The Use of Student-Level Data to Provide Information on Student Pathways and Mobility: A Study of the Statistical Journey Through Canadian Lifelong Learning

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Section 1: Background and Introduction

This paper explores tools for understanding student transitions and mobility. Student transitions and mobility together form what could be termed student pathways, or the lines of movement that students follow while in school — either in elementary, secondary, or postsecondary education (PSE). Knowing how students progress between and move within education systems is invaluable to the management and continued improvement of education systems. More specifically, the ability to view student transitions and mobility through observation of individual student-level activities over time can help the education sector better plan, as well as isolate factors that contribute to specific educational outcomes for specific groups of students.

Recognizing the benefits of student-level data observed over time, jurisdictions across Canada have developed or are developing systems for collecting and maintaining individual unit records. Simultaneously, jurisdictions and researchers are also utilizing interprovincial data sets and survey data to examine student transitions and mobility. In an effort to better understand Canadian student-level data tools for examining student transitions and mobility, the Canadian Education Statistics Council (CESC), a partnership between the Council of Ministers of Education, Canada (CMEC), and Statistics Canada (STATCAN), contracted the Educational Policy Institute (EPI) to investigate the use of student-level data systems.

This paper is organized in the following way:

- Section 1 provides background information and an introduction to the project.
- Section 2 overviews the project methodology, summarizes the key definitions used in this research paper, and discusses project limitations.
- Section 3 discusses the policy significance of student transitions and mobility in different education sectors and explores current discussions about analysis of student pathways and mobility, looking at both the current literature and data gathered through interviews with key informants.
- Section 4 overviews and analyzes currently existing pan-Canadian tools for understanding student mobility and transitions, such as the Youth in Transition Survey (YITS) and the Postsecondary Student Information System (PSIS).
- Section 5 overviews jurisdictional tools for understanding student mobility and transitions.
- Section 6 discusses the use of unique identifier systems in the United States, Australia, and the United Kingdom.
- Section 7 provides conclusions regarding the state of student mobility and transitions data collection and use across Canada and in comparative international countries.

Section 2: Project Methodology

The project methodology consisted of four interlocking processes:

- A pre-survey of members of CMEC's Strategic Management Committee (SMC)
- Interviews with key informants identified by SMC members
- A literature and document review
- A synthesis and analysis of the research findings

At the project outset, EPI prepared discussion guides for kindergarten to grade 12 (K–12)-affiliated jurisdictional informants and for PSE-affiliated informants. For both PSE and K–12, separate discussion guides were prepared for informants from jurisdictions that had unique identifier systems and for informants from jurisdictions that did not have unique identifier systems.

Following approval of discussion guides by SMC, EPI emailed SMC members again to send the final discussion guide and a short pre-survey that asked for the recommendation of key informants as well as basic information regarding tools for understanding student transitions and mobility in each Canadian jurisdiction. Copies of the project introduction notes, pre-interview surveys, and interview guides can be found in the appendices to this report.

With basic jurisdictional information, EPI contacted the recommended key informants to arrange individual and group interviews according to the recommendations of SMC members and the key informants themselves. Interviews ranging from 30 minutes to over one hour were conducted with key informants, largely but not exclusively by telephone. In a separate process, EPI contacted non-jurisdictional (STATCAN, Maritime Provinces Higher Education Commission or MPHEC, international) key informants and conducted interviews using discussion guides customized to match these key informants' areas of expertise. In total, EPI spoke with 44 key informants in individual and group interviews. For each jurisdiction, at least one key informant came from the ministry/department responsible for K–12 education and one key informant came from the ministry/department responsible for PSE. The identity of these individual informants will remain confidential.

Concurrent with the interview process, a literature review was conducted that yielded background information about the policy relevance of student transitions and mobility and tools for measurement. The interview and literature review processes frequently interlaced, as informants recommended or provided documents of interest. Much background information relevant to Canada came from informants rather than literature. As a result, rather than presenting a "free-standing" literature review, information from literature and interviews are presented simultaneously in the section below, serving as a conceptual introduction to the project research.[1]

Definitions of Terms Used

The terms **"mobility," "transitions,"** and **"pathways"** are used a great deal throughout this discussion and require some clarification. **"Mobility"** refers to "horizontal" movements across different schools, school systems, or geographic areas. **"Transitions"** refers to "vertical" movement through education systems or into the workforce, i.e., between elementary and secondary education or from

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[1] The literature consisted of searches through the ERIC database, PROQUEST, and relevant organizational Web sites. Much of the literature that surfaced through this process focused on data system construction from a technical or political feasibility perspective. Information presented below about the policy relevance of mobility and transitions data was largely inferred from key informant interviews.

K–12 to PSE or PSE to the workforce. The word **"pathway"** encompasses both transitions (vertical movement) and mobility (horizontal movement).

When student-level data is observable over time, it is referred to as **"longitudinal."** The focus of this paper is on data systems that are longitudinal in nature. When student-level data cannot be linked through time, the data are referred to as **"flat"** or **"snapshot."** When student-level data are bundled to produce school-level, school-division/board-level, institutional-level, or jurisdictional-level data, they are referred to as **"aggregate data."**

Student-level data are also referred to in this paper as "individual unit records." To observe individual unit records longitudinally, a **"unique identifier,"** a code that identifies individual student records, is needed to connect records over time. British Columbia's Personal Education Number (PEN) and the Ontario Education Number (OEN) are examples of unique identifiers. As unique identifiers are essential to longitudinal file construction, longitudinal student-level data systems are also referred to as **"unique identifier systems."** Unique identifier systems that span K–12 education and the PSE system are referred to as having a **"K–12 to PSE linkage."**

In this discussion, distinction between the terms **"data"** and **"statistics"** is important. **"Data"** refers to individual unit records or pieces of information that are collected, stored, or used in their original format. **"Statistics"** refer to calculations and numbers generated as a result of using the data.

Limitations and Challenges of This Paper

This report on the use of individual unit record systems is the result of a broad survey of practices in Canada. While comparing jurisdictional unique identifier and individual unit record policies, jurisdictional similarities and differences in data element definitions were not explored.

Profiles of jurisdictional practices contained in this paper are largely based on interviews conducted with jurisdictional key informants identified by SMC members. Areas of emphasis and omission in jurisdictional profiles are the result in large part of the specific areas of expertise or interest of key informants. Thus, the profile of one jurisdiction may focus more on data warehousing, while another jurisdictional profile may examine statistic generation in greater detail.

Much of the literature on the use of individual unit records comes from the United States. While this literature is rich with information, one challenge was to effectively select which concepts are applicable in the Canadian context.

This report examines jurisdictional unique identifier use in both the K–12 and PSE systems. Discussing K–12 and PSE simultaneously formed a continuous challenge in light of the sectors' differences in culture and mission.

Section 3: Using Student Data to Understand Student Pathways

Student pathway data can be used and framed in many ways by policy makers. In some cases, observing student pathways can be framed as a way of observing student achievement when certain pathways — such as progressing to the next grade, graduating from high school, or continuing to PSE — are understood to be superior routes to the alternatives — not progressing, not graduating, and not continuing. In other cases, macro analyses of student pathways and mobility can allow for system- and institutional-level evidence-based planning in areas such as enrolment and program offerings, and the generation of valuable system-level statistics and labour force projections. Increasingly, Canadian jurisdictions are utilizing individual unit records to conduct policy-relevant analyses. Within jurisdictions, data use for policy development has proliferated beyond governmental quarters to school divisions, schools, and PSE institutions.

The sections below discuss mobility and transitions data use in K–12, PSE, and K–12 and PSE linkages, highlighting the differences between the systems and discussing the benefits and complications of having a linked system.

K–12

One of the most common uses of individual unit record mobility and transition data in elementary and secondary education is the accurate facilitation of per-student funding formulas. Jurisdictional systems for collecting and maintaining individual unit records longitudinally were frequently introduced specifically for the purpose of improving accuracy and consistency in funding practices. Mobility and transition data can have many other policy-relevant uses in elementary and secondary education as well.

In elementary and secondary education, students pass through a series of transitions from grade to grade. Success in K–12 education is often defined first and foremost as graduation from high school and, increasingly, as progression to PSE. Along the way, the successive attainment of essential and advanced skills is represented in transitions from grade to grade and represented in greater specificity through course marks. Individual unit record data can allow policy makers to become aware of any changes in key transition rates and to create tools for monitoring of initiatives to facilitate greater success in transitions.

A central student transition of interest to policy makers is the continuation of schooling past jurisdictionally defined legal school-leaving ages. School leaving and transitions from traditional schooling to such programs as General Education Development and Adult Basic Education programs are the result of explicit educational decisions, the first educational decisions made by students that could be called "structural," i.e., decisions about what form, if any, school should take. After students have persisted beyond the legal school-leaving age, high school graduation is a transition of high interest. In addition, stakeholders in the K–12 sector often have an appetite for knowing where students go after leaving K–12 systems and how they are doing after they get there, whether that destination is PSE or the workforce.

Policy makers have an interest in observing the above-described transitions from a cohort perspective, whether that means a cohort representing a jurisdiction, a school division, a population subset, or any other population base beyond the individual school level. Without cohort data for elementary and secondary education, policy makers lack the tools needed to answer basic questions such as what percentage of our jurisdiction's students left school upon reaching the school leaving age? or what percentage of our high school students graduate in the standard amount of time? To

observe cohort transitions data, student mobility must be accounted for. Cohort data would be much simpler to calculate if all students stayed in the same schools from start to finish. As students move from school to school, a method is required to uniquely identify them so that each student is treated as an individual unit for calculating transition rates.

At the K–12 level, the measurement of mobility is important in order to produce a full account of student transitions. Without accounting for mobility, schools exist in a vacuum, and a single student moving between schools appears (at the system level) as a series of dropouts and enrolments rather than a single student moving through different schools. Though mobility must be accounted for, it is not typically an "outcome" of education at the K–12 level. Student mobility in the K–12 sector is typically the result of family movement, which can be driven by any number of factors, including education issues such as school quality or specialization (e.g., French immersion, special needs). Mobility could only be considered of policy relevance as an outcome of education if reasons for student movement could be shown to relate to education. One informant indicated that in his jurisdiction mobility is considered a factor affecting student achievement. The informant indicated that mobility is known to depress student achievement temporarily, so this fact is taken into account if schools with high levels of in-mobility have lower standardized testing scores.

There is a third way to use individual unit record data in the K–12 sector that touches upon issues of student transitions and mobility, but seeks to answer a different set of questions. This approach could be termed "student success measurement," and it is far more prevalent in the United States than in Canada. This approach could be said to have emerged at least in part from a perceived need to supplement traditional measures of student success. In Canada, this approach is somewhat evident in the various batteries of standardized testing employed in different jurisdictions. Data from standardized tests are frequently included in or compared to individual unit record data in many jurisdictions, producing a supplemental way for policy makers to view student success beyond the traditional transitional measures (grade progression) discussed above.

In the United States, the "student success measurement" perspective has been the predominant paradigm through which individual unit records have been used and the primary reason for data system development. The federal *No Child Left Behind Act* (2001) has mandated the establishment of data systems capable of capturing "adequate progress" down to the student level in every school in the country. In the United States, at the K–12 level, the collection of student-level data has been framed around the need for information that will allow for school improvement and enhancement of educational outcomes. Information has come to be viewed as essential to individual school improvement (Data Quality Campaign, 2005). The policy relevance of information has been grasped in Canada as well, but the actions coming out of that knowledge have been different across jurisdictions.

PSE

In PSE, at the system level, data use gravitates toward simply understanding how an increasingly complex system functions and at what frequencies and how students are attaining credentials. Differences in data use between K–12 and PSE relate to the mandatory versus optional nature of the K–12 and PSE sectors, the institutional diversity of PSE, the agency and independence of PSE versus K–12 students (before the legal school-leaving age), and the ambiguity of what might constitute "desirable" student transitions in PSE.

The most evident distinction between the K–12 and PSE system's desired data uses is this: in K–

12, students are on a prescribed pathway and there is a desire to understand how well students are moving along; in PSE, there is no prescribed pathway and, instead, a tangled web of pathways that students may follow, pathways that policy makers wish to understand. As such, from the policy-maker perspective, decisions about PSE attendance are more the result of choices about education (e.g., program of study or institutional choice) and not the result of circumstantial choices (e.g., residential choice). Moreover, in PSE there is no default PSE institution for a student to attend, and students are not required to attend at all. PSE students' acceptable levels of monetary investment, experiences at PSE institutions, and evolving educational goals are primary drivers of student mobility and transitions. The same kind of direct relationship between qualities of education and student behaviours cannot be inferred at the K–12 level.

As well, the line between what constitutes mobility and what constitutes transitions in PSE is quite murky and largely depends on value judgment: is movement from a community college to university horizontal movement through the diversity of the PSE sector or a vertical transition between distinct and hierarchically placed levels of education? There is no explicit answer. In PSE, student movement can be between colleges and universities and between a diverse range of programs and levels of study leading to different credential forms. In K–12 education, desirable transitions are quite explicitly defined, i.e., moving from grade to grade. In PSE, the view is not so clear. What should policy makers do with information about student transitions from college to apprenticeship programs or university? How should they perceive a student who leaves before attaining a credential because a good job was offered based on knowledge and skills acquired in the PSE system? Further, even if what constitutes "mobility" and what constitutes a "transition" is determined, the meaning of mobility and transitions is unclear. Finnie and Qiu express this uncertainty about

the "policy meaning" of student pathways in PSE in their recently published analysis of transitions and mobility in the Atlantic provinces:

> Those who obtain a diploma but only after moving across different programs, institutions, or levels of study – perhaps with a pause in their studies along the way – may represent wasteful diversions on the path to a preferred diploma (perhaps due to initially flawed choices with respect to program choice), or necessary deviations along the path to the preferred outcome (e.g., some pathways may represent "necessary experimentation" or delays which may have nothing at all to do with the PSE system itself). (Finnie & Qiu, 2009, p. 1)

While the specific "policy meaning" of mobility and transitions at the PSE level may be unclear, there is certainly a tremendous desire in the sector to understand pathways as a means of understanding how the PSE system functions, i.e., how its different institutional forms function together and relate to one another. When student-level mobility and transitions data at the PSE level are connected with contextual student information about family background or educational experience, the policy relevance can be quite clear. Finnie and Qiu describe this phenomenon in the introduction to their 2008 analysis, *The Patterns of Persistence in Post-Secondary Education Canada: Evidence from the YITS-B Dataset,* as follows:

> If, for example, leaving rates are high, this essentially raises the "access to PSE" and "PSE attainment" issues at another stage, especially if the reasons for leaving are significantly

related to financial reasons or family background or other relatively well defined indicators of "barriers" to program completion. If, on the other hand, leaving rates are significantly related to a student's educational experiences, an entirely different set of policy issues would be raised. Finally, if persistence rates are found to be significantly lower once the full set of PSE pathways is taken into account, the concern currently attached to the issue might be at least partly attenuated. (Finnie & Qiu, 2008, p. 7)

At present, most jurisdictions do not have a system-level understanding of student pathways in PSE. Without understanding student pathways, policy makers could lack a full understanding of how PSE systems work and how institutional forms relate to one another from a student behaviour perspective.

With the increasing diversity of institutions and credentials, there is an appetite for information about how students move through the PSE system and what pathways they take to eventually obtain credentials or leave the system. With students increasingly transferring between institutions and programs leading to different types of credentials (what one informant described as "student swirl"), it has become increasingly difficult to understand how well the PSE system works in the absence of system-wide student-level data. For example, institutional leaders and jurisdictions may see what appears to be a large dropout rate from an institution, but that institution may in fact be successful in educating students for a number of years before they choose to transfer and complete somewhere else. To have a full view of program success and institutional function, there is a desire to understand what is happening to students beyond institutional walls. In short, there is a desire to understand the system.

A form of mobility at the PSE level not discussed in this paper is mobility for the purpose of educational enhancement, which typically takes the form of temporary international mobility (exchanges) that have pedagogical value to students but are not typically of policy relevance to jurisdictions (Usher & Junor, 2008).

The "student success measurement" paradigm of individual unit record data use described above in the section dealing with K–12 education is notably absent in the PSE sector. Interest in measuring student achievement through explicit means such as standardized testing has not been articulated in PSE. For one, desired student outcomes are far less easily defined in PSE, and definition of desired outcomes is complicated by the academic tradition of free inquiry, largely unfettered by explicit external demands. The academy is largely resistant to "instrumentalization" of its teaching, i.e., viewing academic teaching as leading to definitive desired outcomes. In addition, successful student transitions (attaining credit from year to year) are still trusted as measurements of student success, as there are no equivalent practices of "social promotion" in PSE. Even given these conditions, following the European "Tuning Process"[2] there is interest in Canada in codifying, across institutions, the competencies that should be the result of programs of study. It is unlikely at this point that such a process would result in centralized methods of assessing student competency attainment.

K–12 to PSE Transitions

The transitions that take place between K–12 and PSE are an increasingly important indicator

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[2] For more information about the Tuning Process, see http://tuning.unideusto.org/tuningeu/.

as PSE attendance becomes more universal.[3] From the policy perspective:

- Many jurisdictions want to know to what extent K–12 education systems are leading students into PSE, principally to gauge skilled workforce development.
- The K–12 sector frequently measures success by PSE progression and success. With some sophisticated data systems, K–12 systems can receive feedback from PSE institutions about their students' performance in PSE.
- The PSE sector can use K–12 data to predict demand and to focus on target student markets. Likewise, PSE has a deep interest in receiving students who are ready for expected levels of academic work, and can only benefit from feedback loops with the K–12 sector.

Examples of cooperation on data issues abound both in Canada and internationally. In British Columbia, even before the introduction of the PEN system in PSE, PSE institutions used K–12 cohort data to predict student demand for PSE, which allowed them to plan for applications and enrolments accordingly. Now, with the PEN system well established, PSE institutions use transitions data to better understand and develop niche markets for their institutions. British Columbia's Student Transitions Project has been established specifically to monitor the transition from secondary to postsecondary education, investigating connections between performance in high school and PSE behaviour, among many other determinants of PSE outcomes.[4] In Florida, where a comprehensive

student data system links PSE and K–12, feedback reports are developed whereby high schools receive information about their past years' graduates' performance in PSE, allowing for analysis of areas in need of improvement. Ten other states in the United States also produce such feedback reports (Ewell & Boeke, 2007).

Though K–12 and PSE educational contexts are significantly different, cooperation on data issues can be mutually beneficial to the sectors. A precondition of efforts to develop cross-sector data is a perspective sometimes described as a K–16 or a K–20, the view of elementary, secondary, and postsecondary education (including graduate studies, in the case of the K–20 perspective) as part of single pipeline for student learning (Clements, 2007). An observation from the United States related to the differing nature of the K–12 and PSE sectors and the difficulty of data collaboration between the sectors rings true in Canada:

> The cultures of K–12 education and postsecondary education in the United States are materially and consequentially different. While K–12 has historically focused on equity of opportunity and universal attainment, postsecondary has considered selectivity, the advancement of knowledge, and the propagation of scholars among its core values. In addition, K–12 and postsecondary education have historically operated as separate systems. As a result, governance, regulation, accountability, politics and policy are substantially different between the two sectors. Together, these factors can impede state efforts toward

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[3] Of course, such a measure can be established probabilistically with survey data, but this study focuses on the establishment of systems to constantly produce "census" data for analysis.

[4] For more information about the Student Transitions Project, see http://www.aved.gov.bc.ca/student_transitions/welcome.htm.

cross-sector work. (Conger, 2008)

While the two educational sectors differ greatly, Conger (2008) goes on to explain ways in which effective cooperation can take place. Such cooperation begins with identification of mutual goals.

Implementing K–12-to-PSE Data System Linkages

In order to understand K–12-to-PSE transitions on an individual level in addition to the aggregate level, it is necessary to implement a linkage between the K–12 and PSE data systems. The establishment of cross-sector linkages is a more complicated affair than establishing individual unit record systems in K–12 or PSE alone. Linkages require the bridging of cultural and operational differences to serve mutual interests. A well-developed American literature focuses on the implementation of individual unit record data systems, with special attention paid to K–12-to-PSE linkages and the stakeholder commitment needed to successfully establish linkages (Conger, 2008; Clements, 2007; Data Quality Campaign, 2005; Ewell, Schild, & Paulson, 2003). Consistently, emphasis is placed in this literature on the need to begin establishing linkages by having partners in each sector who have identified mutual benefits to data cooperation frame limited policy questions and initial data cooperation processes that can answer these questions that the K–12 and PSE sectors share. Through such pilots, benefits can be demonstrated to a wider range of stakeholders, trust can be built, and the political will for further cooperation can be generated.

Numerous key informants in Canada, along with sources from the United States, stressed the need for defining and agreeing upon mutual benefits as a necessary precursor to any cooperation between education sectors. In Canadian jurisdictions where student-level data are used to analyze transitions between K–12

education and PSE, a major focus of data use has been the identification of populations and geographic areas that may have lower than average transition rates, so that policy makers may consider what barriers there may be. In the US, much of this cooperative focus has been on "college readiness," which refers to general preparedness for PSE (Laird, 2008). The concern with K–12-to-PSE transitions is similar in the US, though the reactions of American states tend to focus far more on individual students' academic preparedness rather than on broad trends affecting transitions.

Whether data are cross-sector or restricted to the K–12 and/or PSE sector(s), to be a suitable resource for evaluation, analysis, and research they must be separated to individual units (students), must be longitudinal, i.e., follow students over time, and are best when attached to meaningful indicators. The differences between K–12 and PSE data needs discussed above emerge principally from the different meanings attached in each sector to student mobility and transitions. Observing pathways has value in itself from a systems planning perspective, but the policy relevance of pathways data is in large part determined by the richness of data connected to individual unit records. Several jurisdictions have developed comprehensive longitudinal data systems, while other survey-based and administrative data-based efforts continue at the jurisdictional and pan-Canadian levels. The section below profiles pan-Canadian tools for understanding student transitions and mobility, then delves into specific jurisdictional practices.

Section 4: Jurisdictional Tools for Understanding Pathways and Transitions

This section overviews existing tools at the jurisdictional level for understanding student pathways and transitions. When this research was conducted during January to May 2009, every jurisdiction in Canada collected and housed individual student-level data of some kind for at least one education sector. Many jurisdictions employed longitudinal individual unit record systems for operational purposes; others used these systems for wider research purposes as well. This section overviews and compares these systems.

The general intent of the section is to provide a rough understanding of jurisdictional education data environments. It begins with a tabular look into each system, and then provides a jurisdiction-by-jurisdiction elaboration.

Jurisdictional Unique Identifier Summary Tables

The three summary tables below describe jurisdictional use of unique identifiers, or a number or code that identifies individual student records, at the K–12 and PSE levels, and the presence of unique identifier linkages between K–12 and PSE. An overview will also describe the presence or absence of linkages between K–12 and PSE individual unit record data systems.

Table 1 below outlines the presence of unique identifier data systems across Canadian jurisdictions in the areas of early childhood, elementary and secondary education. In this context, unique identifier data systems refer to systems in which student information is collected, including a unique number or code for each individual that does or could allow for longitudinal file construction.

Table 1: Presence of Jurisdictional Unique Identifier Systems Pre-Kindergarten (PK)–12

Jurisdiction	Public Schools	Early Childhood	Home-Schooled	Private/Religious	On-Reserve
British Columbia	Y	Y	Y	Y	Some
Alberta	Y	Y	Y	Y	Y
Saskatchewan	Y	Some	Y	Y	Y
Manitoba	Y	Some	Y	Y	Some
Ontario	Y	N	N	Some	N
Quebec	Y	N	N	Y	N
Nova Scotia	Y	N	Y	N	N
New Brunswick	Y	N	N	N	N
Newfoundland and Labrador	Some	N	Some	Some	Some
Prince Edward Island	N	N	N	N	N
Yukon Territory	Y	N	Y	N/A	N/A
Northwest Territories	Y	N	Y	Y	N/A
Nunavut	Y	N	Y	N/A	N/A

For the most part, nearly all Canadian jurisdictions have unique student identifiers in their public school system. In British Columbia and Alberta unique number systems are used to collect data in early-childhood or other types of schools.

Table 2 below outlines the presence of unique identifier data systems across Canadian jurisdictions in different parts of the PSE system. Unlike in the K–12 sector, the same unique identifier program does not necessarily cover each education area. For example, some jurisdictions, like Ontario, have entirely separate systems for apprenticeship than they do for universities. Financial aid information is frequently separate as well.

Table 2: Presence of Jurisdictional Unique Identifier Systems in PSE

Jurisdiction	Public Universities	Student Financial Aid Applicants/Recipients	Colleges/ Cégeps	Private Career Colleges	Apprenticeships
British Columbia	Y	Y	Y	N	Some
Alberta	Y	Y	Y	N	Y
Saskatchewan	N	Y	N	N	N
Manitoba	N	Y	N	N	N
Ontario	Y	Y	N	N	Y
Quebec	Y	Y	Y	N	Y
New Brunswick	N	Y	Y	N	Y
Nova Scotia	N	Y	N	Y	Y
Newfoundland and Labrador	N	Y	N	N	N
Prince Edward Island	N	Y	N	N	Y
Yukon Territory	N/A	Y	N	N	Some
Northwest Territories	N/A	Y	N	N	Y
Nunavut	N/A	Y	Y	N/A	Y

Analysis of Unique Identifier Systems in K–12

As Table 1 shows, unique identifier systems are quite common across Canada in K–12 public school systems. The use of unique identifiers is quite rare in early childhood education, as jurisdictions tend to enter students into unique identifier systems in either kindergarten or grade 1. Many jurisdictions cover home-schooled students in their data systems, as in most cases home-schooled students are required to be registered as such with the jurisdiction through their local school. Other jurisdictions are aware of all home-schooled children, but do not maintain individual unit records for them. The use of jurisdictional unique identifiers in private and religious schools also differs across the country. Many jurisdictions have two groups of private/independent schools: "inspected" and "non-inspected" schools. Frequently, inspected schools (which may receive public support) are covered by unique identifier/individual unit record systems, while non-inspected schools are not covered.

Jurisdictional legislation relating to non-public education affects system coverage. Unique identifier system coverage of on-reserve schools is uncommon across jurisdictions. Where it does exist, this coverage is frequently the result of specific negotiations between First Nations communities and jurisdictional governments. In at least one case, the participation of on-reserve schools in the jurisdictional identifier system has been made a condition of funding by Indian and Northern Affairs Canada (INAC), the federal body that oversees federal relations with Indian education. Sometimes, on-reserve schools will participate in data systems with the provision that the jurisdiction is not permitted to produce statistics representing on-reserve school students specifically, though their student-level data could be folded into larger cohort statistics. In one exception to this general state of affairs, Saskatchewan publishes statistics specifically for on-reserve schools. Typically, any statistics that are produced about Aboriginal students must be based on self-identification to the education system, thus precluding analysis based on school of attendance.

Jurisdictional unique identifier systems at the K–12 level were often designed principally for administrative purposes. Many jurisdictions first implemented unique identifier systems to facilitate greater accuracy in per-student funding arrangements, arrangements that are now the most common mechanisms through which jurisdictions fund schools. Other jurisdictions designed unique identifier systems to serve performance measurement and analysis purposes from their inception, though funding was always the base question.

Analysis of Unique Identifier Systems in PSE

As Table 2 shows, the presence of unique identifier systems across Canadian PSE systems is uneven. Some jurisdictions have implemented systems while others have not. While few jurisdictions have instituted unique identifier systems for all public PSE students (university and college), all jurisdictions, by administrative necessity, possess longitudinal files for student financial aid applicants and recipients (Clegg et al., 2006). Many jurisdictions are considering or planning the implementation of longitudinal student-level data systems in PSE. Jurisdictional unique identifier systems extend to universities in four jurisdictions and to private career colleges in only one, Nova Scotia. Unique identifiers are prevalent in apprenticeship training across Canada, though these systems are frequently separate from those in K–12 and the college and university sectors. Those jurisdictions that have instituted longitudinal individual unit record systems at the PSE level have done so largely for analysis purposes, a primary difference between systems in place at the PSE and K–12 level. The wave of K–12 unique identifier system development which began in

the 1980s was largely driven by the need for better administrative data that could be used for jurisdictional cost savings by avoiding funding one student twice. Development of equivalent systems in PSE began in the late 1990s, when jurisdictional governments and institutions began to see value in some of the analyses being conducting with data in the K–12 system that was originally collected for administrative purposes. Those jurisdictions that have individual unit record systems at the PSE level also tend to have established or planned linkages with the K–12 system.

Though New Brunswick, Prince Edward Island, Newfoundland and Labrador, and Nova Scotia do not possess provincial-level unique identifier systems in PSE, all four provinces have rich, shared, longitudinal student-level data sets constructed by STATCAN from their jurisdictional PSIS data submissions (in the Maritimes made through MPHEC). The Atlantic provinces are currently the only jurisdictions in the country that have shared interjurisdictional longitudinal data sets in any education area. As described in the jurisdictional profiles below, longitudinal data sets for the Atlantic region have been constructed through a process known as "probabilistic linkage," by which personal identifying information such as name, birthday, and social insurance number (SIN) are compared to establish distinct individual units over time.

Linkages between K–12 and PSE Unique Identifier Systems

Table 3 below describes the presence of unique identifier linkages between K–12 and PSE in Canadian jurisdictions. Systems are characterized as "established" if a functional unique identifier connection exists between K–12 and PSE backed by data sharing between the sectors, or a common database/data warehouse. Systems are characterized as "in implementation" if a linkage between systems is beginning, but incomplete. For example, in the case of Ontario, a "front-end" linkage (a harmonized unique identifying system) has been implemented through a data sharing agreement with the college and university application centres only. A harmonized unique identifier system has not been implemented in the college and university systems to link to the K–12 system. Systems are characterized as "in planning" if concrete steps have been taken toward system development, such as issuance of a request for proposal (RFP) for development of a data system to assist in PSIS participation that will involve linkage, as in Newfoundland and Labrador. Systems are characterized as "under discussion" where informants indicated that the establishment of a linkage is being given serious attention by policy makers. Systems are characterized as "none" where no concrete steps have been taken.

Table 3: Unique Identifier Linkages between K–12 and PSE in Jurisdictional Data Systems

Jurisdiction	K–12-to-PSE Link
British Columbia	Established
Alberta	Established
Saskatchewan	None
Manitoba	Under discussion
Ontario	In implementation
Quebec	Established
Nova Scotia	None
New Brunswick	None
Newfoundland and Labrador	In planning
Prince Edward Island	None
Yukon Territory	Under discussion
Northwest Territories	None
Nunavut	Under discussion

As the table shows, few Canadian jurisdictions presently possess unique identifier linkages between K–12 and PSE. However, several jurisdictions are discussing, planning, or implementing linkages. The details of jurisdictions' linkages status between K–12 and PSE is described in greater detail in the jurisdictional summaries below.

Jurisdictional Summaries

This section elaborates on the information in the summary tables above for each jurisdiction. The sketches of jurisdictional practices below are largely based on interviews conducted with jurisdictional key informants identified by SMC members. Areas of emphasis and omission in jurisdictional profiles are in large part the result of the specific areas of expertise or interest of key informants. Thus, the profile of one jurisdiction may focus more on data warehousing, while another jurisdictional profile may examine statistic generation in greater detail.

Each jurisdictional summary will begin with a description of the existence of unique identifier system(s) at the K–12 and PSE levels. Descriptions of governance and organizational features, as well as examples of system uses, will follow. Publications and studies that rely on jurisdictional data systems will be mentioned in each summary. Consistent with earlier surveys of jurisdictional data systems, it was found that data systems are most frequently used for "internal policy making and in-house studies" (Clegg et al., 2006, p. 13).

British Columbia

British Columbia has a longitudinal student-level data system that spans early childhood education, K–12, and PSE. The province's PEN supports the linkage of individual unit records from year to year. The PEN is assigned upon first entrance to the British Columbia education system, whether that is in Strong Start (early childhood education) or at the doctoral level. The system was first put into place in the early 1990s and was restricted to K–12 education.

At present at the K–12 level, British Columbia's PEN system covers all public schools, early childhood education, home-schooled children (who must be registered through their local school), private and religious schools, and some on-reserve schools. All registered independent schools are under the PEN system. Some on-reserve schools are registered independent schools and thus are included. The province also supports on-reserve schools that are not registered independent schools to be a part of the PEN system if they so choose. At the PSE level, British Columbia's PEN system covers all public PSE institutions, student financial aid applicants, college and university applicants, and some students in apprenticeship training. The system does not cover students in private career colleges or private universities, though a pilot program is currently in planning where the PEN will be introduced at private degree-granting universities, including Trinity Western University, a large private religious university.

While use for school financing was the primary purpose for the system at the outset, performance measurement also emerged as a key use, particularly for Aboriginal students. A key informant indicated that "very shortly after the introduction of the number … we were able to identify this huge gap between Aboriginal and non-Aboriginal students with data that was so precise and powerful. We were able to put that data into the hands of the Aboriginal communities. Communities then were able to go to their school districts and ask why the education was 'not as good'." The system has been used for enrolment-based funding and performance measurement, research, and education policy development for some time.

A key informant indicated that, in 2000, the system was converted into a new, more practical database. Prior to this technical reorganization, upward of 15 separate databases existed. To do longitudinal analyses, a team of highly skilled people was required to extract data from separate databases for the

production of custom longitudinal files. In 2000, the databases were integrated to allow for automatic generation of a series of 100 key longitudinal indicators that could be used as a basis for wider analysis.

In 2002, a linkage was first established with PSE, extending the use of the PEN to PSE students. Key informants indicated that, upon first implementation of the K–12 system in the early 1990s, funding was the driver for participation. Under the new funding model then introduced, schools had to report students' PENs to get funding. The system was essentially imposed by making provision of operating funds dependent on participation. The PSE linkage was the result of a more voluntary process. Key informants indicated that the process began with PSE institutions' interest in participating: "Directors of [institutional] research and various folks in the institution[s] found they could use [the data] to predict supply and demand for students …. [The institutions] very quickly learned that it would help their operations." PSE institutions now use the data to further refine niche markets of students. Key-informants indicated that massive technical improvements between the early 1990s and 2002 made participation in the system far less burdensome on both schools and PSE institutions. When the K–12-to-PSE linkage was established under a memorandum of understanding (MOU) between the Ministry of Education and the Ministry of Advanced Education, responsibility for data management was retained by the Ministry of Education, which also began issuing PENs to students entering the British Columbia PSE system from out of the province. According to one key informant at the Ministry of Education, this expansion of services required "half a dozen people." The informant added that, with operations established, two individuals are required to assign PENs to every student, for both K–12 and PSE in the entire province.

While the PEN follows students throughout the educational continuum, students are never required to present their number to receive education services. It is educational institutions' responsibility to ensure that PENs are recorded. For example, when a British Columbia student enters a PSE institution and does not know his or her PEN, the PSE institution uses a "look-up" function provided by the Ministry of Education. Presenting a PEN up front will "streamline the registration process," according to one key informant, but such presentation is never a requirement.

While PSE institutions agreed to join the system for internal analysis purposes, British Columbia as a jurisdiction has been able to produce some significant research through the K–12-to-PSE data linkage. British Columbia has a long-term multi-faceted research program called the Student Transitions Project. Research under the Student Transitions Project examines student movement from K–12 education to PSE by linking data from K–12 and PSE. This longitudinal data linkage is made possible by the PEN, as the result of a partnership between the British Columba Ministries of Education and Advanced Education, and with the provinces' public PSE institutions. The transitions project issues regular updates on key indicators such as graduation rates, immediate transition rates, cumulative transition rates, Aboriginal achievement, and exiting K–12 students' perceptions of their preparation for PSE (derived from survey data linked to the PEN). More detailed periodic studies on issues such as movement internal to the PSE systems are also a part of the project.[5]

In British Columbia, PSIS data is reported for colleges by the Ministry of Advanced Education and in the university sector by institutions

themselves. All British Columbia universities participate in PSIS.

Alberta

The Province of Alberta has a unique identifier-based individual student record system that spans from early childhood education to postgraduate studies, tracking student information longitudinally. The identifier backing this system is the Alberta Student Number (ASN). The ASN has been used in the province for uniquely identifying students in grades 9 through 12 since the late 1960s. It was extended to cover pre-K–12 students in 1984. In 1999, a linkage was established, expanding it to the PSE system. The linkage was established during a period when K–12 and PSE were housed in the same ministry, as a result of the establishment of Alberta Learning as a ministry covering all forms of education. Informants indicated that "a single ASN reflected a single mandate of the new department for all students in both K–12 and postsecondary education." After responsibility for K–12 and PSE was again divided, resulting in a separate Ministry of Education and Ministry of Advanced Education and Technology, the ASN linkage was maintained between K–12 and PSE through an MOU between the two ministries. The database continues to be housed by the Ministry of Education. Linkage of K–12 and PSE data is not automatic. The MOU stipulates what data are shared on an ongoing basis and for what purpose (mostly performance measurement). Any other request to link K–12 and PSE data must be approved by both ministries to ensure that uses comply with legislation and regulations and that privacy requirements are met. There is no single database that contains all data; rather data from data sets that are not necessarily interoperable in themselves are imported for use in a corporate data warehouse.

At the K–12 level, Alberta's ASN covers all public, separate, francophone, and charter

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[5] For more information about the British Columbia Student Transitions Project, see:
http://www.aved.gov.bc.ca/student_transitions/.

schools, early childhood education, home-schooled children, private schools, and on-reserve schools. Students in on-reserve schools and students living on reserves who attend other public schools are included in the system. While individual unit records for students in on-reserve schools and students from reserves enrolled in other public schools through tuition agreements are included in the common data warehouse, no analyses can be conducted by the province treating these students as a separate group. At the PSE level, Alberta's ASN covers all public PSE institutions, is recorded on the files of financial aid and university/college applicants, and is used to track students in apprenticeship training; it does not cover private career colleges.

Students entering the Alberta education system receive an ASN upon first entry, whether into early childhood education or a postgraduate PSE program. If a student has "stopped out" for a period of time, for example between grade 12 and PSE, the student must report his or her number upon re-entry to the system. There are online mechanisms through which students can retrieve their number. Likewise, students must self-report their number when first applying for PSE or student financial aid. A new centralized application system being designed for the province's PSE institutions will have a built-in ASN look-up feature for students to use. The self-reporting mechanisms imbedded in the Alberta system address the problem of number duplication. This is a primary difference between the Alberta and British Columbia systems. In British Columbia, ultimate responsibility for collection and movement of PENs between institutions rests with the institutions. In Alberta, this responsibility rests with students.

A host of data is attached to the ASN and housed in the province's common data warehouse. These data include Aboriginal identity (self-declared) and other demographic information. Scores from Alberta's standardized

tests are housed in a separated database, but can be linked to the ASN. Several regular reports are produced with these data, and a number of policy processes are directly informed by data from the common data warehouse. Informants indicated that there is a great deal of satisfaction with the system and that, by and large, it provides all information that policy makers require. One informant indicated that the system provides more policy-relevant information than can possibly be examined by available staff, an issue common to all well-developed data systems. Alberta informants described the system as able to "answer an almost unlimited number of policy-relevant questions."

Like most unique identifier based systems, Alberta's ASN system is used to accurately facilitate a per-student funding model at the K–12 level. For example, Alberta has used information from the data system to ensure that funding formulas are accurately applied by monitoring and verifying sudden enrolment increases or declines of student classifications with larger per-student funding levels (e.g., special needs, English as a second language). Data use for system-level planning is well entrenched in the ministry. Several groups at the ministry are organized around analysis of specific issues. For example, one group focuses on workforce planning for elementary and secondary education, examining geographically shifting demand for education and planning to have teachers ready to meet that demand. Informants described other ways in which data inform policy on an ad hoc basis. Alberta publishes information about K–12 education through its Accountability Pillar.[6] The Accountability Pillar contains 19 key indicators that are published about the entire K–12 system by the province, while school

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[6] For more information about Alberta's Accountability Pillar, see: http://education.alberta.ca/admin/funding/account ability.aspx.

jurisdictions publish local data for these indicators. The Accountability Pillar is largely survey-based, examining student and parent satisfaction, but also contains key transitions information made possible by the common data warehouse. In Alberta, standardized testing data are not linked to individual unit records with the ASN, but are kept in a separate database for privacy purposes. When testing results are analyzed, information from the common data warehouse is taken into account. For example, informants indicated that research has shown that mobility can depress student achievement. When schools have high rates of in-mobility, this is taken into account when testing data are analyzed.

At the PSE level, one of the largest analysis projects conducted by Alberta is the yearly "turn away" report. This report takes account of the number and distribution of "turn-aways" across the province. Turn-aways are defined as individuals who applied to one or more PSE institutions, met the minimum stated qualifications (as stated on institutional Web sites) in at least one of those institutions, but were accepted to no institutions. Turn-away data inform Alberta's enrolment policies. Enrolment increases might be recommended by the province in light of turn-away data suggesting that qualified applicants are not making it into the system. In another example of data use for policy making, in Alberta all new PSE programs must be approved by the province prior to implementation. The province uses mobility data as one variable in predicting demand for a program, as expected demand is central to the program approval process. If many students are leaving their region to attend nursing programs, then the province would view that region experiencing nursing-student out-migration as a potential location for a new nursing program. The province uses mobility data both to recommend new programs to institutions and to assess whether institutionally proposed programs may be sufficiently in demand to warrant approval.

With regard to PSIS, the Government of Alberta centrally manages Alberta's PSIS submission for both colleges and universities. Alberta fills nearly every PSIS field, leaving only personal identifying information unfilled. Due to provincial privacy legislation, Alberta does not remit any personal identifying data to PSIS, such as name or SIN. Thus, Alberta's PSIS submission results are snapshot data, but are not longitudinal in nature.

Saskatchewan

Key informants indicated that Saskatchewan has a unique identifier-based student data system in place at the K–12 level, and described the system as "centralized and live." All information is housed at the provincial level and all updates that schools make to the system are instantaneous. As long as schools keep their records up to date, the province can see current information. This is a key difference between Saskatchewan and several other jurisdictions where schools house their own information and perform scheduled data transfers. In several other jurisdictional systems, multiple data systems are in use at the school level, and scheduled uploads to government require technical bridging between incompatible systems and, at times, the submission of paper records to be re-input at the jurisdictional level.

Saskatchewan's data system covers all public schools, home-schooled students, private and religious schools, and on-reserve schools, but does not entirely cover early childhood education. Although participation is not necessary, some pre-kindergarten students are included in the student data system and can therefore be identified individually. The system is used principally to facilitate a per-student funding formula. Informants indicated that it is very effective in preventing double counting of students within or across schools. Saskatchewan's system is based on the use of a

unique identifier, but this identifier has not been given a specific name.

Saskatchewan collects demographic and progression (transitions) information for students in grades 1 through 12. Demographic data include information such as self-declared Aboriginal identity, residence information that can allow for identification of northern residence, and gender. Academic records are kept by the province only for grades 10 through 12. The province is in charge of high school diploma and transcript issuance, so academic information is housed at the provincial level to facilitate these processes. Key informants indicated that there is interest in expanding academic record keeping to grades 1 through 9 in order to utilize these data to conduct further transitions and student success analyses. Using its data system, Saskatchewan operates the Provincial Education Indicators Program, a statistical project that produces regular reports about education in Saskatchewan.[7] A series of core indicators, which include information such as cohort Aboriginal high school completion rates, high school credit accumulation trends, high school course selection, standardized test results, and cohort persistence from grades 8 through 10 (i.e., past the legal school-leaving age) are published in the *Saskatchewan Education Indicators* report (Saskatchewan Ministry of Education, 2008). The same report contains post-graduation information for Saskatchewan and comparator jurisdictions and regions from the third wave of YITS. Provincial-level core indicators are published in the *Indicators* report, while school-division and school-level data are available internally to schools, school divisions, and the province through the data system. Key informants indicated that, using its unified data system, the

province can easily track student movement from school to school and through grades, seeing clearly when students "fall off the map," withdrawing from one school and not reappearing in another. Informants indicated that investigation of what happens to these students (the suspicion is that many leave the province) would be a priority if greater resources were available.

Key informants indicated that the system allows for very detailed financial accounting of the flow of funds from government through schools. An informant indicated that "you could know which contractor was paid $50 for carpet shampoo by the local high school."

Saskatchewan has neither a unique identifier system nor individual unit record data at the PSE level. The Province of Saskatchewan does possess individual unit records for one group of PSE students, those studying in the province's regional colleges. Regional colleges are institutions that have adult education courses, skills training courses, and some university courses, all of which are brokered through public PSE institutions, similar to the way in which many Aboriginal-owned and -operated PSE institutions function. The province maintains these institutions' individual records as a support service, providing full access to student information only to the institutions at which the students are enrolled. The Ministry of Advanced Education, Employment and Labour has limited access to this information, as the purpose of housing the information is not provincial administrative or analysis uses, but rather to assist the regional colleges by absorbing some of the cost of maintaining student records.

In the area of non-individual-unit-based records for understanding student transitions and mobility, key informants indicated that a high school leavers survey and a postsecondary graduate follow-up survey are used to understand student transitions. The high school

[7]Reports are available from the Provincial Education Indicators Program Web site: http://www.education.gov.sk.ca/AAR_Indicators_Program.

leavers study was conducted in 2005–06 and was again being conducted in the 2008–09 school year, through the cooperation of the Ministry of Education and the Ministry of Advanced Education, Employment and Labour.

In Saskatchewan, PSIS data for the regional colleges are submitted by the province; all other PSE institutions submit PSIS data directly to STATCAN.

Manitoba

Key informants indicated that Manitoba has a unique identifier system that has been in place at the K–12 level for many years. The system is made possible by the Manitoba Education and Training (MET) number that is administered by Manitoba Education, Citizenship and Youth. Key informants characterized the MET number and its attendant database as a "mature" system. Informants indicated that the database goes back to 1996 and serves primarily administrative purposes. The MET system was designed largely to facilitate a per-student funding model. The MET system eases provincial funding allocation processes by identifying how many students are enrolled at a school and ensuring that students are not double-counted within a school or at two schools. At the school level, the MET number eases transfer processes by making it easy for schools to obtain student information. The MET number also allows for the generation of provincial high school graduation rates.

The MET system covers all public schools, some early childhood education providers, home-schooled children (who are required to register as home-schooled through their local school), private and religious schools, and some on-reserve schools. Key informants indicated that on-reserve schools' use of the MET number and Manitoba standardized testing programs and teacher registration were instituted as a quality assurance requirement for federal funding by INAC. Through an agreement with INAC,

Manitoba Education, Citizenship and Youth administers these mechanisms for on-reserve schools. The MET system does not currently extend into PSE.

At the provincial level, each K–12 student is assigned a MET number. Since Manitoba schools use many different data systems and software packages, the MET number is stored with each student's information, although it may not be the primary student identifier employed by the school. When schools report electronically to the province, they submit student information identified only by the provincial MET number. The majority of school information is reported electronically, though key informants indicated that paper reporting still occurs in the province.

Key informants indicated that discussions are currently under way about extending the use of the MET number into PSE. A primary obstacle being faced in this planning stage is the question of how to generate MET numbers for students entering Manitoba PSE who did not attend Manitoba K–12. The outstanding questions are about whose responsibility allocation of the number would be, how it would be ensured that duplicate numbers are not assigned, and how access to the existing database (housed by Manitoba Education, Citizenship and Youth) would be arranged for Manitoba Advanced Education and Literacy, which is responsible for PSE. Key informants indicated that privacy legislation is being negotiated carefully as this process unfolds.

In 2004, MET-derived K–12 longitudinal data were used to measure the effects of socioeconomic status on K–12 educational success. In 2004, the Manitoba Centre for Health Policy, a research centre within the Department of Community Health Sciences of the Faculty of Medicine, University of Manitoba, completed a study on how educational outcomes varied with socioeconomic status in the city of Winnipeg (Brownell et al., 2004). This study was made possible by the use of the MET

number across all data submissions to the province, allowing for researchers to construct longitudinal files. Funding for the study originated with Canadian Institute for Health Information. Though no "hard" health data are linked with MET-number-derived data in the study, researchers cited a rich body of literature regarding the health outcomes of education to suggest that education data are in effect health data as well.

Manitoba also has non-unique identifier survey tools for understanding student transitions and mobility at the PSE level. Among them are the Manitoba University and College Graduate Survey and the Manitoba University and College Early Leavers Survey.

In Manitoba, institutions submit PSIS data directly to STATCAN.

Ontario

Ontario has had a unique-identifier system in place at the K–12 level since 2002: the Ontario Education Number (OEN). The Ontario School Information System (OnSIS), a more sophisticated data system, was introduced in the 2005-06 school year. The OEN follows students from kindergarten to grade 12 in public schools. The system is managed by the Ontario Ministry of Education. OnSIS contains a wide range of student and teacher data. Data about student achievement are collected by the province's Education Quality and Accountability Office (EQAO), and can be linked to student data from OnSIS in a separate reporting system.

The OEN is used in all publicly funded K–12 schools and inspected private secondary schools, but does not cover early-childhood education, home-schooled students, or on-reserve schools. Use of the OEN by Ontario public postsecondary institutions began in 2008. Since 2007, the OEN has accompanied high-school transcripts on the joint application systems for the college and university sectors

(Ontario College Application Service [OCAS] and Ontario Universities' Application Centre [OUAC], respectively). Colleges and universities were able to record the OEN from Ontario high-school transcripts as Ontario students entered PSE. Currently, all but one university records the OEN and includes it in unit record submissions to the Ministry of Training, Colleges and Universities (MTCU). The OEN is not yet widely used in colleges, and has not been adopted by any private institutions. By having the OEN recorded on OCAS and OUAC applications, the province is able to see where applicants come from. As the data system matures, this will allow MTCU to track the movement of Ontario students throughout the PSE system. However, barring the development of a system by which out-of-province and international PSE students are issued OENs, the linkage under development with PSE will cover only students who attended elementary and/or secondary school in Ontario.

The full uses of data from OnSIS are still under development. Data now reach back to 2005, and the province is conducting many internal analyses with these data, which include EQAO examination results and socioeconomic-status indicators from StatCan. Discussions are under way about what types of indicators might be desirable to look at in a standardized way. Already, some indicators, such as cohort graduation rates, are being calculated.

Informants did indicate that Ontario has recently established a separate unique-identifier system covering Employment Ontario programs such as Job Connect, Apprenticeship, and Literacy and Basic Skills. Four existing data systems were folded into one to produce this new unique-identifier system. The informant indicated that, at the outset, there was discussion of basing this system on the OEN, but it was decided to create a new unique identifier for the system, perhaps because many entrants to the system would not have OENs, requiring a mechanism to generate one.

At present, individual PSE institutions in Ontario have the responsibility to submit data to the Postsecondary Student Information System (PSIS). Three institutions currently send data to PSIS, though an agreement between StatCan, MTCU, and Ontario universities was recently reached by which MTCU will assume responsibility for collection and organization of data from universities for PSIS submission. This agreement covers the newly defined "core elements" of PSIS and does not cover the personal identifying information that would be necessary for the establishment of a longitudinal file. An informant indicated that StatCan, after receiving core elements from the province, may go to institutions to attach unique identifying information that could allow for probabilistic linkage, avoiding the problem of having the provincial government handle personal identifying information. This new arrangement does not include Ontario colleges, which will continue to submit PSIS files on an institutional basis.

In addition to its emerging unique-identifier-based tools for understanding student transitions and mobility, Ontario also uses survey tools that are not tied to the unique-identifier systems and present snapshot data. MTCU conducts a PSE graduate survey. This survey examines employment and salary information, among other topics.

Quebec

Quebec has a 12-character unique identifier known as the *code permanent* that stays with individuals from kindergarten through postsecondary and adult education. The system has existed in some form at the K–12 level since 1966; however, it was made mandatory through the PSE system only in 2000. During this interim period, the Ministère de l'Éducation, du Loisir et du Sport and institutions collaborated to lay out a unique identifier system in the university sector (as one

was already being used in the elementary/secondary and college sectors). Its primary purpose at inception was to ensure accurate head counts for the purpose of institutional funding. However, it has also developed into a powerful tool for research, particularly for gaining a better understanding of student mobility and pathways, both within Quebec and between the province and other Canadian and international jurisdictions.

At the K–12 level, the *code permanent* covers all children in pre-elementary education as well as all students enrolled in public and private schools (since the latter receive public funding in Quebec). The system does not capture data from on-reserve schools, though it does capture a substantial amount of data about students in Aboriginal-controlled public school boards (e.g. the Cree School Board of northern Quebec). The system does not cover home-schooled children. The *code permanent* is also used to capture data about students in public colleges (cégeps), universities, and apprenticeship training. Data on students in private postsecondary colleges are not captured as a matter of course, but some data are captured on these students if they are in receipt of student financial aid.

Students entering the Quebec education system receive a *code permanent* at the point of first entry into the system, whether that entry is in pre-elementary education or postgraduate studies. Learning institutions are responsible for obtaining copies of personal identification for each student (normally a birth certificate or immigration papers). These data are transmitted to a division within the ministry, which assigns a *code permanent* and transmits this number back to the school. When a student switches institutions, he or she is required either to again present the same documentation or to present a previous report card that carries the *code permanent*. This is to ensure that a single student is not given more than one *code*.

A single database known as Ariane holds the official list of *codes permanent* along with "tombstone" or static data — such as an individual's birthday — that does not change and contact data. However, this database does not carry any other data, such as grades or classes taken. These data are held separately on one of four other databases (one for K–11 known as Charlemagne, one for cégeps known as Socrates, one for universities known as the *Gestion des données sur l'effectif universitaire,* and one for student financial aid). These can be linked to one another by use of the *code permanent*, but to enhance privacy and data security, the *code* is not used as the primary identifying key in the other four databases. Thus, the *code permanent* really holds no usable information other than name, gender, and address; however, through linkages it can be used to obtain other information.

Very little socio-demographic data are collected in any of the databases. Thus, using the *code permanent* for examination of results by ethnicity is not possible. Data on mother tongue are collected, however, so analysis can be done on that basis. Presumably analysis by neighbourhood and postal code are possible as well, though these do not seem to be major uses of the system.

When the ministry or an external researcher wishes to use the *code permanent* to follow a student across years or across institutions, a request must be made to the ministry's research ethics committee in order to obtain permission to use the *code permanent* to link data across databases. The ethics committee processes several hundred of these requests each year. For example, much work has been done by ministry researchers on issues such as pathways through education, the effects of stopping-out on completion, the effect of taking time out between cégeps and universities, and times to program completion. Outside researchers may access the system as well — one recent project followed up students who

were in kindergarten in the early 1990s, whose teachers had been asked to rate their likelihood of successfully finishing secondary school. (The kindergarten teachers, it turned out, were highly accurate in predicting future success.)

These databases also feed a number of statistical information products that are released regularly by the ministry. These include not only provincial-level documents such as *Indicateurs de l'éducation*, but also school-board-level statistics on student success, which are posted on each board's website, and school-level data, which are not only given to each school but which are released publicly and end up being presented for public consumption through the regular "*Palmarès des écoles* issue of *L'Actualité*.

In Quebec, all PSIS files are submitted by the ministry and all PSE institutions participate in PSIS.

Nova Scotia

At the K–12 level, Nova Scotia has a unique-identifier-based data system — the Provincial Student Module (PSM). This system has been in place since the 1995–96 school year. The PSM covers all public schools, early childhood education, and home-schooled children at an aggregate level. Private and religious schools and on-reserve schools are presently not included in the system, though there has been discussion with on-reserve schools about using the number.

When the system was initially introduced, the health number was used as the unique identifier for eight months, but later the unique student identifier (USI) was developed. The USI is a 10-digit identifier, with the last digit acting as a check digit. The number is assigned upon first entry to the Nova Scotia school system, whether in early childhood education or grade 12. Across the province, school boards and individual schools use different data systems (of which there are a total of five different types),

so the vendors for each of those systems have developed methods for uploading data to the province in a uniform fashion.

At present, the unique identifier system is used principally for administrative purposes. Central functions include assisting in student transfer processes and facilitating accurate per-student funding by eliminating dual enrolments. The number is also used to produce an accurate count of French immersion students in order to request federal funding for these students. Data from the PSM are also used to produce yearly summary statistics. These statistics are yearly aggregate snapshots. Though the presence of a unique identifier could facilitate the construction of longitudinal files, current analysis takes place on a snapshot basis. At present, the type of data submitted to the province that accompanies the USI in the PSM is somewhat limited. When the system was designed, a phased approach to data collection was designed, by which easy-to-collect-and-remit data would come first, with more detailed information coming next. The technical challenges involved with uploading data from five types of school data systems have precluded advancement to more complex data elements. Currently, only phases 1 and 2 have been implemented; data such as birth dates, gender, postal codes, registration dates, and program information (secondary) are included in planned exports to the province.

Nova Scotia is currently planning to move to a new unified data system for the K–12 level. Under this system, all school data across the province would be housed centrally, making data sharing between schools and uploading from the schools to the province easier. Currently the introduction of new data elements for submission to the province requires significant resource investment. Each vendor for the five school data systems must assist in identifying ways in which the new element can be added to submissions to the province in such a way that the data will be interoperable with the other systems. Under a unified system, informants indicated, it will be easier to move forward with inclusion of the new data elements and also to go forward with some more detailed analyses of student mobility and transitions to PSE and the reasons for mobility and transitions to PSE. An RFP was issued for the creation of this new system and a vendor was selected. When interviews were conducted, the Department of Education was waiting for budget details to see whether these plans could be actualized. An informant from Nova Scotia indicated that he was working with officials from New Brunswick to establish interoperability between New Brunswick and Nova Scotia's new education numbers.

Nova Scotia also possesses several non-unique-identifier-based tools for understanding student transitions and mobility. School leaver and high school graduate exit surveys are used to understand student transitions from K–12 and within the K–12 level. The province also collects information about reasons for program switching in secondary school, e.g., reasons for switching from French immersion to English programs. Nova Scotia is also a participant in MPHEC's Maritime Graduate Follow-up Survey, which is currently examining 2003 Maritime university graduates' outcomes and perceptions of their postsecondary education.

For PSE, Nova Scotia longitudinal files have been constructed based on Nova Scotia's participation in PSIS and completion of all PSIS fields, including personal identifying information such as the SIN field. All Atlantic provinces have chosen to include personal information in their PSIS submissions, allowing for the creation of interprovincial longitudinal files by STATCAN. These longitudinal files were analyzed in the 2009 report for the Council of Atlantic Ministers of Education and Training, *Moving Through, Moving On: Persistence in Post-Secondary Education in Atlantic Canada, Evidence from PSIS* (Finnie & Qiu, 2009). This study represents Canada's sole successful use of

individual unit records to examine interprovincial mobility. Nova Scotia, New Brunswick, and Prince Edward Island participate in PSIS mostly through MPHEC. Nova Scotia universities submit data directly to MPHEC, which then transfers data to STATCAN. Nova Scotia colleges submit directly. Provincial governments do not participate in the process of transferring data from institutions through MPHEC to STATCAN. In addition to the macro Atlantic analysis described above, individual Maritime provinces have access to their longitudinal files constructed through PSIS participation.

New Brunswick

New Brunswick currently has a unique identifier system in place at the K–12 level. Prior to 2006, the medicare number was used as the unique identifier. This practice was ended due to the *Protection of Personal Information Act*. A key informant advised that in 2006 the medicare number was replaced with a 10-digit number modeled on the Win School [current student information system]temporary number. At the moment, schools are responsible for the creation of numbers. Each school has a code that forms the beginning of the number with additional digits generated sequentially. A system exists for schools to retrieve student numbers in the event of a transfer, to avoid duplication of numbers across the province. That said, informants indicated that the current system, in which schools generate the provincial unique identifier, is resulting in errors in which students have multiple numbers. Therefore the province does "not use the unique student identifier as the sole means of identifying students." Student-level data available at the Department of Education are used to produce yearly summary statistics and a province-wide dropout report.[8] As the unique

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[8] To view these reports, see the New Brunswick Department of Education Publications Web site: http://www.gnb.ca/0000/pub-e.asp.

identifier is not used as the sole means for identification in the production of these reports, personal information is used to produce linkages.

Informants from New Brunswick indicated that there are plans under way to establish a new, centrally managed New Brunswick Education Number that will encompass the K–12 system and centralize the creation of numbers. Informants indicated that there was an "urgent need" for this new system, "due to some ongoing issues with Win School [a common 'off-the-shelf' education data system] and a lack of adherence to and knowledge of current standards." Under the new system, "no personal information will be inferred from the number, and its assignation will be done electronically and automatically." Key informants indicated that the new system will be a separate data system from Win School and will provide a range of new information to reduce administrative workloads and produce more reliable statistics. Informants indicated that there is interest in extending this number to PSE as well, though such discussions are in very preliminary stages and a linkage cannot be considered planned. Informants indicated that cooperation is currently in process with Nova Scotia to make this new number interoperable with Nova Scotia's existing K–12 system. Nova Scotia provincial officials are working with their counterparts in New Brunswick to help develop a system that will allow for mutual intelligibility between the two provinces' unique identifier systems.

New Brunswick's unique identifier system covers all public schools, but does not cover early childhood education, home-schooled students, private and religious schools, or on-reserve schools.

There is no equivalent provincial-level unique identifier system in PSE. However, New Brunswick participates in PSIS along with the other three Atlantic provinces. New Brunswick

longitudinal files have been constructed for PSE based on New Brunswick's participation in PSIS and completion of personal identifying information such as the SIN field. All Atlantic provinces have chosen to include personal information in their PSIS submissions, allowing for the creation of interprovincial longitudinal files by STATCAN. The longitudinal files produced using PSIS were analyzed in the 2009 report for the Council of Atlantic Ministers of Education and Training, *Moving Through, Moving On: Persistence in Post-Secondary Education in Atlantic Canada, Evidence from PSIS* (Finnie & Qiu, 2009). This study represents Canada's sole successful use of individual unit records to examine interprovincial mobility. Nova Scotia, New Brunswick, and Prince Edward Island participate in PSIS mostly through MPHEC. Institutions submit data directly to MPHEC, which then transfers data to STATCAN. Provincial governments do not participate in the process of transferring data from institutions through MPHEC to STATCAN. In New Brunswick there is some variation in PSIS reporting practice. Most PSIS files are submitted through MPHEC, but New Brunswick Community College and one institution recognized as a university by PSIS submit directly to STATCAN. In addition to the macro Atlantic analysis described above, individual Maritime provinces have access to their longitudinal files constructed through PSIS participation.

New Brunswick also uses non-unique identifier tools to examine student transitions and mobility, the Grade 12 Exit Survey being foremost among these. New Brunswick is also a participant in MPHEC's Maritime Graduate Follow-up Survey, which is currently examining 2003 Maritime university graduates' outcomes and perceptions of their postsecondary education.

Newfoundland and Labrador

Newfoundland and Labrador currently uses the Medical Care Plan (MCP) number as a unique identifier for K–12. In its internal data system, Newfoundland is the only jurisdiction that currently uses a non-education specific identifier, such as a health number or SIN (though the province may soon change this practice). Privacy legislation has eliminated the use of health numbers as education unique identifiers in several provinces, though the Atlantic provinces do submit student SINs through PSIS to allow for longitudinal file construction.

Use of this number as a unique identifier is mandated only for students in grades 10 to 12, as the Department of Education maintains a longitudinal individual record data system at the high school level only for the purpose of maintaining provincial transcripts. In kindergarten through grade 9, submission of student-level data is optional for schools, as aggregate data are what the province requires. Since it is frequently easier for schools to remit individual unit records rather than produce aggregate data, the province often receives individual unit records from K–9. The system does not extend to early childhood education, but does include home-schooled children, private and religious schools, and on-reserve schools. Around 80 per cent of K–9 schools remit individual unit record data, and most that do submit individual unit records submit them with the MCP number, as the MCP number is generally used by schools as an internal student number. The MCP number is received by the province for some students in early childhood education, some students who are home-schooled, some students in private and religious schools, and some students in on-reserve schools. The province aggregates all data received from K–9, so even though the MCP number is frequently submitted by schools to the province in kindergarten-through-grade 9

data, it is not used as a unique identifier by the province until grade 10.

Newfoundland and Labrador schools use several types of data systems and remit data to the province in varying ways. Paper is sometimes used for transferring data. The province cleans data and inputs it into a single database.

When students from out-of-province enter Newfoundland and Labrador schools, the province assigns them a pseudo-MCP number. This process has been problematic, key informants noted, as confusion occurs when students receive their "real" MCP number after the determined period of residency, sometimes resulting in the double counting of students and, at the high school level, the presence of multiple transcripts for a single student.

At present, Newfoundland and Labrador is in the process of creating a new unique identifier system that will cover K–12 with a pilot slated to begin in 2010. The new system will establish a 12-digit unique identifier to replace use of the MCP number, which is problematic for privacy reasons (an informant called its use "no longer justifiable") and not under education control, but administered by health authorities. As a result, education officials are not free to issue MCP numbers at will, and must wait for action from the Department of Health and Community Services. Under the new system, Education will be in control of the unique identifier system. Key informants indicated that once this system is put into place, extension of the system into PSE will be explored in conjunction with PSE authorities.

At present Newfoundland and Labrador does not have a unique identifier in PSE, though it does have complete PSIS participation, like the other Atlantic provinces. Newfoundland and Labrador longitudinal files have been constructed for PSE based on Newfoundland and Labrador's PSE institutions' submission of

data directly to STATCAN and completion of personal identifying information such as the SIN field. All Atlantic provinces have chosen to include personal information in their PSIS submissions, allowing for the creation of interprovincial longitudinal files by STATCAN. These longitudinal files were analyzed in the 2009 report for the Council of Atlantic Ministers of Education and Training, *Moving Through, Moving On: Persistence in Post-Secondary Education in Atlantic Canada, Evidence from PSIS* (Finnie & Qiu, 2009). This study represents Canada's sole successful use of individual unit records to examine interprovincial mobility. In Newfoundland and Labrador, institutions submit data directly to STATCAN, and all PSE institutions participate in PSIS.

Newfoundland and Labrador does administer a graduate follow-up survey, Career Search, every two years, covering graduates from all PSE institutions, including private training institutions. This survey helps Newfoundland and Labrador monitor the employment outcomes of PSE, as well as develop some idea of where students are going post-graduation. Informants indicated that privacy legislation was a major challenge during the publication of the survey, and that this challenge led to broad-based discussions about the nature of data collection and how that can be best done to accommodate privacy concerns. Outmigration of graduating students is of great interest to the province, and informants indicated that, faced with demographic challenges, the province is very interested in developing ways to better understand graduating student outmigration and the immigration of international students and students from other Canadian jurisdictions.

Prince Edward Island

Prince Edward Island does not have a unique identifier system at the K–12 or PSE level, though longitudinal files on student financial aid applicants and recipients are maintained by operational necessity. One Informant indicated

that the province investigated the possibility of introducing a unique identifier for the K–12 level, concluding that costs for the small province outweighed the benefits that such a system would bring. A different informant indicated that there are preliminary discussions under way about the introduction of a unique identifier system for K–12 education. That informant indicated that discussions had originated in the early childhood education sector, where a desire to track students through early learning programs to other stages of education was a primary motivation for wanting longitudinal data. An informant indicated that if a system were to be put in place at the provincial level, Prince Edward Island would be at an advantage, as all of its schools are mandated to use the same software package for administrative data and school-level student number assignment. This similarity across the system would facilitate data uploading to the province and universality of data definitions. Some jurisdictions, including jurisdictions that utilize unique identifier systems, do not have established policies on the type of data systems used by schools, resulting in the need for jurisdictional accommodation of a multitude of systems, and even acceptance of paper records to be input by hand.

Though Prince Edward Island does not have a provincial unique identifier system for PSE, the province does participate in PSIS along with the other Atlantic provinces. Prince Edward Island longitudinal files have been constructed for PSE based on Prince Edward Island's participation in PSIS and completion of personal identifying information fields, such as the SIN field. All Atlantic provinces have chosen to include personal information in their PSIS submissions, allowing for the creation of interprovincial longitudinal files by STATCAN. These longitudinal files were analyzed in the 2009 report for the Council of Atlantic Ministers of Education and Training, *Moving Through, Moving On: Persistence in Post-Secondary Education in Atlantic Canada, Evidence from*

PSIS (Finnie & Qiu, 2009). This study represents Canada's sole successful use of individual unit records to examine interprovincial mobility. Nova Scotia, New Brunswick, and Prince Edward Island participate in PSIS mostly through MPHEC. Institutions submit data directly to MPHEC, which then transfers data to STATCAN. In Prince Edward Island, all PSE institutions participate in PSIS and all of them submit their data through MPHEC. Provincial governments do not participate in the process of transferring data from institutions through MPHEC to STATCAN. In addition to the macro Atlantic analysis described above, individual Maritime provinces have access to their longitudinal files constructed through PSIS participation.

In addition to participation in the unique-identifier-based analysis of PSE mobility and transitions through participation in PSIS in conjunction with the other Atlantic provinces, Prince Edward Island also utilizes survey tools to examine student transitions and mobility. In 2007, Prince Edward Island conducted the survey Life After High School of graduates two years after graduation. The study examines mobility, among other issues. Prince Edward Island is also a participant in MPHEC's Maritime Graduate Follow-up Survey, which is currently examining 2003 Maritime university graduates' experiences in work, further study, and managing student loan repayment.

Yukon

The Yukon Territory has a K–12 unique identifier system called the Yukon Territory ID (YKID) System. All Yukon K–12 students are given a YKID upon entrance to the system. Interestingly, all Yukon K–12 students also have British Columbia PENs and Alberta ASNs. This is because Yukon participates in Alberta and British Columbia standardized testing programs, which require the use of their respective unique identifiers. In what may be Canada's only institutionalized system of interjurisdictional unique identifier sharing, when Yukon K–12

students transition to PSE in Alberta or British Columbia, Yukon reports the relevant unique identifiers (ASN or PEN) to the receiving province along with the students' transcripts. The majority of Yukon K–12 students who continue to PSE do so in Alberta or British Columbia rather than in Yukon Territory. The YKID system covers all public schools and home-schooled children (who register with local schools), but does not cover early childhood education or private and religious schools. There are no on-reserve schools since there are no reserves in Yukon.

The YKID does not follow all students from K–12 into the public Yukon PSE system, which is composed solely of Yukon College. Yukon College does not maintain a unique identifier system shared with the Territory. The YKID does link to student financial aid records, but does not follow students to PSE through institutional administrative data. However, an informant indicated the "vast majority" of PSE students from Yukon receive student financial aid. As a consequence of the near universality of aid in the territory, movement of the majority of Yukon students from Yukon K–12 to Yukon PSE is observable, though this de facto linkage is not a topic of current analysis for the Yukon Department of Education. The Yukon ID does follow Yukon K–12 students in apprenticeship training. Making a connection with the YKID between K–12 and Yukon College is under discussion, and was engendered by an Auditor General's inquiry as to whether the Yukon K–12 system adequately prepares students for PSE.

Neither the Government of Yukon nor Yukon College currently submit data to PSIS.

Northwest Territories

At the K–12 level, the Northwest Territories has a unique identifier-based individual unit record data system. This system is part of a much broader administrative database that is unique in Canada. The Northwest Territories' Case

Management Administrative System (CMAS) has the capacity to track clients of all government services under the umbrella of the Department of Education, Culture and Employment. Through its 14 modules, CMAS issues an internally used, sequential, unique number for each client, though the SIN, health number, name, address, and date of birth are also recorded, since this is an operational database used by departmental branches to facilitate program delivery. As a small jurisdiction, the Northwest Territories operates a diverse range of public services out of this single department. The unique number allows for the linkage of data related to the delivery of services under the Department of Education, Culture and Employment: early childhood education, K–12 education, adult and postsecondary education, career development and employment, apprenticeship and occupational certification, culture, heritage and languages, income support, and employment standards.

In addition to CMAS, which is the central departmental system, the Northwest Territories also uses eSIS, a student information system, specifically for K–12 education, though K–12 enrolment and course records are housed in the CMAS. A centrally managed web-based application, eSIS is used specifically to house student demographic, enrolment, attendance, report card, and other information. Gender and Aboriginal identity are also recorded in the systems.

CMAS was developed in 1998. As technical concerns related to the year 2000 change-over crested, the decision was made to replace numerous "legacy" data systems with differing levels of functionality, with a new system that could encompass all services offered through the department. To individual governmental data users within a programmatic area such as K–12 education or income support, the database is restricted to that field. Broad-based access to the system is controlled for privacy

reasons. There have been some analyses conducted that cut across service sectors with anonymized data and more such work is expected in the future. The richness of this unique source, which encompasses education data and student financial aid data, along with data from numerous social services, will increase over time.

The Northwest Territories' individual unit record data system covers all public schools, home-schooled students, private and religious schools, and the one school in the territory that could be considered the equivalent of an on-reserve school. CMAS and the eSIS system do not at present include early childhood education. The Northwest Territories' only postsecondary institution, Aurora College, uses a separate data system for student records and enrolment data; however, nearly all of the students who attend Aurora College receive student financial aid, and student financial aid is operated out of the Income Security Branch of the Department of Education, Culture and Employment, so virtually all postsecondary student in the territories are tracked from K–12 into PSE, and their PSE records could also technically be linked with K–12 records though CMAS. CMAS also covers apprenticeship training programs.

The Northwest Territories publishes a statistical report on education in the territories, *Towards Excellence: A Report on Education in the NWT.*[9] A similar report is produced for PSE. Other statistics are produced internally on an ongoing basis.

Neither the Government of the Northwest Territories nor Aurora College currently submit data to PSIS.

Nunavut

Nunavut has an individual unit record data system in place at the K–12 level. In Nunavut, the education system is fairly unified. While local governing bodies over education exist, teachers are employed by the territory rather than a board or an equivalent body. Likewise, education data are maintained regionally, with some data maintained centrally, and linked to the Alberta system. Schools perform scheduled transfers of data to the territory throughout the year. The territory's primary use of these data is to track attendance records and enrolment records and to maintain credit accumulation records for the issuance of high school diplomas. Nunavut's system does utilize an internally generated unique identifying number, though names are primarily used to establish individual unit records. Nunavut's K–12 data system covers all public schools from kindergarten through grade 12, and also includes home-schooled children, who are registered with their local school. In Nunavut, there are no private or religious schools and there are no equivalents of the southern on-reserve school. Nunavut does conduct a one-year-out-of-high-school graduate survey.

While Nunavut Arctic College does have an internal data system, at present this system does not link to the K–12 data housed by the territory. Likewise, there is a separate apprenticeship training data system that was recently upgraded to track the several hundred individuals in apprenticeship training, but this system does not link to Nunavut Arctic College's data system or the K–12 data system. In addition, Nunavut maintains a database of its student financial aid recipients. As nearly all Nunavut university students attend PSE outside of the territory[10] and those students receive government financial assistance, financial aid

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[9] For the 2005 report, see: http://www.ece.gov.nt.ca/NEW_Items/ECE_Towards%20Exc%20Web.pdf.

[10] Three university degree programs are offered at Nunavut Arctic College facilities in partnership with southern universities.

data constitute Nunavut's tool for viewing university attendance. The territory is unable to ascertain university completion rates, which informants indicated would be helpful.

At present, Nunavut's data uses are primarily administrative, with some planning and forecasting uses as well. A key informant indicated that, legislatively speaking, Nunavut's *Education Act* does allow for the establishment of a more comprehensive data system that could go beyond current uses. The same informant indicated that a new data system is currently being considered for K–12 education that would be "live" in the sense that student-level changes could be tracked instantaneously. With this system's enhanced functionality, new uses will be possible, but the ways in which the territory would use enhanced data are not yet explicit. There is also interest in covering all levels of education under the same data system.

Neither the Government of Nunavut nor Nunavut Arctic College currently submit data to PSIS.

Section 5: National Tools for Understanding Student Pathways and Mobility in Canada

This section overviews existing pan-Canadian tools for understanding student pathways and mobility. In the absence of consistent longitudinal data across Canadian jurisdictions, governments, STATCAN, and individual researchers frequently collect information through survey instruments or administrative data extractions designed to facilitate specific research or policy analysis programs. This section will profile Canadian tools for understanding student transitions and mobility.

The Youth in Transition Survey (YITS)

In the absence of national longitudinal education data sets, surveys serve as the bedrock of pan-Canadian analyses of student transitions and mobility (though longitudinal data systems could not totally replace surveys and can contain survey components). YITS was created for longitudinal analysis of the patterns of, and influences on, major transitions in young people's lives, particularly with respect to education, training, and work (Statistics Canada A, n.d.). The survey involved two cohorts, ages 15 and 18–20 when first conducted in 2000. The same respondents are contacted at two-year intervals. The survey provides information on patterns of education and work activities over time for the same individuals. YITS has also been linked longitudinally to the Program for International Student Assessment (PISA), also managed by STATCAN (Statistics Canada A, n.d.).

YITS is a "a source of policy-relevant data on education with few equals anywhere in the world" (Finnie, Sweetman, & Usher, 2008). Recent examples of student mobility and transitions studies conducted with YITS include:
- Finnie and Qiu's groundbreaking 2008 paper for the Canada Millennium

Scholarship Foundation's Measuring the Effectiveness of Student Aid (MESA) project, *The Patterns of Persistence in Post-Secondary Education in Canada*, which formed a major innovation in the analysis of student pathways on a pan-Canadian basis.
- Finnie, Sweetman, and Usher's *Who Goes? Who Stays? What Matter? Accessing and Persisting in Post-secondary Education in Canada*, a compilation volume released by the Queen's University School of Policy Studies in 2008. Some of the studies contained in this volume utilize data related to youth attitudes, plans, and aspirations, information that could only be garnered from a survey. However, most of the studies utilized more "hard" information about student transitions and mobility that could be obtained far more reliably through a longitudinal individual unit record administrative data system.

Although YITS is a rich source of information on student pathways and transitions, it has limitations. These limitations are largely those shared by all surveys and are unavoidable, since some of the data contained in YITS could not be obtained by any other means. Recall bias is one limitation. All the data in the study — whether data relating to student opinions, high school grades, or activities since last interviewed — are reported by the student, hence subject to memory limitations and distortions. In addition, any survey has a length limit. Consequently, there is information that cannot be collected through the survey. There are also sample size limitations, which mean the sample is not large enough to support analyses of sub-populations that may be of interest to policy makers. Most important, YITS is a single research program longitudinally following one cohort of young people. Institutionalized longitudinal data systems function continuously, allowing for the

comparison of differing cohorts as data richness develops over time.

Other Survey Tools

Canadian jurisdictions and interjurisdictional bodies also frequently implement their own survey tools for the purpose of understanding student transitions and mobility. The ad hoc and costly nature of survey research, in addition to inherent reliability questions with surveys, has peaked interest in the use of administrative data for research and analysis. The use of administrative databases to facilitate research and analysis is now common in Canada and internationally. Individual surveys conducted by jurisdictions are mentioned in the jurisdictional descriptions sections found above in addition to descriptions of jurisdictions' individual-unit-record-based data systems.

STATCAN conducts Canada's National Graduate Survey, which investigates "the extent to which graduates of postsecondary programs had been successful in obtaining employment since graduation; the relationship between the graduates' programs of study and the employment subsequently obtained; the graduates' job and career satisfaction; the rates of under-employment and unemployment; the type of employment obtained related to career expectations and qualification requirements; and the influence of postsecondary education on occupational achievement" (Statistics Canada, n.d.). Other STATCAN surveys investigating student transitions and mobility include the 2000 School Leavers' Survey/School Leavers' Follow-Up Survey and the 2002 Post-Secondary Education Participation Survey (Usher & Junor, 2008, p. 7).

The Postsecondary Student Information System (PSIS)

The Postsecondary Student Information System (PSIS), formerly the Enhanced Student Information System (ESIS), is a STATCAN program operated "under the aegis of the Canadian Education Statistics Council …. The primary objective of PSIS is to meet policy and planning needs in the field of postsecondary education and the transition to the labour market" (Statistics Canada Culture, Tourism and the Centre for Education Statistics, 2002). In a 1997 joint strategic planning exercise between the Canadian Council of Ministers of Education and the Centre for Education Statistics at STATCAN, "PSIS emerged as a lynchpin" designed to replace several existent STATCAN surveys (Statistics Canada Culture, Tourism and Centre for Education Statistics, 2002). Throughout its history, STATCAN, Human Resources and Skills Development Canada, and the federal Policy Research Initiative have provided funding to PSIS.

PSIS is composed of six files and 200 data elements that cover institutional, programmatic, and student information. Implementation of PSIS across Canadian jurisdictions has been highly uneven. Informants indicated that when PSIS was implemented, primary responsibility for data collection, cleaning, and submission was placed on institutions. When data requests for PSIS were first made, a large number of Canadian PSE institutions did not possess many of the data requested by PSIS.

It is widely accepted that the introduction of PSIS could have been more successful with a phased approach to data element requests. Universities faced a massive data request that would have required most to overhaul internal data practices. In an effort to revitalize the implementation process, STATCAN recently augmented its approach to PSIS by identifying, in consultation with stakeholders, core elements among the large PSIS data set for institutions to focus upon principally, leaving the remaining elements for future implementation. Through continued discussion with jurisdictions and the further development of mechanisms for institutions to transfer data

through jurisdictional governments or interjurisdictional organizations to STATCAN, PSIS participation by Canadian institutions is expanding, allowing STATCAN to obtain a richer yearly snapshot of Canadian PSE. The trouble that PSIS has continuously faced is in producing longitudinal data sets, the key to conducting the bulk of policy-relevant research and analysis. According to STATCAN:

> One of the key objectives of PSIS is to provide information that will enable researchers to perform studies of student mobility, pathways and their relationship to education and labour market outcomes …. To accomplish this objective, Statistics Canada's PSIS database will carry *one* longitudinal record for each postsecondary student in Canada …. The PSIS_NSN will enable us to link the information institutions submit each year with the student information already held on the national database. Maintaining a unique record for each student is dependent upon broad implementation of the PSIS_NSN. Linking student records within the national database is the sole purpose of the PSIS_NSN. It has no administrative purpose. Unlike a health insurance number that must be presented to obtain health services, students will not use the number to obtain education services. In fact, students are not required to know or remember the PSIS National Student Number. (Statistics Canada B, n.d.)

The PSIS National Student Number (PSIS_NSN) was a key component planned for PSIS. The plan was that PSIS_NSN would facilitate longitudinal data analysis within and across Canadian jurisdictional PSE systems. Along with all PSIS data collection and submission efforts, responsibility for generation, use, and reporting to STATCAN of the PSIS_NSN was delegated to institutions from the outset. An algorithm was distributed to institutions by which they could generate unique PSIS_NSNs for their students. Institutions were asked to attach these unique identifiers to their PSIS-submitted individual unit records. According to one key informant, this institutionally driven process was implemented "based on the assumption that institutions would put in resources to do this at a high cost not estimated or evaluated. There was a little bit of success in the Atlantic region, but, basically, it did not work."

For the Atlantic region, longitudinal PSIS files have been constructed by STATCAN and successfully analyzed to profile transitions and mobility in these provinces (Finnie & Qiu, 2009). This innovative study forms a first for Canada, the only example of interjurisdictional analysis of student transitions and mobility. Longitudinal file linkage, however, is not based on use of the PSIS_NSN, which has never been put into use by the vast majority of Canadian PSE institutions, but rather through a practice known as probabilistic linkage (described below) that currently cannot be replicated in other regions due to the constraints of local privacy legislation and practices.

PSIS began with pilot programs in the Maritime universities and Ontario colleges. The Atlantic provinces were early adopters of PSIS and invested resources in its implementation. Through MPHEC, PSIS effectively became the internal PSE data system for Maritime governments. Data collected by MPHEC is transferred to STATCAN and Maritime governments. Newfoundland and Labrador institutions transfer their data directly to STATCAN. Longitudinal files have been constructed through probabilistic linkage, a process though which various personal

identifying fields such as surname (PSIS Element 4042), date of birth (PSIS Element 4230), and SIN (PSIS Element 4020) are compared on student records to establish individual units (students) and track them over time within the Atlantic region. Having successfully participated in the establishment of a longitudinal, interjurisdictional data system backed by interjurisdictionally comparable data definitions (and with comparably limited resources), some stakeholders in the Atlantic PSE sector are unhappy that PSIS has not been implemented in the same way across Canada.

While several Canadian jurisdictions have extensive PSIS participation, outside of the Atlantic region all other jurisdictions have balked at transferring personal identifying information to STATCAN, citing jurisdictional privacy legislation, practices, and concerns. Alberta, for example, completes every PSIS element with the exception of personal identifying information. Not transferring personal information is not in all cases indicative of information-withholding. For example, Alberta does not collect SINs or other personal identifying information at a jurisdictional level because the province uses a unique identifier, the ASN, and so does not even possess the information that could allow for probabilistic linkage by STATCAN. Given the non-implementation of the PSIS_NSN and the fact that complete jurisdictional submission of personal identifying information to facilitate probabilistic linkage is restricted to the Atlantic region (though some institutions and jurisdictions report some personal identifying information), the way forward for longitudinal file construction with PSIS data is unclear (though snapshot data will likely continue to improve across the country). All of this being said, STATCAN and, more specifically, the PSIS Task Force on Core Elements continue to explore ways forward. A possible route by which probabilistic linkage could be implemented outside the Atlantic region is through agreements stipulating that students'

personal information is reported directly from institutions. One such agreement is in its infancy in Ontario. However, such arrangements would still be subject to jurisdictional privacy legislation. STATCAN has also determined that the development of more elaborate privacy impact assessments could facilitate greater reporting. The technical feasibility of probabilistic linkage has been proven. What remains to be seen is whether any alternative reporting arrangements or improved privacy guarantees can assuage jurisdictions that have thus far shown little enthusiasm for allowing personal information to cross jurisdictional lines. For the time being, the collection of personal information is not on the immediate agenda of the PSIS Task Force on Core Elements, as personal information has not yet been phased in as a core element. Once personal information is phased in as part of the core elements, far more movement on this front could be possible.

K–12 education in Canada has experienced no comparable effort to PSIS, no system intended for reporting student-level data in an interjurisdictionally longitudinal fashion. STATCAN does, however, collect a wealth of snapshot data about K–12 education.

Section 6: International Use of Unique Identifiers

In this section, the use of unique identifier systems in the United States, Australia, and the United Kingdom is discussed. This section profiles specific practices in selected countries, and does not serve as an exhaustive account of the countries' national practices. International comparisons can be highly valuable tools to any policy development/analysis process; however, it is essential to consider the political, cultural, geographic, and educational differences in each country.

Unique Identifier Use in the United States

Similar to the situation with Canadian provinces, in the United States individual states have responsibility for education. However, federal intervention in and control over some education matters is an institutionalized practice in the United States, whereas in Canada jurisdictional control over education is near total. Like in Canada, in the United States, these federal-provincial relationships differ in K–12 and PSE. As well, extensive federal involvement in education and the United States' tradition of private charitable foundation and non-governmental organization involvement in education affairs lead to a multitude of actors affecting all education matters. The issue of unique identifiers is no exception to this rule. At present, federal and state governments, private charitable foundations, non-profit organizations, quasi-governmental interstate organizations, and companies in the private sector all affect this issue area. And, with all 50 states possessing principal control over education issues, the United States has seen 50 different responses to the impetuses to create individual unit record data systems at the K–12 and PSE levels.

One key difference between Canada and the United States is what actually serves as the

unique identifying number in most states. Whereas in Canada the use of the SIN as a unique identifier has largely been rejected due to privacy concerns, the social security number (SSN) — the US equivalent of the SIN — continues to be used as a unique identifier in most states. This practice, however, is on the decline: between 2002 and 2007, "11 of the 47 databases examined … stopped using the SSN as the major key link, 12 more encrypt the SSN before manipulating the data" (Ewell & Boeke, 2007, p. 6).

An account of states' individual unit record data capabilities as of 2008 is available from the Data Quality Campaign (DQC), a non-profit organization backed by a group of quasi-governmental interstate organizations, non-profit education foundations, and for-profit school evaluation outfits. [11] The DQC has defined what it views as the "10 essential elements of a comprehensive longitudinal data system." The DQC is dedicated to improving education data in the United States by measuring and encouraging state progress toward the introduction of these 10 essential elements, found below (DQC).[12]

1. A unique statewide student identifier
2. Student-level enrolment, demographic, and program participation information
3. The ability to match individual students' test records from year to year to measure academic growth
4. Information on untested students
5. A teacher identifier system with the ability to match teachers to students

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[11] The US office of the EPI is an endorsing partner of the Data Quality Campaign.
[12] The steps that states must take, according to the DQC, to reach these 10 essential elements, along with element details, can be found on the DQC Web site:
http://www.dataqualitycampaign.org/survey/action-steps.

6. Student-level transcript information, including information on courses completed and grades earned
7. Student-level college readiness test scores (SAT, ACT, AP, IB)
8. Student-level graduation and dropout data
9. The ability to match student records between P–12 and postsecondary systems
10. A state data audit system assessing data quality, validity, and reliability

Each year the DQC conducts a survey of states' progress toward these 10 elements. The 2008 survey revealed significant progress toward the goal of all states possessing each of the 10 elements. In 2008, six states reported possessing all 10 elements, up from no states in 2005. Likewise, just about all the states reported having at least five of the elements in 2008, up from 29 in 2005. Twenty-eight states reported possessing the ability to match student records between K–12 and PSE in 2008, up from 12 in 2005. This bridging between K–12 and PSE is frequently emphasized in the literature from the United States as both the most challenging and the most important feature of a data system to achieve (Clements, 2007, p. 4).

Key informants indicated that the current unique identifier landscape in the United States will likely change in the near future. These expected changes are due to the 2008 federal stimulus package's introduction of a US$250 million competitive grant program, under which states may apply for federal funding for the enhancement and introduction of education data systems. As these new funds emerge, key informants indicated, the State Higher Education Executives Organizations (SHEEO)[13] is

working to develop a vision of what the ideal data system looks like.

There is a system that already exists for federal funding for data system development. At present, 27 states have received funding through this mechanism, which focuses exclusively on state K–12 authorities. New funding will go through the same mechanism, but the mandate will be expanded to focus on individual unit record systems that link K–12, PSE, and labour market data. One key informant indicated that these funds may also assist in interstate initiatives.

Beyond the problem of states establishing unique identifier systems internally is the question of whether the data they collect are comparable across state lines. To that end, SHEEO convened state governors to agree on a uniform way of measuring high school graduation rate. Uptake of that method by states is also covered by the DQC's annual survey. In 2008, 42 states reported capability to calculate the governors' graduation rate (this new universal form of measurement), up from 12 in 2005.

Nationwide studies on the use of unique identifier systems have also been conducted by the Lumina Foundation for Education.[14] A 2007 study published by Lumina (Ewell & Boeke, 2007) contains a detailed analysis of data interoperability between states. Going beyond

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[13] According to SHEEO informants, "The State Higher Education Executive Officers (SHEEO) is a nonprofit, nationwide association of the chief executive officers serving statewide coordinating boards and governing

boards of postsecondary education." SHEEO could be considered the United States equivalent of CMEC. More information is available on the SHEEO Web site: http://www.sheeo.org/default.htm.

[14] "Lumina Foundation for Education, an Indianapolis-based, private, independent foundation, strives to help people achieve their potential by expanding access and success in education beyond high school" Lumina Foundation Web site, http://www.luminafoundation.org/about_us/). For more information about the Lumina Foundation, see the Web site.

analysis of tracking systems themselves (though this is discussed), the report examines states' data, in terms of both the presence and comparability of variables. For example, 100 per cent of states with student unit record (SUR) data systems have data on gender, and the comparability of this variable is high. On the other hand, 50 per cent of states with SUR data systems have data on financial aid details, but comparability across states is only moderate. As could be predicted, across state lines there is far higher comparability on demographic information and more moderate and low comparability observed where data presented are the result of distinct state practices, such as testing, grade point average calculation, or transfer credit. This analysis is critical, as assessment of the comparability of jurisdictional student tracking systems, if interoperability is a goal, can be truly useful only if data sets behind student identifiers are rendered comparable.

The sections below profile developments specific to the K–12 and PSE sectors. It is often difficult to separate developments in the two sectors, especially in the United States, where states have been moving toward more integrated systems of education. States have increasingly instituted coordinating agencies over education systems described as K–16 (kindergarten through university), P–16 (early childhood education through university), or even K–20 or P–20 (kindergarten or early childhood education through postgraduate studies) (Laird, 2008). Coordinating bodies over the multiple sectors are frequently developing overarching data strategies. Nevertheless, it is possible to describe some developments and practices separately.

K–12

At the K–12 level, development of unique identifier systems has largely been driven by the federal *No Child Left Behind Act* (2001). The focus of this mandate was to develop methods

of better understanding student progress within educational institutions. In other words, this federal law sought to measure whether schools — and the teachers working in them — were providing students with the necessary skills to progress through school. In order to establish accountability for learning, measurements of student learning had to develop, as the traditional measurement of progression, e.g., moving from grade 3 to grade 4, was not seen as an effective measure of skills mastery. Therefore, the focus in K–12 systems became the institution, its teachers, and their effect on students, who are more or less taken to be immobile. In the US K–12 sector, mobility becomes an explicit question for education policy only once students reach the age when they can legally leave school.

At the K–12 level, all states must report data to the federal ED*Facts* initiative, the mechanism through which the federal government collects all education data from states. This functions as a loose state-to-federal accountability mechanism.[15] Data submitted through EDF*acts* are not longtitudinal, but rather snapshot data.

The US Department of Education's Regional Education Laboratory Program funds 10 regional education laboratories (RELs) which "provide technical assistance through applied research and development of fast response projects and large-scale rigorous studies, primarily to educators and policymakers at the state and local level" (United States Department of Education Institute of Education Sciences, n.d.). RELs have been active in helping states with technical data capacity and have done some comparative work on different states' systems. Profiles of exising projects in this field can be found on the RELs Web site.[16]

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[15] For more information about ED*Facts*, see: http://www.ed.gov/about/inits/ed/edfacts/index.html.
[16] See: http://ies.ed.gov/ncee/edlabs/.

PSE

In PSE, the situation is different, in that policy decisions are driven by concerns about student progress and credential attainment, and a need to measure student learning has not been part of the discussion. To date, unique identifiers at the PSE level in the United States have been used to develop measurements of progress at the state level. However, the ability to accurately measure progress is complicated by mass student mobility in the US PSE sector:

> According to federal studies using a nationally representative cohort (Adelman, 1999), 54 percent of the students who graduated from high school and had eventually received a baccalaureate degree by 1996 attended two or more institutions, 19 percent had attended three or more, and more that 40 percent crossed state lines in doing so. (Ewell, Schild, & Paulson, 2003)

If retention and success rates are to be understood, this situation of extreme inter-institutional and interstate mobility demands inter-institutional and interstate unit record cooperation.

In the United States, for now, the federal government's creation of a national individual unit record student database is prohibited by federal legislation. Section 132 of the *College Access and Opportunity Act of 2005*:

> (a) Prohibition- Except as described in (b), nothing in this Act shall be construed to authorize the design, development, creation, implementation, or maintenance of a nationwide

database of personally identifiable information on individuals receiving assistance, attending institutions receiving assistance, or otherwise involved in any studies or other collections of data under this Act, including a student unit record system, an education bar code system, or any other system that tracks individual students over time.

> (b) Exception- The provisions of subsection (a) shall not affect the loan obligation enforcement activities described in section 485B of this Act. (United States House of Representatives, n.d.)

This mandated opposition to the establishment of a federal individual unit record system stems in large part from privacy concerns. Privacy concerns come in two forms: (1) concern about information security and the possibility for data theft and or misuse, and (2) libertarian-inspired opposition to the state knowing too much about its citizens and fear of the Big Brother power of government information storage. This second form of concern is largely behind the federal prohibition. This libertarian perspective is expressed strongly by Lilienthal (2006). Despite a prohibition on federal government construction of a database, development is moving forward on other fronts, in addition to the new funding for state system development mentioned above.

However, in the United States, like in Canada, there is national student data at the PSE level. In the United States, all states must submit data to the Integrated Postsecondary Education Data System (IPEDS). IPEDS is "the core PSE data collection program for the National Center for Education Statistics 'NCES'." NCES is part of the US Department of Education. IPEDS collects

comprehensive data from postsecondary institutions, but these data are not longitudinal (National Center for Education Statistics, n.d.).

However, despite federal collection of data, information held by the National Student Clearinghouse (NSC), a non-profit organization, constitutes the most comprehensive national longitudinal PSE student database in the United States. The Clearinghouse's primary purpose is to serve as a resource for assessment of student aid eligibility by guarantors and lenders, offloading the responsibility for enrolment data verification from institutions (National Student Clearinghouse, n.d.). Institutions participate in this program free of charge, simply uploading enrolment histories of students to the NSC. Lenders and guarantors pay a per-record fee to access this information. As the system is designed to facilitate financial aid assessment verification processes, the information contained in the clearing house about individual students is largely demographic and unchanging data. Increasingly the NSC has been mobilized for research purposes, offering its own research services, and it publishes national data on persistence, graduation rates, and time to graduation. The system uses SSNs but, through a proprietary algorithm, converts them into a unique identifier. Though these data have been historically off-limits for national analyses, a key informant indicated that policy analysts are starting to work with the clearing house to determine cohort graduation rates, and that future analyses using clearing house data are becoming more likely. However, this system is not without its faults, and it can misconstrue enrolment, particularly in distance education, for student mobility. In one case, a state thought that, due to NSC data, most students who left the state went to attend PSE in Arizona and Rhode Island. It was later discovered that these students were actually staying home and studying through distance education at the University of Phoenix and DeVry, headquartered in Arizona and Rhode Island, respectively.

Florida: A Case Study of State-Level Activity

Florida is considered to have the most robust education data system in the United States. Florida has achieved all 10 essential elements outlined by the DQC and has gone far beyond these structures, implementing a host of data linkages designed to facilitate evidence-based policy making. Student-level data are housed in Florida in what is known as the P–20 Education Data Warehouse.[17]

Florida's data system relies on the SSN to create data linkages. The system extends through all public K–12 schools, public early childhood education, all public PSE, and private non-profit postsecondary institutions.[18] In addition, the system extends into several workforce development programs and, in the K–12 level, teachers are also longitudinally tracked in the system and matched to their students' progress.

Like most individual unit record systems, Florida's system was first introduced to improve the accuracy of enrolment-based funding practices. When first introduced in the 1980s, the system was used to disperse federal and state funds to schools. Over time the system was expanded to collect student information such as courses taken, along with enrolment data. By 1998 the state had begun to produce cohort-based state-wide graduation rates. In 2000, the process of linking all of the data that had been collected in a single database was under way. Today, Florida's data system links through the education system and to numerous outcomes of education. Databases on military enlistment, incarceration, and the receipt of

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[17] P–20 refers to a view of the education system as a single pipeline stretching from pre-kindergarten to postgraduate education.
[18] Proprietary institutions are not covered by the system.

state assistance all link to the P–20 Education Data Warehouse.

In the K–12 system, data are collected to comply with the federal *No Child Left Behind Act.* The state also uses its own yearly assessment processes to give schools yearly grades, from A through F. In addition, the use of "feedback reports" is now standardized. Feedback reports are used on many levels. High schools receive yearly reports detailing how their previous year's graduates fared in postsecondary institutions. These feedback reports for high school also describe students' scores on SAT and ACT tests, along with whether they required any remedial course in their postsecondary institutions. Teachers colleges receive yearly longitudinal reports on the performance of their graduates. The performance of new teachers' classes is related back to teachers colleges, along with a few other indicators specific to teachers during their first few years of employment. Community colleges receive feedback reports on how many of their graduates or leavers enrolled in four-year institutions.

Emergent Interstate Collaboration

In terms of state-level collaborations, there has been one pilot program between Kentucky, Ohio, Tennessee, and West Virginia. Under this collaboration, the states merged their data sets to conduct mobility and transitions analyses. Key informants indicated that this process was quite challenging and underscored the need for comparable data definitions. Technical challenges occurred, but the ability to actually compare relevant figures was a challenge in the forefront. Establishing individual units across the states was not as large a challenge as was establishing comparability, i.e., same definitions, between state-level data. Key informants indicated that, even if it is not possible for states to examine individual unit records as part of a single data set tracking students across state lines, it is important that

states use similar data definitions and statistics so that interstate comparisons can be made.

Unique Identifier Use in Australia

Australia's 2003 *Higher Education Support Act* provided for the development of the country's Higher Education Information Management System (HEIMS).[19] This system is operated by the Department of Education, Employment and Workplace Relations. Like many individual unit record systems in Canada and the United States, HEIMS was introduced for administrative purposes, in this case for the administration of Australia's student support programs: the standard Higher Education Contribution Scheme-Higher Education Loan Program; FEE-HELP, for students in non-Commonwealth-supported places; and the Overseas Higher Education Loan Program for Australians studying in other countries. Under HEIMS, each student entering Australian postsecondary education is issued a Commonwealth Higher Education Student Support Number. This number follows the student over time and across institutions.

HEIMS maintains longitudinal individual unit records across Australian PSE, and while these records are used principally for financial aid administration and checking regarding abuses to the system, there was some indication that a broadening of the system's mandate to encompass wider analysis purposes may occur in the future. Australia does have significant national coordination on data definitions with regard to demographic issues, so, if other data were to be included in HEIMS, there is already likely comparability of data definitions.

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[19] For more information about HEIMS, see: http://www.backingaustraliasfuture.gov.au/archive/15.htm.

Unique Identifier Use in the United Kingdom

The United Kingdom's Higher Education Statistics Agency (HESA) longitudinally maintains individual unit records for every postsecondary student in the United Kingdom in both the college and university sectors. HESA maintains this information explicitly for analysis purposes. HESA data sets have no administrative functions. HESA was established following a 1993 white paper calling for improved higher education statistics and "the 1992 Higher and Further Education Acts, which established an integrated higher education system throughout the United Kingdom" (Higher Education Statistics Agency, n.d.). It is important to note that HESA exists within the United Kingdom's unitary higher education system, which, from a legal perspective, has more in common with a Canadian jurisdictional PSE system than with the Canadian PSE in its entirety. Though larger in scale, HESA is probably best compared with Canadian jurisdictional data systems, given that it operates within a centrally governed PSE system.

HESA supplies statistical analyses to the following stakeholders (Higher Education Statistics Agency, n.d.):

- The Department for Innovation, Universities and Skills
- Welsh Assembly Government
- Scottish Executive (Scottish Government)
- Department for Employment and Learning, Northern Ireland
- Higher Education Funding Council for England
- Higher Education Funding Council for Wales
- Scottish Further and Higher Education Funding Council
- Training and Development Agency for Schools
- Research Councils

HESA student records (held indefinitely without personal identifying information) contain a range of data elements collected both through administrative processes and through student surveys.[20] The Higher Education Student Identifier is used to track students over time and across institutions. In addition to providing statistical analyses internally to government stakeholders, HESA also produces publications and supplies data on an ad hoc basis to initiatives such as league tables.[21] Data are not available for commercial uses that cannot reasonably be described as furthering knowledge and information about higher education.

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[20]For a complete data dictionary for HESA's student records, along with explanatory notes intended for students about each field's use, see: http://www.hesa.ac.uk/index.php/content/view/145/177/.

[21] For more information about HESA publications, see: http://www.hesa.ac.uk/index.php/component/option,com_pubs/Itemid,122/.

Section 7: Conclusions Regarding Current Practices in Canada and Abroad

Individual unit record data systems are in place or in development in most Canadian jurisdictions. While data they include and parts of education systems they cover vary, increasingly, Canadian jurisdictions are recognizing the power of longitudinal student-level data to understand and improve education systems. Jurisdictions are using longitudinal student-level data systems for purposes such as:

- Preventing double-funding of students across institutions under per-student funding models
- Calculating general-cohort high school graduation rates and Aboriginal-cohort high school graduation rates
- Understanding student pathway relationships between college and university systems
- Examining the demographic factors that contribute to school leaving
- Providing feedback reports to high schools on their graduates' performance in PSE

- Predicting demand for PSE programs and teachers in geographic locations before demand surfaces

This report profiled the state of jurisdictional longitudinal data systems, discussed the policy relevance of student mobility and transitions data to the K–12 and PSE sectors, and examined some international examples of unique identifier use for understanding student mobility and transitions. As jurisdictions continue to develop their individual unit record data systems, these systems will likely become increasingly important sources of education data in Canada, at both the K–12 and PSE levels, both within jurisdictions and from a pan-Canadian perspective. Many jurisdictions have already established functional "information loops" between longitudinal data collection and policy makers, facilitating informed, evidence-based policy making. Future prospects for research and analysis with individual unit records are exciting. Such analyses will likely become increasingly important, given accelerating trends toward student pathways that stray from the traditional routes and the increasing importance of interjurisdictional migration to many jurisdictions.

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Appendix 1: K–12 Discussion Guide

Project Introduction Note to Participants

The Canadian Education Statistics Council (CESC), a partnership between the Council of Ministers of Education (CMEC) and Statistics Canada, recently commissioned the Educational Policy Institute (EPI) to research provincial/territorial experiences in collecting, storing and using individual student record data as well as to assess the feasibility of a pan-Canadian unique student identifier system.

The main goals of the research are the following:
- To examine the information available on student pathways and mobility in each jurisdiction and across Canada;
- To review the current use of student identification systems in jurisdictions across Canada;
- To review national lifelong student identification systems used in other countries; and
- To assess the potential of implementing a Pan-Canadian student identification system.

As part of this research, EPI has committed to conduct between 30 and 40 key informant interviews, including interviews with at least two representatives from each jurisdiction as well as conversations with Canadian federal representatives. In addition, EPI staff will conduct telephone interviews with a number of international key informants. (Please note that parallel documents will be sent to your colleagues at the post-secondary level.)

Prior to the interview, EPI will send a short, one-page survey to participants in order to gather some background information into individual jurisdictional practices regarding student data collection and use. We are looking for general information regarding existing administrative and survey data that is currently being used/or could be used in the future to learn about student mobility and transitions as well as the existence of a unique student identifier or other practices that have or are scheduled to be implemented that would improve the Ministry or Department's knowledge of such issues.

IT IS IMPORTANT TO NOTE THAT THROUGHOUT THIS DISCUSSION GUIDE AND RESEARCH, WHEN WE REFER TO "DATA" WE MEAN INDIVIDUAL UNIT RECORDS OR PIECES OF INFORMATION THAT ARE COLLECTED, STORED OR USED IN THEIR ORIGINAL FORMAT; WHEN WE TALK ABOUT "STATISTICS" WE REFER TO CALCULATIONS AND NUMBERS GENERATED AS A RESULT OF USING THE "DATA.

In addition, when we talk about "mobility" we mean "horizontal" movements across different schools, school systems or geographic areas; when we discuss "transitions" we refer to "vertical" movements through the school system, i.e.i.e., between elementary and secondary education or from K-12 to PSE or PSE to the work force. The word "pathway" is generally used to refer to an individual`s journey within education or their movements through time, either vertically or horizontally.

Please note that the information collected during these conversations will not be linked to specific individuals. Your responses to all questions of opinion will be kept confidential. Information of fact about your Ministry or Department your may be reported with the name of your Ministry or Department.

The survey should take 10-15 minutes to complete, and additional time might be necessary to gather some of the requested documents.

The key informant interview should take about
45 minutes, but we ask that you please allocate
one hour's time for the conversation.

Respondent Information

Contact information for Survey Respondent

Jurisdiction	
Ministry/Department	
Contact Person Name	
Position	
Phone	
Email	
Survey Submitted Date	

Contact information for Interview Respondent(s)

Jurisdiction	
Ministry/Department	
Contact Person Name	
Position	
Phone	
Email	
Interview Date and Time	

Pre-Survey for K-12 Ministry/Department Key Informants

1. What kind of administrative, survey or other (e.g. testing) data or statistics does you Ministry or Department have that is currently being used/or could be used in the future to learn about student mobility and transitions?

   Examples could include data collected or statistics generated by the province/territory, individual schools or school boards or even the federal government including Statistics Canada.

2. Could you please let us know about/attach to your response relevant studies/documents that could help us learn more Question 1?

3. Does your Ministry or Department hold individual unit records of every public K-12 student in the province/territory?

   If yes, please continue to next question.
   If no, please skip to Question 7.

4. Does your Ministry or Department have individual unit records for students in the following school systems? (Please circle the correct answer.)
   a. Early childhood education   Yes/No
   b. Home schooled children   Yes/No
   c. Private/religious schools   Yes/No
   d. On-reserve schools   Yes/No

5. What data are included in the individual student record? (e.g. name, address, gender, etc.) *We would appreciate it if you could list the data fields as well as send us the data dictionary, if possible.*

6. Are the data part of:
   a. A longitudinal file   Yes/No
   b. A set of flat (single-year or snapshot) files   Yes/No

7. If not held at the Ministry or Department level, at what is the level(s) is the individual unit record is held?
   a. School district
   b. Individual school
   c. Other

8. Does your Ministry or Department have a unique student identifier, meaning a unique number or code used to indentify individual learners in the system?
   a. Yes
   b. No
   c. Other

9. Could you please briefly describe how this unique student identifier is used to generate statistics and greater understanding about student mobility and pathways?

Interview Guide for K-12 with Unique Student Identifier at the Ministerial/Departmental Level
Background Information
1. What data or statistics does your Ministry/Department currently have or collect that is used or could be used to help decision-makers better understand student mobility, transitions and pathways through lifelong learning?

2. Could you please give me a little background on how the unique student identifier system works in your jurisdiction?

3. How is the number assigned?
   a) Do you use an existing identifier, such as the SIN, or is a random number generated?
   b) When is the number assigned?
   c) Who assigns the number?
   d) How long does the number follow the student?
   e) Is the number public or private?
   f) Is the number centrally managed?
   g) Is the number required to get education services?
   h) What is the coverage of the number?

Information on Data Collection
I am now going to ask questions relating to your data collection.
1. What data are collected along with the unique student identifier (e.g. gender, disability, ethnicity, parental socio-economic status, test scores, grades, etc.)?
   a) By whom are these data collected?
   b) How are they transmitted to your Ministry/Department?

2. Does the student unit record system links to other databases?
   a) If so, which ones?
   b) Are these Ministry/Department databases or others?

3. Who has authority over changing data elements and definitions?

4. How are changes in information accounted for/collected? (In other words, changes of name, address, school, etc.)
   a) Who has the responsibility to report these changes?
   b) What are the benefits or disadvantages for the student who reports or doesn't report, i.e. do they lose funding?

5. Is there a link between K-12 and PSE? How does that link work?

6. Is your unique student identifier capable of identifying student movements between?
   a) Between public and private schools?
   b) Private and religious schools?
   c) Across different school boards?
   d) How about across provinces and territories?

7. How do you track home-schooled children?

8. How do you track students studying in on-reserve schools?

9. How are students from out-of-province included in the system?

10. How are international students included in the system?

Information on Data Storage
1. Where are the data stored?

2. Is there a mechanism within the system to ensure that data submitted by providers are accurate, i.e. a data validation system?

Information on Data Use
In this section, we are interested in getting more information on the data use in general, but also how it is used specifically to better understand and generate research relating to student transitions and mobility.
1. What reports do you regularly generate from this information?

2. What are the questions and topics that you explore using this data?

3. What statistics do you derive from the data?
   - Performance reporting? (e.g. number graduating, not meeting standards)
   - Benchmarking? (e.g. comparing those standards against others or a standard)
   - Evidence-based policy making? (e.g. do you use this research to answer questions and to generate new statistics for policymaking and other uses)

4. How are these data specifically used to better understand and generate research relating to student transitions and mobility?

5. Who has access to the collected data?

6. How do you, if at all, allow other jurisdictions or entities to access the individual unit records? Do they have access to statistics that are generated from the data?

7. Do you have privacy policies governing the use of student-unit data by third parties, such as researchers and institutions? If so, could you please describe them?

8. How have you dealt with privacy concerns in the past?

9. What are some of the concerns/challenges that you have moving forward regarding privacy issues?

The Evolution of Your Current System

In this section, I am looking for some background on how your Ministry or Department decided to implement your system of a unique student identifier.

1. What were your primary reasons for developing a unique student identifier?

2. How long has the system been in place?

3. Who was involved in the decision-making process?

4. What was the process like?

5. Why did you decide on your particular method?

6. Did you use other methods in the past? Why and when did you make the change?

7. What were some of the main obstacles/barriers you had to overcome in order to be able to put the system in place?

8. What are the opportunities and weaknesses that you continue to face in having the unique student identifier in your jurisdiction?

Feasibility of a Pan-Canadian Student Identifier System

1. Do you think that a pan-Canadian student identifier system is feasible? Why or why not?

2. What are some of the advantages to such a system?

3. What are some of the disadvantages to such a system?

4. Could some of the advantages be gained through another means, e.g. an alternative model such as a regional system? Please explain.

5. How prepared is your jurisdiction to be able to participate in such an endeavor?
   a. What would be of the challenges to its participation?
   b. What would be some of the benefits to its participation?

6. In an ideal world, from your vantage point, how would such a system work?
   a. How could such a system be operationalized?
   b. Who would be the key stakeholders required to implement such a system?

7. What are some of the barriers that Canada faces in the implementation of a unique student identifier?

8. Do you know of data sharing practices in any other field that could provide models for such a process in the education field?

9. Do you have any other comments or information on a student identifier?

Questions for Departments/Ministries without a Unique Student Identifier
Background
1. What data or statistics does your Ministry/Department currently have or collect that is used or could be used to help decision-makers better understand student mobility, transitions and pathways through lifelong learning?

Student Identifiers in Your Ministry or Department
1. Do you think that your Ministry/Department should have a unique student identifier? Why or why not?

2. Does your Ministry/Department have plans to set up a unique student identifier?

3. Why is your Ministry/Department thinking about or planning to implement a unique student identifier?

4. What does your Ministry/Department hope to gain from having a unique student identifier?

5. From your perspective, what are the steps that need to take place for implementation?

6. To what extent have you or will you be looking toward other jurisdictions, whether within or outside of Canada, for ideas? Which ones?

7. What are the particular strengths and weaknesses that your jurisdiction/Ministry/Department could face in having the unique student identifier in your jurisdiction? (Please think of the following sub-categories when answering.)
    - Benchmarking
    - Research
    - Policy
    - Privacy legislation

8. What are some of the barriers you face in the implementation of a unique student identifier? (This is a question about process.)

Feasibility of a Pan-Canadian Student Identifier System
1. Do you think that a pan-Canadian student identifier system is feasible? Why or why not?

2. What are some of the advantages to such a system?

3. What are some of the disadvantages to such a system?

4. Could some of the advantages be gained through another means, e.g. an alternative model such as a regional system? Please explain.

5. How prepared is your jurisdiction to be able to participate in such an endeavor?
    a. What would be of the challenges to its participation?
    b. What would be some of the benefits to its participation?

6. In an ideal world, from your vantage point, how would such a system work?
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7. What are some of the barriers that Canada faces in the implementation of a unique student identifier?

8. Do you know of data sharing practices in any other field that could provide models for such a process in the education field?

9. Do you have any other comments or information on a student identifier?

This completes our interview. Thank you very much for your time.

Appendix 2: PSE Discussion Guide

Project Introduction Note to Participants

The Canadian Education Statistics Council (CESC), a partnership between the Council of Ministers of Education (CMEC) and Statistics Canada, recently commissioned the Educational Policy Institute (EPI) to research provincial/territorial experiences in collecting, storing and using individual student record data as well as to assess the feasibility of a pan-Canadian unique student identifier system.

The main goals of the research are the following:

- To examine the information available on student pathways and mobility in each jurisdiction and across Canada;
- To review the current use of student identification systems in jurisdictions across Canada;
- To review national lifelong student identification systems used in other countries; and
- To assess the potential of implementing a Pan-Canadian student identification system.

As part of this research, EPI has committed to conduct between 30 and 40 key informant interviews, including interviews with at least two representatives from each jurisdiction as well as conversations with Canadian federal representatives. In addition, EPI staff will conduct telephone interviews with a number of international key informants. (Please note that parallel documents will be sent to your colleagues at the elementary and secondary education level.)

Prior to the interview, EPI will send a short, one-page survey to participants in order to gather some background information into individual jurisdictional practices regarding student data collection and use. We are looking for general information regarding existing administrative and survey data that is currently being used/or could be used in the future to learn about student mobility and transitions as well as the existence of a unique student identifier or other practices that have or are scheduled to be implemented that would improve the Ministry or Department's knowledge of such issues.

IT IS IMPORTANT TO NOTE THAT THROUGHOUT THIS DISCUSSION GUIDE AND RESEARCH, WHEN WE REFER TO "DATA" WE MEAN INDIVIDUAL UNIT RECORDS OR PIECES OF INFORMATION THAT ARE COLLECTED, STORED OR USED IN THEIR ORIGINAL FORMAT; WHEN WE TALK ABOUT "STATISTICS" WE REFER TO CALCULATIONS AND NUMBERS GENERATED AS A RESULT OF USING THE "DATA.

In addition, when we talk about "mobility" we mean "horizontal" movements across different schools, school systems or geographic areas; when we discuss "transitions" we refer to "vertical" movements through the school system, i.e. between elementary and secondary education or from K-12 to PSE or PSE to the work force. The word "pathway" is generally used to refer to an individual`s journey within education or their movements through time, either vertically or horizontally.

Please note that the information collected during these conversations will not be linked to specific individuals. Your responses to all questions of opinion will be kept confidential. Information of fact about your Ministry or Department your may be reported with the name of your Ministry or Department.

The survey should take 10-15 minutes to complete, and additional time might be

necessary to gather some of the requested documents.

The key informant interview should take about 45 minutes, but we ask that you please allocate one hour's time for the conversation.

Respondent Information
Contact information for Survey Respondent

Jurisdiction	
Ministry/Department	
Contact Person Name	
Position	
Phone	
Email	
Survey Submitted Date	

Contact information for Interview Respondent(s)

Jurisdiction	
Ministry/Department	
Contact Person Name	
Position	
Phone	
Email	
Interview Date and Time	

Pre-Survey for PSE Ministry/Department Key Informants

1. What kind of administrative, survey or other data or statistics does you Ministry or Department have that is currently being used/or could be used in the future to learn about student mobility and transitions?

   Examples could include data collected or statistics generated by the province/territory, individual institutions, regions or even the federal government including Statistics Canada.

2. Could you please let us know about/attach to your response relevant studies/documents that could help us learn more Question 1?   Yes/No

3. Does your Ministry or Department hold individual unit records of every PSE student in the province/territory?   Yes/No

4. Does your Ministry or Department have individual unit records for the following students? (Please circle the correct answer.)
   a. Student financial assistance applicants   Yes/No
   b. College/CEGEP applicants/enrollees   Yes/No
   c. University applicants/enrollees   Yes/No
   d. Private career colleges applicants/enrollees   Yes/No
   e. Apprenticeship program applicants/enrollees   Yes/No
   f. Other _____   Yes/No

5. What data are included in the individual student record? (e.g. name, address, gender, etc.) *We would appreciate it if you could list the data fields as well as send us the data dictionary, if possible.*

6. Are the data part of:
    a. A longitudinal file   Yes/No
    b. A set of flat (single-year or snapshot) files   Yes/No

7. Does your Ministry or Department have a unique student identifier, meaning a unique number or code used to indentify individual learners in the system?
    a. Yes
    b. No
    c. Other

8. Could you please briefly describe how this unique student identifier is used to generate statistics and greater understanding about student mobility and pathways?

Thank you very much for your participation in this pre-survey. We look forward to speaking with you soon on the phone for our key informant interview.

Interview Guide for PSE with Unique Student Identifier at the Ministerial/Departmental Level
Background Information

1. What data or statistics does your Ministry/Department currently have or collect that is used or could be used to help decision-makers better understand student mobility, transitions and pathways through lifelong learning?

2. Could you please give me a little background on how the unique student identifier system works in your jurisdiction?

3. How is the number assigned?
   a. Do you use an existing identifier, such as the SIN, or is a random number generated?
   b. When is the number assigned?
   c. Who assigns the number?
   d. How long does the number follow the student?
   e. Is the number public or private?
   f. Is the number centrally managed?
   g. Is the number required to get education services, such as financial aid?
   h. What is the coverage of the number?

Information on Data Collection
I am now going to ask questions relating to your data collection.

1. What data are collected along with the unique student identifier (e.g. gender, disability, ethnicity, parental income, etc.)?
   a) By whom are these data collected?
   b) How are they transmitted to your Ministry/Department?

2. Does the student unit record system links to other databases?
   a) If so, which ones?
   b) Are these Ministry/Department databases or others?

3. Who has authority over changing data elements and definitions?

4. How are changes in information accounted for/collected? (In other words, changes of name, address, institution, etc.)
   a) Who has the responsibility to report these changes?
   b) What are the benefits or disadvantages for the student who reports or doesn't report, i.e. do they lose funding?

5. Is there a link between K-12 and PSE? How does that link work?

6. Is your unique student identifier capable of identifying student movements between?

   a) Between one institution to another?
   b) Between college and university?
   c) Between public and private institutions?

      d) How about across provinces and territories?

7. How do you track students studying in non-accredited institutions?

8. How do you track students studying in non-degree granting institutions or in non-degree courses in degree-granting institutions (such as continuing education or recertification)?

9. How are students from out-of-province included in the system?

10. How are international students included in the system?

Information on Data Storage
1. Where are the data stored?

2. Is there a mechanism within the system to ensure that data submitted by providers are accurate, i.e. a data validation system?

Information on Data Use
In this section, we are interested in getting more information on the data use in general, but also how it is used specifically to better understand and generate research relating to student transitions and mobility.
1. What reports do you regularly generate from this information?

2. What are the questions and topics that you explore using this data?

3. What statistics do you derive from the data?
   - Performance reporting? (e.g. number graduating, not meeting standards)
   - Benchmarking? (e.g. comparing those standards against others or a standard)
   - Evidence-based policy making? (e.g. do you use this research to answer questions and to generate new statistics for policymaking and other uses)

4. How are these data specifically used to better understand and generate research relating to student transitions and mobility?

5. Who has access to the collected data?

6. How do you, if at all, allow other jurisdictions or entities to access the individual unit records? Do they have access to statistics generated from the data?

7. Do you have privacy policies governing the use of student-unit data by third parties, such as researchers and institutions? If so, could you please describe them?

8. How have you dealt with privacy concerns in the past?

9. What are some of the concerns/challenges that you have moving forward regarding privacy issues?

The Evolution of Your Current System

In this section, I'm looking for some background on how your Ministry or Department decided to implement your system of a unique student identifier.

1. What were your primary reasons for developing a unique student identifier?

3. How long has the system been in place?

4. Who was involved in the decision-making process?

5. What was the process like?

6. How did you decide to use this particular method?

7. Did you use other methods in the past? Why and when did you make the change?

8. What were some of the main obstacles/barriers you had to overcome in order to be able to put the system in place?

9. What are the strengths and weaknesses that you continue to face in having the unique student identifier in your jurisdiction?

Feasibility of a Pan-Canadian Student Identifier System

1. Do you think that a pan-Canadian student identifier system is feasible? Why or why not?

2. What are some of the advantages to such a system?

3. What are some of the disadvantages to such a system?

4. Could some of the advantages be gained through another means, e.g. an alternative model such as a regional system? Please explain.

5. How prepared is your jurisdiction to be able to participate in such an endeavor?
   a. What would be of the challenges to its participation?
   b. What would be some of the benefits to its participation?

6. In an ideal world, from your vantage point, how would such a system work?
   a. How could such a system be operationalized?
   b. Who would be the key stakeholders required to implement such a system?

7. What are some of the barriers that Canada faces in the implementation of a unique student identifier?

8. Do you know of data sharing practices in any other field that could provide models for such a process in the education field?

9. Do you have any other comments or information on a student identifier?

Questions for Departments/Ministries without a Unique Student Identifier
Background
1. What data or statistics does your Ministry/Department currently have or collect that is used or could be used to help decision-makers better understand student mobility, transitions and pathways through lifelong learning?

Student Identifiers in Your Ministry or Department
2. Do you think that your Ministry/Department should have a unique student identifier? Why or why not?

3. Does your Ministry/Department have plans to set up a unique student identifier?

4. Why is your Ministry/Department thinking about or planning to implement a unique student identifier?

5. What does your Ministry/Department hope to gain from having a unique student identifier?

6. From your perspective, what are the steps that need to take place for implementation?

7. To what extent have you or will you be looking toward other jurisdictions, whether within or outside of Canada, for ideas? Which ones?

8. What are the particular strengths and weaknesses that your jurisdiction/Ministry/Department could face in having the unique student identifier in your jurisdiction? (Please think of the following sub-categories when answering.)
   - Benchmarking
   - Research
   - Policy
   - Privacy legislation

9. What are some of the barriers you face in the implementation of a unique student identifier? (This is a question about process.)

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This completes our interview. Thank you very much for your time.