groups? What factors affect students' decision-making about which institution they will attend and how? Outcomes matter, too. There is a powerful body of U.S. literature on "undermatching," which shows that students from low-income and racialized groups are more likely to choose less selective institutions than they qualify for, and, unfortunately, they have inferior outcomes there (Chingos, McPherson, & Bowen, 2009; Hoxby & Avery, 2013).

5.2.4 *Private career colleges*

Research on students who choose to attend private career colleges (see Li & Jones, 2015; Milian & Hicks, 2014; R.A. Malatest & Associates Ltd., 2008, 2009) raises interesting questions of public policy, although significant research challenges. Tracking the relationship of students in private career colleges to the broader postsecondary sector is challenging for a number of reasons. First, because students in private career colleges are not issued Ontario Education Numbers, we can't necessarily see how their progress relates to the broader education landscape. Second, as a matter of logistics, without a central source of data such as an OEN, it is particularly difficult to assess student progress given the large number of private career colleges, their small size, and the fact that most of their regulation falls under consumer protection legislation rather than educational auspices. This context has an impact on what data are collected, reported and shared. Only approximately one-third of Ontario private career colleges have met additional educational requirements (established through MAESD), allowing students enrolled there to qualify for OSAP.

National data suggest that students in career colleges are more likely to be recent immigrants, Indigenous and/or low-income than students in public colleges. They are also likely to be older. (R.A. Malatest & Associates Ltd., 2008). Research conducted on a subset of these students six to nine months post-graduation suggested that graduation rates and post-graduation employment levels were comparable to students in public colleges, although they had lower average earnings of approximately \$25,000 (R.A. Malatest & Associates Ltd., 2009) and higher loan default rates (Milian & Hicks, 2014). Private career colleges also serve a high number of international students (Li & Jones, 2015).

Private career colleges form an important part of the understanding of equity of access to postsecondary. Their relative success at enrolling students from marginalized groups co-exists with concerns that graduates from these programs may face more limited opportunities upon graduation. There does not appear to be research looking at students' transition into private career colleges. Without including private career college information in MAESD's individual-level administrative data, it is difficult to fully understand the role of these institutions in the ecosystem of postsecondary institutions in the province.

5.2.5 Access to success: The role of persistence in data on equity of access

There was a near consensus among informants that an access agenda requires collection of data about students' persistence and outcomes in postsecondary. One researcher said simply that persistence is "integrally related" to access. Like access, persistence in postsecondary is more likely "the more prepared you are, the better matched you are to the program that's right for you, [and] the more you have a sense of where you want to go." As another informant commented,

Looking at access issues without looking at outcome issues is a mug's game — it's not of interest to know about getting in without knowing what happens when you get there ... Without data, it may be that our programs to admit students with disabilities are failing — or whatever initiatives we have to get Indigenous students in are not producing the graduates we want. That's a resource issue and a quality of service issue. We may be putting our resources in the wrong place. There may be alternative ways of supporting people.

From the perspective of several informants in the K-12 sector, too, knowledge of whether students were adequately prepared not just to enter postsecondary but to succeed while there is a key measure of success of the K-12 system. "That was the data we wanted in our high schools, to know how our grads were doing after a year or two," explained one institutional researcher. She commented, however, that it was difficult for boards — let alone schools — to get information from postsecondary institutions, even though those same institutions wanted detailed information from the secondary schools to assist their decision-making.

5.2.6 Advanced study

The considerable increase in the percentage of students who accessed postsecondary education over the past decade has led some commentators to speak of PSE as becoming all but compulsory. Two even

speculated about the benefits of making some form of PSE compulsory, effectively solving the question of access overnight.

In that context, a handful of informants speculated that as the proportion of the population doing some kind of postsecondary increases, some of the economic, social and health advantages formerly associated with higher education may be reserved for those who pursue additional qualifications, and that professional or graduate study will come to play a similar gatekeeping role; certainly, the percentage of the population with multiple degrees or qualifications is growing. This trend would appear to suggest a few key points around collecting and reporting data. The need for demographic data about advanced programs is as vital as the need for demographic data about initial access to PSE. Moreover, the classic ways in which education is reported in socio-economic status reports — for example, for the purpose of tracking inequality or social mobility — may benefit from disaggregating the category of PSE to distinguish those with multiple qualifications.

5.3 Influences on decision-making

The second lens through which to view research around postsecondary access starts with the influences that may — or may not — shape postsecondary pathways. This is an area where there is some theory development, some data and considerable speculation. If demographic analysis and institutional destinations are the central barometers of success of postsecondary policy around equity of access, an empirically based understanding of key influences that shape those outcomes provides the necessary ingredients for the robust development of policy and design of interventions. Many, if not most, of my interviewees talked about the importance of understanding the influences on students' outcomes over time, starting early in the lives of children and youth and continuing through the various institutional contexts in which students find themselves — K-12 education, the postsecondary application process, and within colleges and universities — as students strive to ensure that getting in the door translates to success and persistence within postsecondary.

At a minimum, this list of influences should include gaining a better understanding of how family background shapes students' expectations and preparation for postsecondary, and further, the impact of neighbourhood-level factors. It would require a stronger understanding of how K-12 programs and practices shape postsecondary access. Informants pointed to questions of school culture and environment. Are schools promoting PSE or are they postsecondary neutral? Do parent-involvement activities help parents support their children in achieving PSE goals? There were also questions about the work and attitudes of guidance counsellors and the curriculum. There is a strong international research base on students' access to curriculum ("streaming"); evaluation research on student success initiatives such as dual-credit programs tends not to look beyond graduation.

Informants pointed to a number of data gaps around key aspects of the college application process, including the availability and effectiveness of supports for students considering applying to PSE, factors affecting student decision-making, and whether there are particular patterns in institutional decision-

making. A central concern is how students are affected by the cost of postsecondary education, and how changes to student financial assistance programs may or may not affect decision-making. For students who have particular challenges to overcome, the scope and effectiveness of access programs matter; and the effectiveness of academic and social supports students receive upon enrollment are particularly important for non-traditional students. Data suggest that mature students may face distinct challenges and barriers that go well beyond the direct cost of postsecondary to encompass family responsibilities.

A full research agenda on equity of access should be focused on exploring how these influences intersect with issues of identity, advantage and disadvantage. Many of my informants provided considerable insight and pointers to existing evidence and research holes required to inform such an analysis (see Appendix 2).

Understanding influences on PSE access: The case of access to a rigorous academic curriculum

There is a substantial body of research on streaming, tracking or program of study indicating that students' access to a rigorous academic curriculum is one of the most important predictors of academic achievement generally and of postsecondary access. Longitudinal research has come very close to demonstrating a causal link between students' placement in lower academic streams and depressed achievement (Education Quality and Accountability Office, 2012; Hanushek & Wossemann, 2005; Oakes, 1985; Organization for Economic Co-operation and Development, 2016). One informant pointed out that no First Nation school on a reserve currently offers a full set of university-level courses, which has significant impact on access for that particularly disadvantaged group.

Other research has identified some types of special education programming as strongly correlated with reduced postsecondary access opportunities (see Brown & Parekh, 2013; Robson et al., 2016). Understanding which types of special education supports can contribute to the widest range of postsecondary options and how the impact of special education programming on PSE prospects varies across demographic groups is an important part of the research agenda. At this point, there is a conspicuous lack of comparable data on the nature and quality of special education programming provided across Ontario school boards and its impacts (Auditor General of Ontario, 2008).

This research suggests the need for Ontario-wide data on which subgroups are getting access to the academic curriculum; differences between boards and even schools in terms of practices and outcomes around special education and streaming; tracking the impact of de-streaming initiatives on graduation rates and on PSE access; and finding more effective ways of supporting struggling students that don't rely on grouping and a curriculum that may not prepare students for a range of PSE options.

5.4 Data to understand the impact of policy and context changes

The informants interviewed for this paper were deeply interested in the factors that have already generated — and will continue to generate — change in the higher education sector. Some of these factors intersect. To understand, respond to and prepare for these changes requires ensuring that data sets can track the impact of these changes on equity of access. A full discussion of the issues raised by informants is beyond this paper, but a short list of the considerations they raised provides a thought provoking outline of data collection challenges for the purposes of policy making.

5.4.1 *Changing context*

Perhaps the two most striking ways in which the broad context for postsecondary education is changing are the changes associated with technology and generational transitions.

Our current data systems do not provide very much information about the use of technology in the classroom or provide us with a way of mapping the spread of online programs. We should have data to track student enrollment in, experiences with, and learning and career outcomes of online programs. While some phenomena, like MOOCs (Massive Open Online Courses), appear to be hyped beyond their practical significance, online learning is becoming an increasingly important aspect of the broader postsecondary sector, and there are a range of issues with pressing data implications. From an equity perspective, what are the demographics of those choosing online programs? If online programs are disproportionately chosen by disadvantaged students, what are the key indications of quality and what are the relative outcomes?

A number of the people interviewed for this paper suggested that the upcoming generation of students may fundamentally reject some of the structures of postsecondary education that have, in turn, shaped the current challenges around equity of access. Whether it be new demand for hyper-specialization and a vocational connection, a new emphasis on hands-on and experiential learning throughout the education system, a greater percentage of students forced to live at home for reasons of affordability, a rejection of the default assumption that students will stay within a single program or institution, or an expectation of improved social and mental health supports in their postsecondary education, there is a great deal of discussion and a range of assumptions about the expectations and pathways for the newest group of students. Colleges and universities are also directly affected by issues like declining enrollment due to demographic trends.

5.4.2 *Changing policies*

There are a number of significant policy changes designed to improve students' access to postsecondary. Perhaps two of the most important, currently, are the commitment to a target of having 70% of Ontarians participating in postsecondary and the announcement in 2017 of a new Ontario Student Grant. Changes in secondary education, which promote higher rates of graduation, are also significant.

Several informants considered that the new, greater percentage of students attending postsecondary itself to be probably one of the greatest drivers of change in the area of understanding equity of access. In the process of meeting the government's target of 70% PSE enrollment, new groups of students are entering the

postsecondary environment, including students who would have been very unlikely to attend a generation ago. In this context, how is the student body changing demographically? What are the experiences and outcomes of this new group of students and how do they differ from those of the traditional student a generation ago? For example, a recent blog post speculated that a persistent downturn in graduate earnings might reflect in part the wider intake of students from an access perspective (Higher Education Strategy Associates, 2017).

There have also been major changes in provincial policies around student financial assistance in the past year. These include the elimination of provincial education tax credits and the creation of a new Ontario Student Grant for students with low family incomes, in addition to new application processes and plans to provide students with information about the net cost of tuition. With the right data, the tuition grant presents both an important opportunity to assess the impact of a targeted initiative to boost enrollment of disadvantaged students. While family income may not be the most important predictor of a student's risk of not attending postsecondary, it is highly correlated with other factors such as parental education, race, disability, and indigeneity — so all those groups are likely to benefit. Assessing the extent to which this relatively uncontroversial proxy for disadvantage works for all groups is an important question for equity of access. Similarly, this tuition change allows for certain experiments — for example, working with matched groups of much younger students and parents to provide parental education about the availability of the grant to see if it shapes their expectations and planning and even achievement over time.

As discussed above, the past decade has seen significant investment and innovation in secondary education with the goal of enhancing student success, and in some cases — such as dual-credit programs — specifically of enhancing students' familiarity with postsecondary environments to promote improved access. We don't know at this point whether these programs were successful in boosting PSE access for disadvantaged groups. There are other policy changes happening at the school board level, such as changing funding structures to avoid providing additional funding to schools that place students with disabilities in segregated classrooms or that place students in applied courses. In addition to analyzing whether these policy changes result in more students being enrolled in academically rigorous programming and understanding the impact on achievement in K-12, linked data would allow a better understanding of how these changes affect PSE access, particularly for underrepresented groups.

While this list of context and policy changes is far from exhaustive, it indicates the extent to which we need to be constantly revisiting and re-evaluating data infrastructure to determine the impact of changes.

6. Models and criteria for effective data architecture to understand equity of postsecondary access

Ontario is far from having the robust data infrastructure we need to fully understand issues of equity of access to postsecondary education. Yet, it is encouraging to look beyond this sector, and in many cases

beyond Ontario's borders, to identify feasible models that provide considerably richer opportunities for research and understanding about PSE access.

There are many possible models and proposals to consider. In this section, I examine four highlighted by informants. Each makes a different contribution to our understanding of potential, feasible ways to strengthen both data infrastructure and research capacity in higher education in Ontario: the recommendations of the Data Quality Campaign, a US advocacy group that promotes the development of state-wide data systems that can accommodate administrative and research use, and that supports direct access by educators and the public; British Columbia's data warehouses and systems to promote data linkages from early education through to postsecondary; Ontario's Institute for Clinical and Evaluative Sciences, which is a secure repository for extensive health and health-related data sets with built-in data analysis services to promote use by stakeholders and the broader research community; and the University of Chicago Consortium on School Research, a local-level research partnership between Chicago public schools, three universities, and the National Student Clearinghouse for postsecondary access. The consortium has been, over decades, a model partnership in groundbreaking applied research with a significant impact on practice.

6.1 Essential elements of a longitudinal data system

The Data Quality Campaign is a US non-profit that advocates for state-wide data systems that can accommodate administrative, research and public users. The campaign has a range of supporters, including technology companies that likely have a financial interest in the development of large data systems. Nonetheless, they have done a range of interesting research and advocacy to develop a list of 10 essential elements in effective data systems for student success and school improvement (see for example, Data Quality Campaign, 2013; Data Quality Campaign, 2016). The list was first developed in 2005 and the campaign regularly surveys all states on the extent to which the elements are in place.

Several of these elements reflect US-specific policy issues (for example, using large-scale data for teacher evaluation) but most are generic. The presence or absence of these elements provides useful criteria for assessing the effectiveness of student data systems. Ontario is like 48 US states in that we use a unique student identifier, which is common across key databases and across years. In 49 states — but unlike Ontario — linked student-level enrollment, demographic and program participation information is included in one database for K-12. The data system has the capacity to match individual students' test records from year to year to measure academic growth. All 50 US states have student and school-level information (the latter is publicly available) about dropout and graduation rates. In 28 states there is the capacity to match student records between the PreK-12 and postsecondary systems, including data about persistence. A key institution in ensuring this capacity and safeguarding data is the National Student Clearinghouse, a non-profit that has student-level data on enrollment and outcomes from over 3,000 colleges and universities. The National Student Clearinghouse operates on revenues derived from fees paid by institutions for its

record-keeping services, and from fees paid by students to get authorized copies of their records.¹⁶ Forty-five US states have established a state data audit system assessing data quality, validity and reliability. According to the Data Quality Campaign's work to try to improve the usefulness of data, key reports include school-by-school information about the postsecondary enrollment of graduates and their success over five years post-graduation.

6.2 British Columbia: Sharing and linking data to understand student transitions and progress

British Columbia has an extensive system in place to allow sharing and analysis of data about patterns of student access to postsecondary, mobility between programs and institutions, and student success through a number of linked initiatives tied to the Personal Education Number that follows students from early childhood through K-12 and postsecondary education. British Columbia meets most of the criteria established by the Data Quality Campaign. The extensive sharing of data reflects, in part, the design of the postsecondary system since the 1950's on the principle that a key pathway to promote access will include student movement between college and university.

Of particular interest to the study of access and persistence is the Student Transitions Project (STP).¹⁷ STP has been described as an "information sharing environment" that includes all 25 public postsecondary institutions in the province, the provincial government, and the BC Council on Admissions and Transfer (BCCAT). STP is governed by a steering committee with representatives from each group and is staffed with a data manager.

The purpose of the Student Transitions Project is to facilitate linkage of publicly held data sources for the purposes of analysis and research. The main users are the institutions themselves, which are able to access province-wide, individual-level data for the purposes of planning and management to help students transition smoothly into postsecondary and to graduate. All institutions have access to a secure SharePoint site through which they can see each other's data on transition from K-12, student mobility and graduation. Depersonalized, linked, student-level information is also available to third-party researchers through an application process, in which they are required to demonstrate a public interest purpose, conformity with ethics requirements, and adequate provisions for data storage and confidentiality.¹⁸ There are provisions in place to protect student privacy and ensure the linked data are not used to make decisions about individual students.

¹⁶ For more information, see <http://www.studentclearinghouse.org/>

¹⁷ <http://www2.gov.bc.ca/gov/content/education-training/postsecondary-education/data-research/student-transitions-project>

¹⁸ See Student Transitions Project Data Access Policy (<http://www2.gov.bc.ca/assets/gov/education/postsecondary-education/data-research/dataaccesspolicy.pdf>), Information Sharing Agreement (http://www2.gov.bc.ca/assets/gov/education/postsecondary-education/data-research/stp_isa.pdf), and Confidentiality Agreement (<http://www2.gov.bc.ca/assets/gov/education/postsecondary-education/data-research/confidentialityagreement.pdf>).

Underlying the Student Transitions Project is the Postsecondary Central Data Warehouse, maintained by the Ministry of Advanced Education. It contains standardized data relating to student demographics, programs, credentials, courses, session registration and campuses.¹⁹ Demographic data are limited but include gender, age, mother tongue and Aboriginal status (First Nation, Métis, or Inuit), plus postal-code linked family income and family education variables from the census. The warehouse publishes reports by institution with searchable fields. Significant amounts of system data are published and available through an open-data portal.

At the K-12 level, the Ministry of Education controls the data from all public schools. About 15 years ago, with funding from the Canadian Foundation for Innovation, the government worked with UBC researchers to create a public data utility called Edudata Canada. Edudata was intended as an educational version of the Centre for Health Services and Policy Research, which has the capacity to analyze health data to inform health policy (akin to ICES, see below). Through agreements, Edudata has access to all centrally held microdata linked by the Personal Education Number. It manages external requests for access to depersonalized data (for example, from school boards or third party researchers) and provides analytic services to help researchers shape research questions into ones that can be used to explore the data.

¹⁹ See data definitions for the elements in the database: http://www2.gov.bc.ca/assets/gov/education/postsecondary-education/data-research/ddef_student_standards.pdf

Select findings from the Student Transitions Project

- In 2017 STP published a 10-year longitudinal study of student pathways for an entire cohort of Grade 8 students, with extensive information about both graduates and non-graduates, addressing questions like postsecondary outcomes based on selected course-type enrollment, how many non-graduates ultimately made it into postsecondary and through which institutions (Heslop, 2016).
- STP produces an annual report on student pathways into and out of each participating institution, including information about new students, transfers, and graduation.
- A study of student mobility between institutions combined administrative data from STP with a targeted survey to understand students' motivations for planned and unplanned shifts between institutions and what supports were helpful (Beatty-Guenter, 2015).
- The British Columbia government produces an annual report on Aboriginal education, which includes data on Aboriginal and non-Aboriginal student transitions to postsecondary education, by institution-type, for graduates and non-graduates using STP data (see for example, Ministry of Education , 2016).
- BCCAT uses data available through STP to produce reports on, for example, the outcomes of students who move from college to university. This research has been important in demonstrating a consistent pattern of transfer students graduating from universities with GPAs that are at least equivalent to those of direct-entry students (Tikina, 2015). Transfer students, as a group, are more likely to be lower-income, Aboriginal and rural. Apart from the importance of this general finding about the effectiveness of this pathway for college recruitment and student decision-making, the council is also able use the SharePoint data to provide information at the program and institution level to assist in accreditation decision-making that is a prerequisite for successful transfers. For example, a geography program at Simon Fraser University can look at the success of students from different Vancouver college programs in their first year course in order to assess students' levels of preparation.

6.3 An Ontario model: Institute for Clinical Evaluative Sciences

Ontario's Institute for Clinical Evaluative Sciences (ICES) is an established, arms-length government agency that collects and maintains huge volumes of administrative data in the health sector. It is a publicly funded, non-profit agency with a statutory mandate to do research, and with status under health legislation as a prescribed entity that allows it to collect and use data for secondary research without consent. There are over 220 scientists associated with ICES at universities across Ontario, more than four times the number of staff in the Information Management Branch at MAESD. The ICES data repository consists of over 80 data

sets with record-level, coded and linkable health information encompassing most of the administrative health records for those eligible for health coverage in Ontario and data from the provincial Community Health Survey.²⁰ Data are linked using the OHIP number or, in some cases, name and date of birth. There is an express philosophy of “link once, use many times,” so if data sets are linked for one purpose, they will be maintained within ICES in a linked form for future use — partly because it is perceived that the highest possibility of a data breach arises during the process of linking.

Privacy is a top concern at ICES, where there is a full-time staff position dedicated to ensuring that privacy concerns are addressed in advance and privacy audits are completed every three years. Very few individuals ever see identifiable data, even within the institute. There has never been a breach of privacy. At the same time, the institution is structured around the principle of advancing wide use of its data to support research generation to improve health services. Apart from in-house research led by ICES scientists (ICES has produced hundreds of research reports and papers), there are two streams of activity within ICES designed to promote data use by those within the health sector and the broader research community. Core funding from the Ministry of Health allows ICES to do analysis in response to questions from hospitals, charities, Local Health Integration Networks and other stakeholders. Furthermore, through the Strategy for Patient-Oriented Research (SPOR), a recent initiative funded by the Canadian Institutes of Health Research, ICES is able to provide data and analytic services for non-profit researchers and, effective 2016, for private use on a cost-recovery basis. On application, and subject to separate Research Ethics Board approval, researchers can gain access to research-ready, linked data sets constructed to support the testing of specific hypotheses.²¹ Identifying information is removed or coded using an algorithm that preserves privacy while providing individual-level information that researchers need to study specific research questions. While these data sets don't leave ICES's protected environment and output must be approved to ensure no privacy breaches, researchers can work on their own computers using virtual desktop infrastructure over the internet. Arms-length researchers enjoy academic freedom in terms of publishing and sharing their results. ICES data may well be directly useful for some access- or persistence- related questions (for example, questions relating to mental health), but are particularly useful as a fairly developed Ontario model that balances privacy with the promotion of administrative data use for research.

6.4 UChicago Consortium on School Research

The UChicago Consortium on School Research is a research centre based at the University of Chicago and developed in partnership with Chicago public schools. The consortium has a comprehensive,

²⁰ A summary of all data sets, and complete data dictionary, is available at <https://datadictionary.ices.on.ca/>.

²¹ The wide scope of projects undertaken through the Applied Health Research Question program at ICES, using linked data sets, is extensive and wide ranging. A sample of recent projects gives some sense of the range of clinical, organizational and public health research that is facilitated through this client-driven initiative: Long-term exposure to air pollution and outdoor noise and the development of cardiovascular outcomes and diabetes; Robotic-assisted minimally invasive surgery evaluation; Rate of breast cancer screening using mammography in Ontario; Quality of care indicators for patients with spinal cord injury; Leading from the Front: Support for organ and tissue donor registration among physicians; Children with developmental disabilities in Ontario

demographically disaggregated data archive linked to the National Student Clearinghouse. The consortium collects extensive demographic information including race and information about family poverty on students in the public school system.

The mission of the consortium is to develop research of high technical quality that can inform and assess policy and practice in the Chicago public schools. It focuses on building capacity for school reform by identifying what matters for student success and school improvement, creating critical indicators to chart progress, and conducting theory-driven evaluation to identify how programs and policies are working. It has developed a range of well-validated instruments to examine key theory-driven concepts — such as “relational trust” — which it has shown to be significant in schools that effectively support students and learning. Characteristics of its work are high engagement with a diverse group of stakeholders, multiple methods and investigators, and a commitment to working with stakeholder groups and sharing research findings. The consortium is a model of an academic-policy partnership in that the researchers are able to identify their own priorities and develop lines of inquiry that may produce findings that are uncomfortable for government; at the same time, because of the partnership, there is a shared commitment to produce work that will inform practice in an extremely troubled school system. The consortium has developed a line of research specifically about access to college highlighting causes of gaps between aspiration, eligibility and enrollment, and how those gaps differ by race and income (Nagaoka, Roderick, & Coca, 2009).

None of these models is directly transferrable to the context of Ontario. Yet, taken together they indicate that there are current, operational models — at the jurisdictional or local level — that demonstrate the potential of privacy-protected data warehouses with linked data sets to provide the basis for research, evaluation and policy-making. ICES demonstrates that such a prospect is feasible under current Ontario laws governing privacy, and all three cases demonstrate an emphasis on developing active tools to increase the use of data, especially administrative data, collected by educational institutions and government.

7. Conclusions

Ontario is unique in the Canadian context in that the province boasts two education-focused research agencies (HEQCO and EQAO) with a potential capacity and mandates to collect and leverage data towards the continual improvement of its education system. And yet, the system of data infrastructure to understand equity of postsecondary access in Ontario is currently lacking critical elements and is, in fact, behind several Canadian jurisdictions in terms of public- and research-sector capacity to assess progress and evaluate change in the key area of equity of access.

This paper draws upon 35 interviews with key informants in the research community, in government and arms-length agencies, colleges, universities and the apprenticeship sector. It also includes a broad review of the Canadian literature on postsecondary access and persistence.

The key questions which framed this research are:

1. What are the key data sources that contribute to what we know now about access to postsecondary education in Ontario?
2. What do we need to know to design policies and programs that effectively address access-related issues?
3. What are relevant criteria for effective data infrastructure and models to which Ontario can look in order to expand policy-relevant knowledge about equity of access?

In pursuing these lines of inquiry, it has become evident that Ontario has a large, but largely untapped resource for understanding equity access, namely administrative data.

What do we know now?

There is a significant research base in the area of equity of postsecondary access, drawing on studies from Statistics Canada (particularly the Youth in Transition Survey), and national administrative data sets (the Postsecondary Information System and the Registered Apprenticeship Information System). Much of our current understanding about postsecondary access comes from these sources.

According to most informants, the most promising key to further understanding lies in administrative data, particularly the linkages enabled by the Ontario Education Number. The OEN is a unique student identifier that spans some public childcare programs, elementary and secondary school, and the postsecondary system. It offers the possibility for longitudinal analysis of the experiences and outcomes of multiple cohorts of students without the significant delays that would be involved in new data collection. The OEN is linked to standardized student assessments in K-12, and to OCAS and the Ontario Universities' Application Centre, but not to student loan data. In K-12, where significant program level data are collected centrally, it is extremely

unfortunate from a research perspective that all program data are actively depersonalized before being stored in a data warehouse, and that there are very limited linkages to PSE data. At this point, the major use of the OEN in postsecondary is for internal, government questions; there is not a routine process to allow researchers, postsecondary institutions or institutions charged with advising government on education issues to access OEN data. The demographic data attached to the OEN is minimal — date of birth, age, and, for the K-12 system only, Aboriginal identification based on parental consent.

Individual institutions and consortia of universities and colleges collect considerable data that are highly relevant to questions of postsecondary access. Unfortunately, much of these data are considered proprietary and not shared with government or external researchers. There is a limited — but very exciting — supply of experimental research in the area of postsecondary access.

What do we need to know?

Based on a review of literature and the interviews I conducted, I identified a set of questions about what we need to know to understand postsecondary access. These questions were addressed with respect to the types of data that would best provide information. The key questions are: Who goes where? What are the influences on postsecondary decision-making? What are the impacts of changes in policy and context?

The most critical data needed for studying equity of access are detailed, individual-level demographic data. Both the Ontario Human Rights Commission and the Truth and Reconciliation Commission have identified the importance of data in identifying systemic inequality and developing appropriate responses to it. The lack of demographic data in postsecondary is a serious concern, but has not to date been a government priority. There is an urgent need for the postsecondary system to catch up with the K-12 sector and to work with Indigenous communities to develop an appropriate system for use and control of Indigenous identification data.

The other key questions relate to where students go: What happens to those who leave school before the end of high school? What factors affect students making the choice not to continue into PSE? What institutions do people choose, what factors lie behind those choices, and what are the overall social patterns between institution types? The central sociological question of educational stratification — among other forms, by institution-type — intersects with the question of equity of access to postsecondary. For a comprehensive picture of access to postsecondary education, two groups are particularly important: apprentices and those enrolled in private career colleges. The OEN is not used to trace these students' educational pathways, although their numbers are significant. In both cases, students don't usually go directly from high school, so there is much to understand about the pathways that students follow in getting there.

Data on persistence are another major priority. They are integrally linked to the questions of access and essential for understanding whether students are in fact succeeding in postsecondary.

In terms of influences, there are a range of policy-sensitive factors that shape students' access decisions, which have distinct data implications starting with family and neighbourhood background. There is a strong consensus that students' PSE access decision-making starts early and has much to do with home and community culture. Both elementary and secondary school experiences are key in shaping students' capacity to succeed in, and attitudes toward postsecondary education. School culture, career curriculum and services, parental involvement in programs, and access to an academic curriculum are all factors that may shape access. In the transition between K-12 and postsecondary, there is a great deal we don't know about barriers. Similarly, the array of access programs in place in universities and colleges, and the highly contextualized definitions of success associated with them, represent a major area where there is a need for improved data. We also have limited data on those who delay entry to postsecondary. While it is more controversial, several people talked about the importance of public information about employment and earnings outcomes from postsecondary from both a human capital and social equity perspective.

Changes that will be particularly important include technology and generational change. Policy changes with major effects on equity of access include the scope and impact of online, open and personalized education options, and the "massification" of PSE through significant increases in the percentage of students enrolling. This trend is likely to have broad effects. For an equity of access analysis, what's particularly important is the characteristics of the incremental group; that is, those who would have been much less likely to attend PSE a generation ago. We should actively track the potential impact of the tuition grants and various K-12 policies intended to promote student success up to and including PSE access.

What criteria should guide us?

There are clear priorities for an improved data infrastructure.

Number one is a more accessible system of linked administrative data, which includes detailed demographic data collected in a comparable way (for example, using census categories). The government has the power to require that these data be collected and to specify the form. Given the importance of linkages and the close connection between K-12 and postsecondary, there should be consideration given to a single data warehouse for the entire education spectrum. Such a data warehouse should include provisions to actively promote use of the data along the lines of ICES, the arms-length, non-profit agency that uses health information for improvement and innovation in health care, or the British Columbia Student Transitions Project. Chicago provides an interesting model where a consortium that includes both school boards and academics manages the comprehensive data warehouse, and where there is a very active program of survey and observational research in addition to the use of administrative data.

Administrative data, with attached demographic information, are central to building the knowledge base around equity of postsecondary access. Nevertheless, it will need to be supplemented with longitudinal surveys or even ethnographic research to better understand groups that continue to be at high risk of not continuing into postsecondary education. To better understand questions of equity of access, we need to track key information about who goes where, and to understand what the factors are that are shaping students' opportunities and decisions.

8. Recommendations

Goal:

A more open and accessible data system that enables government agencies to fulfill their research and evaluation mandates related to education and contributes effectively to evidence-based policy development, and student success and well-being in Ontario.

Recommendations:

Provide government agencies with education-related mandates complete access to a data infrastructure that includes administrative (program) data and the Ontario Education Number (that is the unique, province-wide student identifier, which connects student data across key databases over time). To this end, Ontario should:

- 1) Ensure a continuity of student records between the early years, K-12 and the postsecondary system, including apprenticeships and private career colleges.
- 2) Link individual student data to administrative data about programs (collected and stored through OnSIS) and outcomes (that is, graduation rate and dropout rates, postsecondary access and persistence).
 - Track student enrollment and program participation
 - It should be possible to examine student achievement measures (province-wide test results, courses completed, grades, and proposed postsecondary outcome measures) in relation to program factors (for example, students' access to opportunities, program of study and supports)
- 3) Collect and incorporate information on student demographics.
 - Demographic information should be based on standard questions across institutions and levels (K-12 and PSE) and should allow identification of the most vulnerable groups (that

is, race, Indigenous status, disability, sexual orientation/identification, immigrant/visible minority, and first generation)

- These data should be collected on the basis of informed consent and should be attached to the OEN
- This recommendation reflects the advice of the Ontario Human Rights Commission and the Truth and Reconciliation Commission

In order to ensure public confidence, there must be both regular data audits to assess the quality, validity and reliability of data and robust privacy protections.

To ensure the public value of the data is maximized, the enhanced infrastructure outlined above must incorporate governance structures to allow use of linked data sets by stakeholders (institutions, school boards, Ontario government ministries and partners) and the broader research community. Ideally, the structure would permit data linkages within and across ministries to ensure the educational impacts of related programs are understood and tracked (for example, youth mental health or poverty reduction strategies).

Finally, it is important to recognize that administrative data, however critical, cannot be the only major data informing government policy. There is a continuing need for targeted survey and qualitative data, particularly directed to understanding groups facing complex barriers to entering postsecondary. And there is a need for a larger body of experimental research to test and refine hypotheses about potentially significant interventions.

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