COLLEGE & UNIVERSITY GRADUATE RETENTION IN NEW BRUNSWICK

2010 - 2018

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College & university graduate retention in New Brunswick: 2010 - 2018

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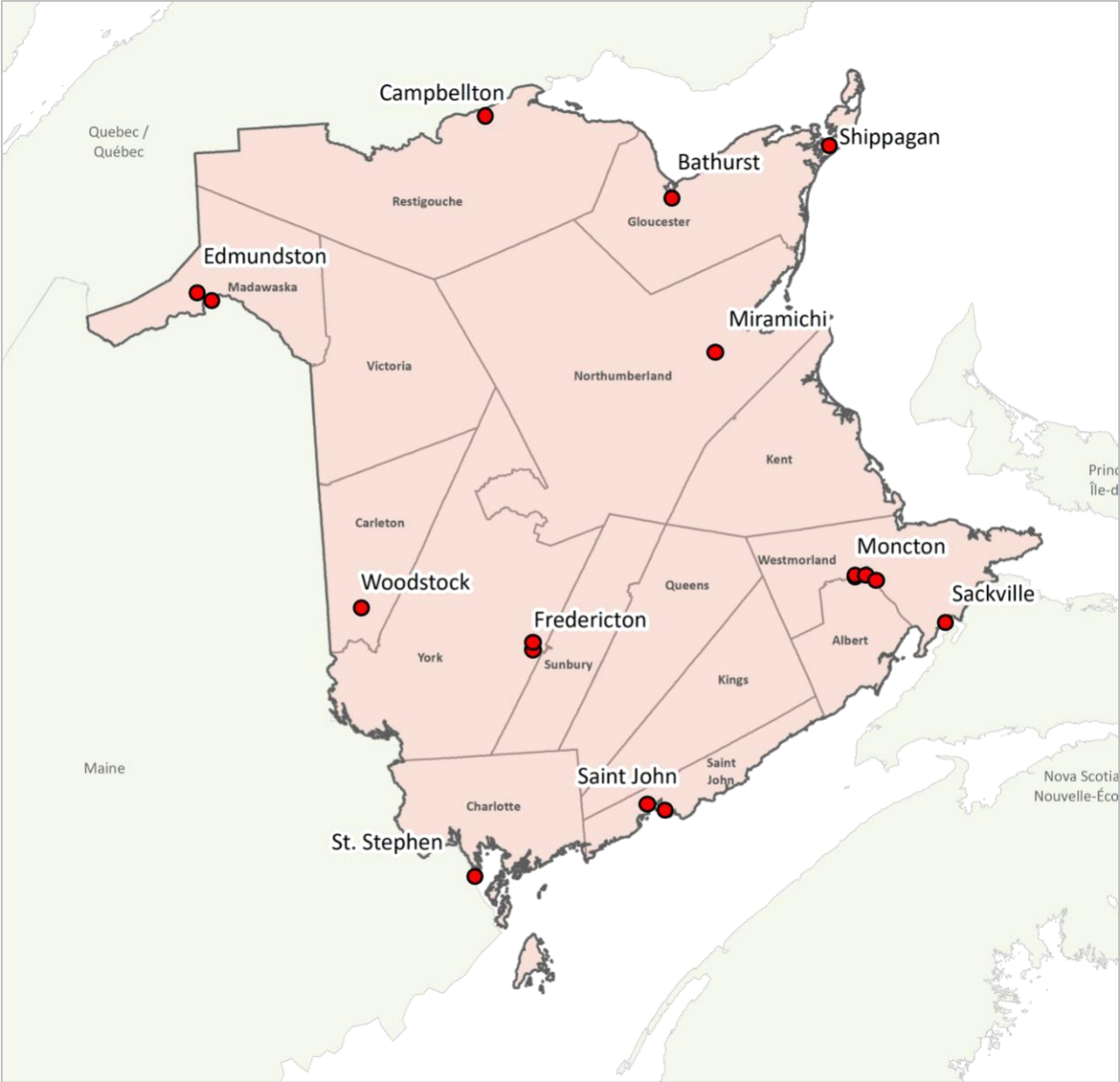
ABBREVIATIONS

CCNB: Collège communautaire du Nouveau-Brunswick

EECD: Education and Early Childhood Development

MPHEC: Maritime Provinces Higher Education Commission

MTA: Mount Allison University

NBCC: New Brunswick Community College

NBCCD: New Brunswick College of Craft and Design

STU: St. Thomas University

UdeM: Université de Moncton

UNB: University of New Brunswick

EXECUTIVE SUMMARY

New Brunswick (NB) invests substantially in educating post-secondary students, but how many of these students stay and contribute to the local economy? College and university graduates are among the most mobile Canadians, and when qualified graduates leave the province, taking their human capital and potential earnings with them, much of that investment is lost.

Estimating graduate retention rates can help determine if NB is seeing a high or low return on its investments, and understanding what kinds of graduates are leaving can help inform targeted policies that encourage graduates to stay. To this end, this report measures the retention of graduates of publicly funded colleges and universities in NB – specifically, graduates of UNB, UdeM, MTA, STU, NBCC, CCNB, and NBCCD.

Using matched administrative data from the University and Community College Registrar Databases and the Citizen Database, this report provides descriptive statistics on the number of graduates and 1-year retention rates of graduates from the NB institutions listed above, as well as 3-year retention rates among university graduates.

Highlight of Findings

- About 73% of university graduates and 93% of college graduates are matched to the Citizen Database.

- University graduates have an overall 1-year retention rate of 68%, whereas college graduates have an overall 1-year retention rate of 91%.

- Among university graduates, 1-year retention rates by previous residence are 89% for NB residents, 30% for Out of Province graduates, and 34% for Out of Country graduates.

- Among college graduates, 1-year retention rates by previous residence are 97% for NB residents, 27% for Out of Province graduates, and 50% for Out of Country graduates.

- Domestic university graduates have a 1-year retention rate of 73%, and international student graduates (student immigration status) have a 1-year retention rate of 32%.

- 1-year retention rates are 71% for female university graduates and 69% for male university graduates. 1-year retention rates for female *and* male college graduates are 91%.

- Graduates from NBCC and CCNB have 1-year retention rates of 94% and 85%, respectively. The highest 1-year retention rate for universities is for UdeM (84%), and the lowest is for MTA (42%).

The discrepancy between matching ratios and retention rates for universities and colleges is most likely caused by the composition of graduates by location of previous residence. Approximately 90% of college graduates are NB residents, whereas about 64% of university graduates are NB residents. The institutions with a high representation of NB graduates (i.e. NBCC, CCNB, UdeM) exhibit higher retention rates than those with more varied representation (i.e. MTA, UNB). University graduates are also generally more mobile in their search for employment that matches their skills and wage demand. However, international students' retention rates have been on the rise more recently, suggesting targeted retention policies are proving effective.

Similar to previous studies, we find that graduates who are originally from NB are more likely to stay, and college graduates who are originally from NB are the most likely of all.

INTRODUCTION

New Brunswick (NB) invests substantially in educating post-secondary students. When qualified graduates leave the province, much of that investment is lost, as they take their human capital (and potential earnings) with them when they relocate. Understanding what kinds of graduates are leaving and what kinds of graduates are staying can help inform targeted policies that encourage graduates to stay and contribute to the local economy, and estimating graduate retention rates can help determine if NB is seeing a high or low return on its investments.

The objective of this report is to present a statistical description of individuals who have graduated from the following publicly funded colleges and universities in NB:[1]

- The University of New Brunswick (UNB)
- Université de Moncton (UdeM)
- Mount Allison University (MTA)
- St. Thomas University (STU)
- New Brunswick Community College (NBCC)
- Collège communautaire du Nouveau-Brunswick (CCNB)
- The New Brunswick College of Craft and Design (NBCCD)

To better understand which graduates have a higher probability of remaining in the province, we examine

- the **number** of post-secondary graduates who stayed in New Brunswick and

- the **retention rates** of post-secondary graduates who stayed in New Brunswick.

More specifically, we analyze the number and retention rates of post-secondary graduates remaining in NB 1 year and 3 years after graduation.

To obtain our results, we matched data from the Citizen Database with data from the NB University and Community College Registrar Databases for analysis. Matching graduation data to the Citizen database (the analytic version of the Medicare Registry) is advantageous because Medicare coverage in NB is nearly universal (McDonald et al., 2018). The longitudinal nature of these data files allows individuals – and their mobility decisions – to be tracked and observed over time. Results are broken down by year of graduation, demographics,[2] and educational background.[3]

In the following sections, we review the existing literature on different dimensions of retention across different profiles, followed by a discussion of the key definitions, concepts, datasets, and methodology used in this study. We then present the empirical findings. Finally, we summarize the main results, draw policy implications, and suggest potential avenues for future work.

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[1] The Maritime College of Forest Technology is excluded from this study.
[2] For the purposes of this report, investigated demographics include gender, immigrant status, and previous residence.
[3] For the purposes of this report, information on educational background includes institution of study, level of education, and field of study, with results broken down by colleges and universities.

Background

Population retention in New Brunswick is a pressing policy concern. An aging population and the interprovincial migration of youth are creating a demographic shift that will continue to impact the province's economy, tax base, and social support system. According to the Government of New Brunswick's population growth strategy for 2019-2024 (GNB, 2019), the number of working-age individuals for each senior in NB decreased from 4.6 to 3.1 between 2008 and 2018, and this ratio is expected to decline further.

While NB invests heavily in measures to tackle these demographic challenges, it also invests substantially in post-secondary education. Yet, when graduates leave the province, much of that investment is lost. Not only is the retention of graduates important to combat an aging population, but taxes on their earnings could also be used to revitalize the provincial economy, creating a stronger social support system. Understanding the characteristics of graduates who are staying and graduates who are leaving can help inform the design and delivery of more targeted policies that may encourage future graduates to stay in NB.

Literature Review

Ample literature exists on the employment and earnings effects of various college and university degree programs, but there is a lack of studies on the retention of graduates within particular jurisdictions. The literature that does exist shows that the most important determinant of retention for graduates is their previous place of residence. If graduates are originally from the region in which they studied, they are more likely to stay.

2-Year Maritime Retention Rates – MPHEC Survey Data

Of the most relevant existing literature, the Maritime Provinces Higher Education Commission (MPHEC) surveyed a sample of Maritime university graduates 2 years after completing their degrees to estimate retention rates.[4] The analysis (MPHEC, 2018) was limited to graduates from bachelor's programs who had not completed any other post-secondary education prior to enrolling in their first degree.

Their most recent data, which represents the class of 2014, shows the 2-year retention rates of graduates in their province of study (57% for NB, 54% for NS, and 59% for PEI).

When only the retention rates of Maritimers in their home province are considered, MPHEC results show that 74% of New Brunswickers, 76% of Nova Scotians, and 66% of Prince Edward Islanders were residing in their home province 2 years after graduation.

For those from outside the Maritimes, only 4% of graduates from NB universities remained in the province 2 years after graduation, indicating that a graduate's province of origin is a strong determinant of retention. Following graduation, Maritimers are much more likely to stay in the region than their peers who came to study from outside the Maritimes. Retention rates for both groups have remained relatively steady over the last 15 years for all examined cohorts.

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[4]The graduating classes of 1999, 2003, 2007, 2012, and 2014 were surveyed 2 years after graduation.

The results of our study are similar to those of MPHEC (2018), though the methodologies differ. While MPHEC uses a survey-based approach, we use administrative Medicare data to identify location. Thus, our work uses a much larger sample size, as survey data relies on information from a sample of the specified population, whereas administrative data contains information on a specified population as a whole. Moreover, our study takes a more focused approach, as it examines only graduates from NB instead of the entire Maritimes; and it is more comprehensive and wider in scope, as it covers all post-secondary graduates – even those with previous post-secondary education. While we do not expect to achieve exactly the same results as previous works when using different datasets (i.e., survey data vs. administrative data), the similarity of this report's findings and MPHEC findings indicates our results are robust and not overly sensitive, at the macro level, to approach.

<u>1-Year Maritime Retention Rates – PSIS and Income Tax Data</u>

Galarneau et al. (2017) estimated 1-year retention rates of undergraduate and graduate students from universities in the Maritimes by combining Postsecondary Information System (PSIS) data with personal income tax data. Their study combined 6 cohorts of graduates (classes of 2006-2011), as retention rates between the cohorts did not vary significantly. For those with an undergraduate degree, retention rates were higher for women (70%) than for men (64%).

Retention rates were highest for undergraduates whose place of residence at the time of admission was in the Maritimes: 83% for women and 77% for men. They were lowest for those who lived elsewhere in Canada at the time of admission: 15% for both men and women. For those who came from outside Canada, more than half stayed in the Maritimes after graduating: retention rates were 51% for women and 56% for men, and these patterns were similar for those with graduate degrees.

Galarneau et al. (2017) show that retention rates vary by field of study. Graduates from fields such as education, mathematics and computer and information sciences, humanities, and health and related fields had relatively high retention rates for both men and women. Graduates from architecture and engineering programs had the lowest retention rates among women and the second lowest among men.

Their study also suggests that employment opportunities in specific industries located in other regions of Canada may explain why some graduates choose to leave; and the authors point out that the economic prosperity of Western Canada from 2007 to 2012 may have attracted a number of graduates from Maritime universities during those years.

While Galarneau et al. (2017) use different data sources than this report, we found similar retention rates for female and male undergraduates (71% and 69%, respectively). Again, this similarity in findings suggests that despite differences in approach and methodology, our results are robust.

<u>Graduation Year and 2-Year Retention Rates – PSIS and T1 Family File Data</u>

A forthcoming study (Boco, et al., 2020) uses data from PSIS and the T1 Family File (tax records) to examine labour market outcomes and retention of graduates from post-secondary institutions in NB. Two retention measures are used in the study: the percentage of graduates still residing in NB as of Dec. 31 of the graduation year, and the percentage of graduates still residing in NB 2 years later. For instance, for a student who graduated in June 2014, the study measures where he/she reported living in tax returns on December 31, 2014 and on December 31, 2016.

It should be noted that the study measures the retention of only those who filed a tax return. Results show that on average 78% of graduates remain in NB at the end of December of their graduation year, and on average 72% are still in NB 2 years later. The study also finds that students residing in NB prior to admission are the most likely to remain in the province, averaging a 92% retention rate in the graduation year and 84% 2 years later.

It is not surprising that the results of the Boco et al. (2020) study differ somewhat from the results of this report, as the former uses information from different datasets and employs different methodology, as well as different match rates between PSIS and other administrative data. For instance, Boco et al. (2020) examine retention rates of college and university graduates together, whereas this report examines college and university retention rates separately. Nonetheless, their findings for all graduates still fall between our findings for college and university graduates.

<u>Takeaway</u>

The most common finding from the above studies is that province or region of residence prior to enrollment in post-secondary education is a key determinant in predicting retention. Higher retention rates are expected among graduates who were already living in their home province at the time of their admission, given family ties, friendships, and other bonds they developed in the province. Since home province is a key determinant in retention, and given the home province university participation rate[5] is about 17% for NB based on the most recent MPHEC data, it could be worth considering ways additional strategies could be designed and implemented to increase the number and proportion of domestic graduates from NB.

Data and Methodology

Data

The results of this report are based on the University and Community College Registrar data provided by the investigated post-secondary education institutions and on data from the Citizen Database, available through the New Brunswick Institute for Research, Data and Training (NB-IRDT).

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[5] Home Province Participation: Number of students enrolled full-time in their home province divided by the provincial population aged 18-24

Education Data

The University and Community College Registrar data contains information on individuals who previously attended or are currently attending any of the 7 different institutions examined in this report. Among other variables, it includes information on the students' graduation date, student status, gender, level of education (undergraduate, graduate, college), field of study, program completion status, and permanent province of residence.

This study only includes individuals who graduated from the 7 specified institutions. Individuals who have not completed their degrees/diplomas are excluded from our analysis.

Our analysis only includes years for which the educational institutions collected 12 full months (calendar year) of data (see Table 1).

Table 1: Institutions and Data Ranges

Institution	Available Data
UNB	2010-2018
UdeM	2010-2018
MTA	2014-2018
STU	2014-2018
NBCC	2017-2018
CCNB	2017-2018
NBCCD	2017-2018

Humber College Data

One anomaly discovered in the data for UNB students is that graduates of the UNB Bachelor of Nursing program in Humber College, Ontario, were classified as UNB graduates in the data provided by UNB. Clearly, the question of retention in NB does not apply to these students. Because of residual disclosure issues, overall statistics for UNB graduates contain these students, but the net effect on retention estimates is trivial. Statistics based on field of study, and in particular statistics for UNB Nursing graduates, exclude Humber college graduates from the results reported here.

Citizen Database

The Citizen Database is a longitudinal and administrative database that contains basic demographic and geographic information on all NB residents who have been issued a provincial Medicare card. The database also contains Medicare eligibility status, such as whether a Medicare status is "Active" or "Terminated." This study uses Citizen Database data from 2010 until the end of 2018.

Methodology

This study links data from the University and Community College Registrar Databases and the Citizen Database for analysis, as the longitudinal nature of these datasets allows individuals – and their mobility – to be tracked and observed over time.

As in previous work on the retention of immigrants (see Leonard et al., 2019; McDonald et al., 2018), this report assumes that an individual's NB Medicare status identifies whether he/she remained in the province and, if so, how long he/she remained. An individual's departure from the province is determined by the date of termination of his/her active Medicare status in the Citizen Database. Persons living in NB are extremely likely to have registered with NB Medicare, as this government program covers the cost of many medical expenses. This makes Medicare Registry data a fairly reliable source for estimating residence in NB (see McDonald et al., 2018).

> **"Matched"** individuals (i.e. individuals with Medicare information) are considered to be retained if they have an Active Medicare Registration in NB 1 year or 3 years after the date of graduation – otherwise, they are considered to have left the province on or prior to the date of termination of an active Medicare status.

> **"Unmatched"** individuals (i.e. individuals with no Medicare information) are also assumed to have left the province.

Individuals could be unmatched for a variety of reasons. The main reason is that a graduating student does not have an Active Medicare status because he/she does not remain in NB after graduation. However, other individuals may be unmatched because of missing information or information that is not reported consistently across both datasets. Since matching is based on date of birth, gender, and name, errors may occur, resulting in an unmatched individual even though he/she is actually residing in NB after graduation. Match rates are likely to be lower for Out of Province graduates since they might have retained home province health insurance or may not have been eligible for Medicare (e.g., international students prior to 2017).

As such, the retention rates presented in this analysis are likely to be understated, as graduates who are unmatched due to technical errors (such as name or gender errors) are assumed to have left the province. A number of these unmatched graduates may still be in the province, but they are considered to have left due to a lack of Medicare information.

Using the datasets described above, this study reports the number of graduates across different profile categories and across years. Profile categories include universities and community colleges, gender,[6] immigrant status,[7] institution, level of education (undergraduate, graduate, college), field of study, and previous residence. The number of students who graduated each year is based on calendar year and not academic year.

1-year and 3-year retention rates of graduates are also presented. For an individual who completed multiple programs within a year, only the most recent program is considered. Individuals who continued their studies upon graduation are included in the dataset, and their retention analysis is based on their date of graduation from the program they previously completed. Retention rates are in presented terms of percentages.

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[6] Some graduates from UNB (mainly students studying overseas/online) have "Unknown" gender. These students are excluded from analysis by gender.

[7] Some international students from UNB do not hold any visa (i.e. they are studying overseas/online). These students are excluded from the sample, and hence not all international graduates from UNB are included in this study.

Accounting for Unmatched Individuals

Some insights into the reasons why individuals are unmatched in the data can be derived by considering match rates based on graduates' permanent residence as stated at their time of enrollment in post-secondary education. This accounting for unmatched individuals is based on students' previous residence, and previous residence is based on the "permanent province" reported by the student in the earliest reporting year of their post-secondary education.

Graduates are classified as **from NB** if they state their permanent province is NB. If the previous residence of a graduate is NB, we might assume the student is unmatched due to technical errors, since permanent NB residents should be registered in Medicare.

Graduates are classified as **Out of Province** (Domestic) if they state their permanent province is other than NB, and they are classified as **Out of Country** (International) if their student status suggests they are not Canadian citizens or permanent residents, regardless of the permanent province reported by them. If the previous residence of a graduate is Out of Province or Out of Country, that individual is assumed to be unmatched due to not having Medicare while a student and not enrolling in Medicare after graduation.

Table 2: **Distribution of Matched and Unmatched Graduates from Publicly Funded Post-Secondary Institutions in NB (2010-2018)**

	All Graduates	Matched	Unmatched	Proportion of Unmatched
Total	**43,958**	**33,513**	**10,445**	**24%**

Table 2 above shows the distribution of matched and unmatched graduates in this study. Among the 43,958 individuals who graduated from publicly funded post-secondary institutions between 2010 and 2019, 10,445 (24%) are unmatched. Out of these 10,445 unmatched graduates, approximately 88% (55% Out of Province and 33% Out of Country) did not indicate NB as their previous residence (Figure 1). This indicates that those who could not be matched are most likely not from the province and most likely left after graduation.

Figure 1: Distribution Among Unmatched Graduates by Previous Residence

■ New Brunswick ■ Out of Province (Domestic) □ Out of Country (International)
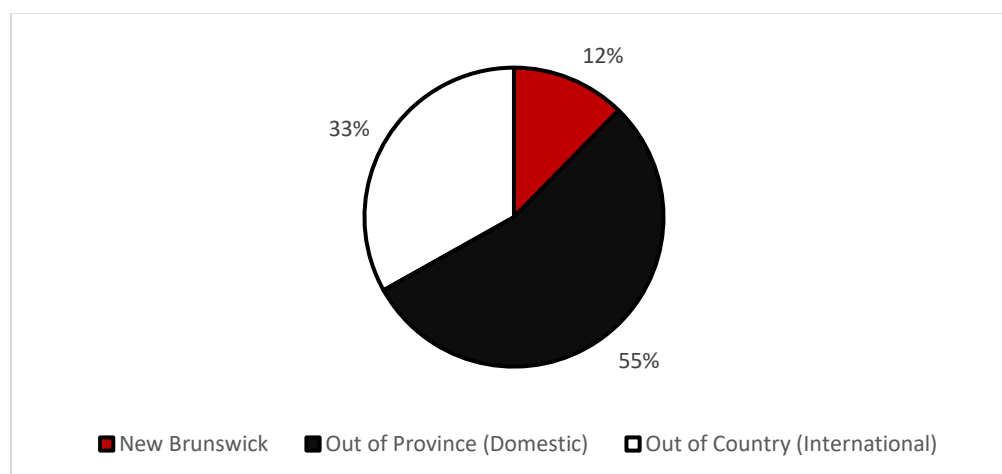
RESULTS

Total

The tables below exhibit the annual number of total graduates from public post-secondary institutions in NB, along with the matching ratio. The matching ratio shows the proportion of graduates from NB post-secondary institutions linked to the Citizen Database (provincial Medicare), and it is calculated by dividing the number of graduates who are matched to the Citizen Database registry by the total number of graduates.

Along with counts, this section also presents estimates for 1-year and 3-year retention rates of all graduates in the province with the assumption that unmatched graduates are not retained in NB. Descriptive statistics are presented separately for university and college graduates.

Counts with Matching Ratios

In Table 3, university data for the years 2014 and 2018 (the 5 years with all university data) suggests that the annual number of graduates from NB is around 4,500.

From 2014, the numbers move upward as MTA and STU datasets become available. Institution-specific statistics are presented later in the report.

The matching ratio for university graduates hovers around 70%, and the overall matching ratio is 73%, which is likely due to Out of Province and Out of Country students comprising a significant proportion of university graduates.

Table 3: Annual Distribution of Matched University Graduates in NB (2010-2018)

Graduation Year	Total Graduates	Matched Graduates	Matching Ratio
2010	3,646	2,727	75%
2011	3,682	2,782	76%
2012	3,555	2,727	77%
2013	3,612	2,787	77%
2014	4,681	3,272	70%
2015	4,672	3,322	71%
2016	4,554	3,195	70%
2017	4,432	3,169	72%
2018	4,182	3,043	73%

STU and MTA data begin in 2014.

Compared to the 73% matching ratio for university graduates, the matching ratios for college graduates is significantly higher (93% overall). This is due to the high proportion of NB residents

among college graduates, who are more likely to have provincial Medicare prior to enrollment and are therefore more likely to be matched (see Table 4).

Table 4: Annual Distribution of Matched College Graduates in NB (2017-2018)

Graduation Year	Total Graduates	Matched Graduates	Matching Ratio
2017	3,460	3,222	93.1%
2018	3,482	3,267	93.8%

1-year Retention Rates

The overall 1-year retention rate for university graduates is around 68% (see Figure 2), which is lower than the 1-year retention rate for college graduates (91%).

Similar to matching ratios, the disparity between the retention rates of university and college graduates can be attributed to the proportion of NB and Non-NB (Out of Province and Out of Country) graduates, since colleges mostly consist of NB residents, who are more likely to remain in the province after graduation. In addition to having a higher ratio of Out of Province and Out of Country graduates, university graduates are generally more mobile in terms of the labour market, as they may find better opportunities and greater diversity of jobs elsewhere (Wozniak, 2010). Thus, they might be more likely to leave the province.

Figure 2: 1-Year Retention Rates of University and College Graduates
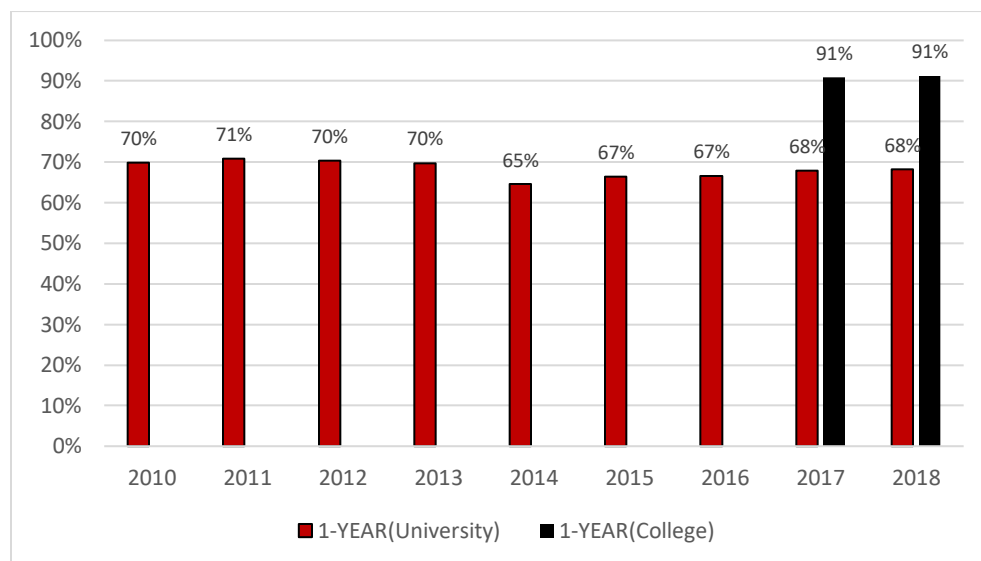
STU and MTA data begin in 2014.

3-year Retention Rates

Overall, 61% of university students remain in NB 3 years after graduation. Even though retention rates remain fairly similar through the years, there is a slight drop as of 2014, when the 3-year retention rates include MTA and STU data.

Figure 3: 3-Year Retention Rates of University Graduates
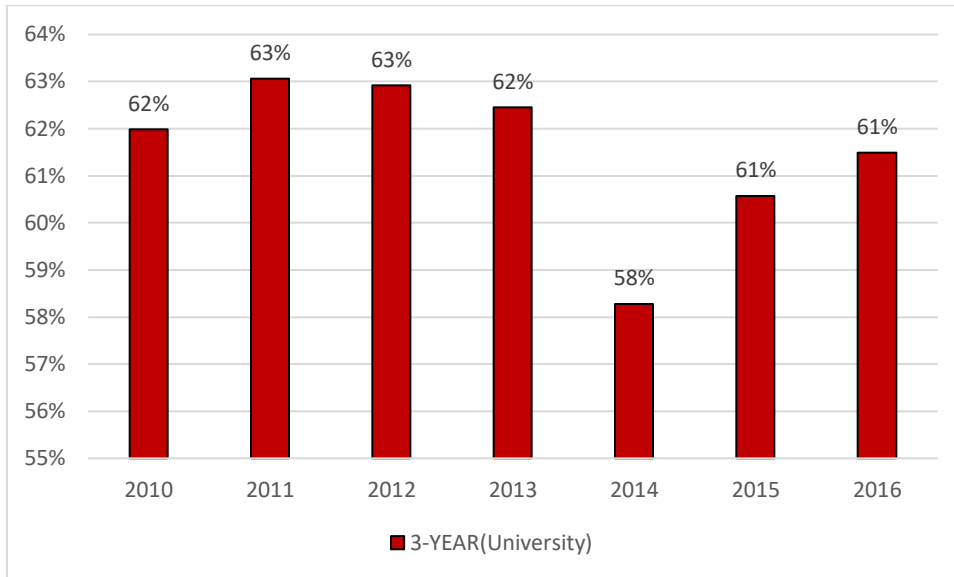
STU and MTA data begin in 2014.

The findings of this section indicate that college graduates have higher 1-year retention rates than university graduates (3-year retention rates for college graduates are unavailable due to a lack of available data from earlier years). Likewise, the matching ratios for college graduates are higher than those of university graduates. These differences are possibly due to the large proportion of NB residents among college graduates compared to the smaller proportion of NB residents among university graduates, along with the greater mobility of university graduates and the higher likelihood that previous residents of NB will remain in the province.

By Gender

The estimates below present the counts and retention rates of both university and college graduates, stratified by gender. Any graduates with a gender status that is "Not Available" or "Unknown" have been excluded from the analysis by gender. Therefore, this section's sample size is not identical to the rest of the report.

Counts

University

Table 5 shows that the proportion of female university graduates is approximately 1.5 times higher than the proportion of male graduates. The changes in numbers over the years are reflective of the inclusion of different post-secondary institutions' data, including the significant rise in both male and female graduates in 2014 reflecting the inclusion MTA and STU graduates.

Table 5: Total Number of Graduates in NB by Gender (University)

Graduation Years	Male	Female
2010	1,429	2,111
2011	1,391	2,133
2012	1,413	1,980
2013	1,484	1,997
2014	1,779	2,788
2015	1,833	2,737
2016	1,814	2,640
2017	1,717	2,620
2018	1,650	2,444

NOTE: "Unknown" gender category is dropped from the sample, thus sample size by gender is not equal to the sample size in the rest of the study.

College

The ratio between male and female graduates from college is basically 1:1, though the number of male college graduates is higher than that of females (see Table 6).

Table 6: Total Number of Graduates in NB by Gender (College)

Graduation Years	Male	Female
2017	1,849	1,611
2018	1,854	1,628

NOTE: "Unknown" gender category is dropped from the sample, thus sample size by gender is not equal to the sample size in the rest of the study.

1-year Retention Rates

In general female university graduates have retention rates that are either higher than or equal to those of their male counterparts from 2010 to 2018 (see Figure 4). The overall 1-year retention rates for female and male graduates are quite close, at 71% and 69%, respectively. For college graduates, there is no difference in retention between male and female graduates, as 1-year rates for both genders stand at 91%.

Figure 4: 1-Year Retention Rates of Graduates by Gender
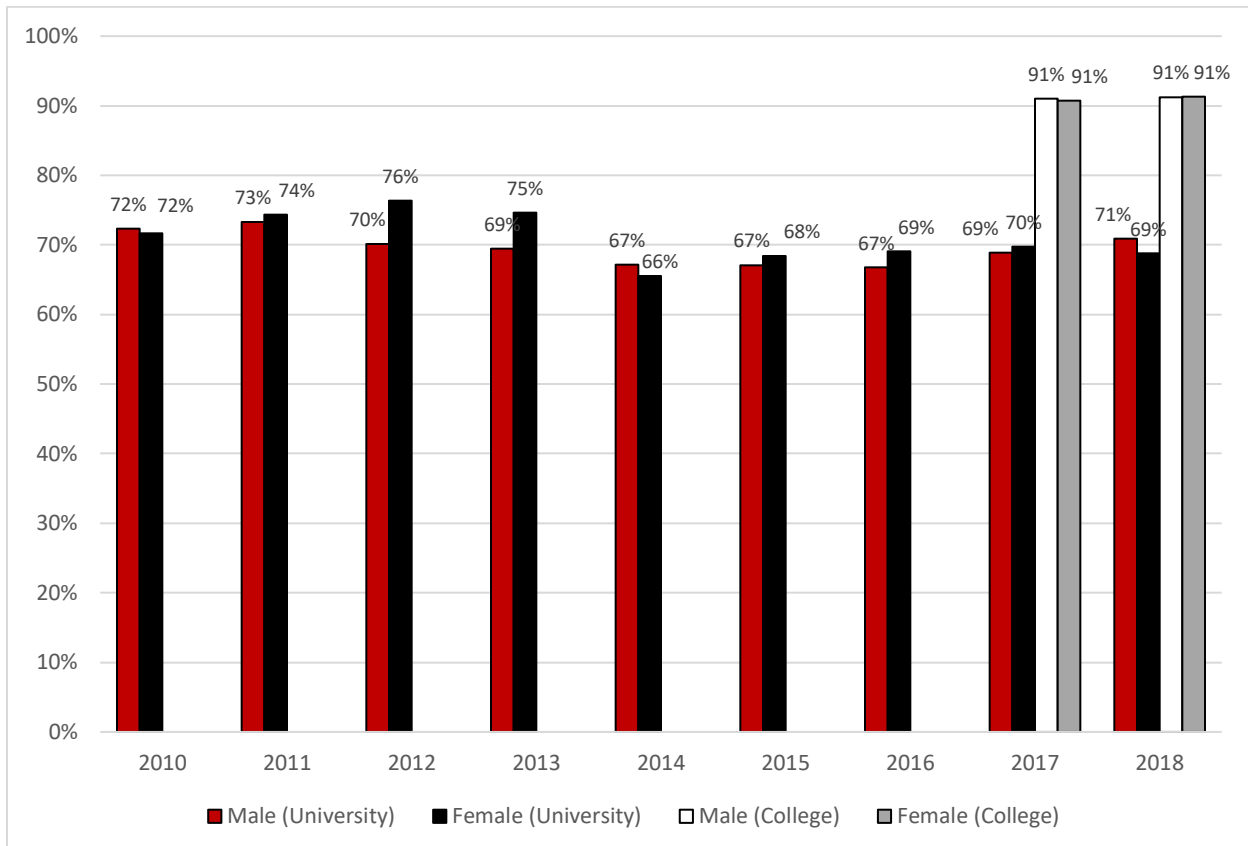
NOTE: "Unknown" gender category is dropped from the sample, thus sample size by gender is not equal to the sample size in the rest of the study.

3-year Retention Rates

University

Figure 5: 3-Year Retention Rates of Graduates by Gender (University)
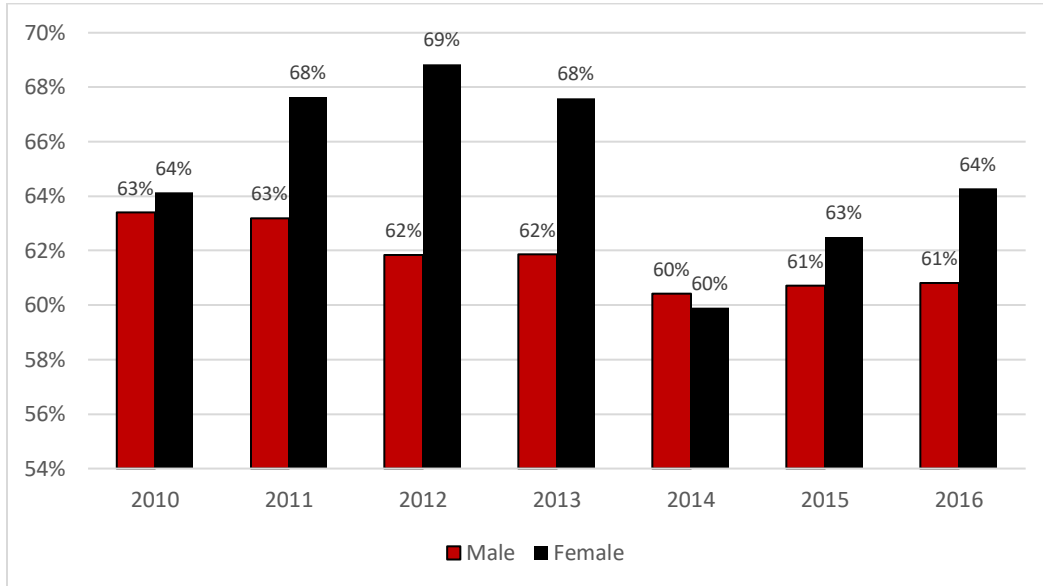
NOTE: "Unknown" gender category is dropped from the sample, thus sample size by gender is not equal to the sample size in the rest of the study.

The trend of higher retention rates for females continues 3 years after graduation (see Figure 5). Overall, the retention rate for female graduates is around 65%, while about 62% of male graduates are likely to remain in the province 3 years after graduation. In other words, it appears that female graduates are slightly less likely to leave NB.

By Previous Residence

The previous residence of students is based on their permanent residence (province) in the earliest reporting cycle (i.e., during registration for a post-secondary institution), including whether they are from NB or from Out of Province.

The Out of Country classification for international graduates is based on their student status, which would indicate they are not Canadian citizens or permanent residents, irrespective of their permanent residence in the first reporting cycle.

Counts

University

The number of Out of Country and Out of Province graduates gradually increased over the study period (see Table 7). From 2010-2013, about two-thirds (70%) of all graduates indicated NB was their previous residence. From 2014 onwards, around three-fifths (60%) of all university students were from NB, and the rest were from Out of Province (25%) and Out of Country (15%).

Table 7: Total Number of Graduates in NB by Previous Residence (University)

Graduation Year	New Brunswick	Out of Province (Domestic)	Out of Country (International)
2010	2,507	701	438
2011	2,485	725	472
2012	2,466	556	533
2013	2,505	552	555
2014	2,871	1,106	704
2015	2,869	1,108	695
2016	2,746	1,099	709
2017	2,672	1,126	634
2018	2,402	1,204	576

*STU and MTA data begin in 2014.

College

Table 8 shows the vast majority (90%) of college graduates are from NB. The share of college graduates from Out of Country is higher (7%) compared to Out of Province graduates (3%).

Table 8: Total Number of Graduates in NB by Previous Residence (College)

Graduation Year	New Brunswick	Out of Province (Domestic)	Out of Country (International)
2017	3,101	98	261
2018	3,099	103	280

1-year Retention Rates

University

Figure 6 below clearly shows that graduates originally residing in NB have much higher retention rates than Non-NB (Out of Province and Out of Country) graduates. Overall, 89% of NB graduates are retained after 1 year. For Out of Province graduates, the overall 1-year retention rate is at 30%, although it appears that since 2014 (even after the inclusion of STU and MTA data) the annual rate has dropped to about 25%.

Out of Country graduates initially exhibited lower retention rates than the other 2 categories, but as of 2015 more remained in province after 1 year as opposed to Out of Province graduates. The notable rise in retention rates for international graduates from 2017 onwards could have been caused by the implementation of policy making international students eligible to apply for provincial Medicare (i.e. more matched international graduates), as well as various student and work permit programs aimed at international graduates.

Figure 6: 1-Year Retention Rates of Graduates by Previous Residence (University)
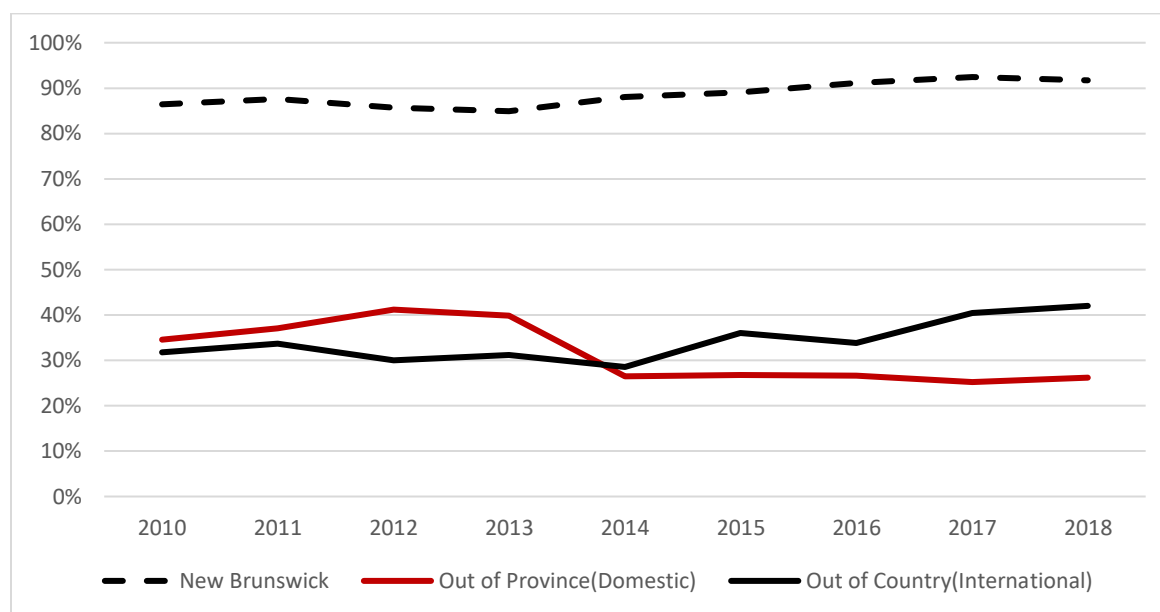
STU and MTA data begin in 2014.

<u>College</u>

Figure 7 below shows that college graduates who are NB residents have much higher retention rates (97%) than Out of Province and Out of Country graduates from college – a trend similar to that of university graduates.

Overall, 50% of (international) college students from Out of Country remain in the province 1 year after graduating, which is significantly higher than Out of Province students, who have an overall retention rate of 27%.

Figure 7: 1-Year Retention Rates of Graduates by Previous Residence (College)
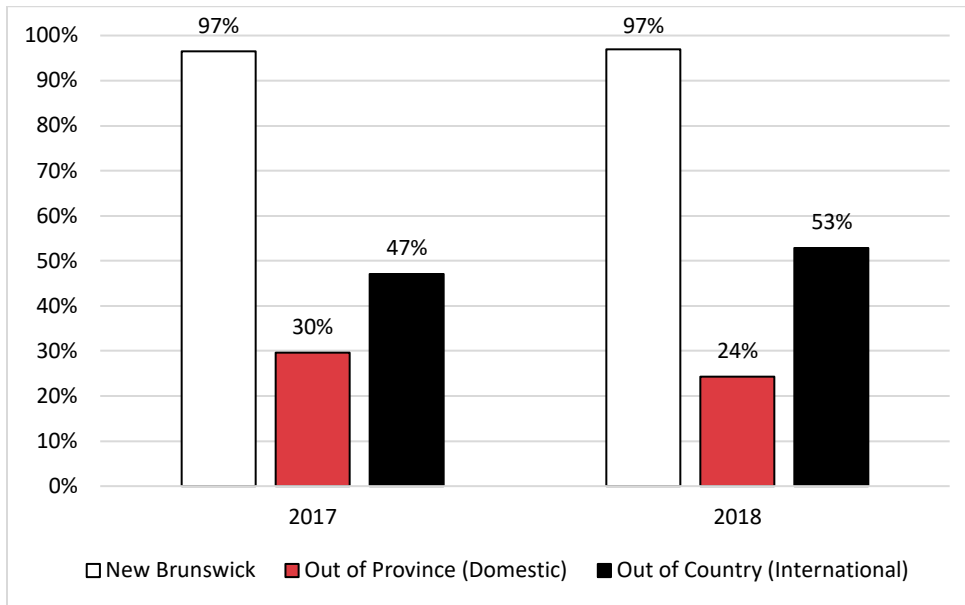
3-Year Retention Rates

<u>University</u>

The overall 3-year retention rate for NB university graduates is 80% (see Figure 8).

Retention rates are much lower for Out of Province and Out of Country graduates, who exhibit overall retention rates of 28% and 26%, respectively.

Once again, these results show that one's previous residence is the biggest indicator of retention. In other words, if you are from NB, you are far more likely to remain in NB.

Among Non-NB students, Out of Country students appear to be retained more in recent years than Out of Province students. This could be partially attributed to the growth of incentives for Out of Country graduates to stay in the province due to targeted student and employment programs. It is also possible that as students originally from other provinces graduate in NB, they return to their home provinces, whereas international students may wish to stay because of factors such as the financial costs of moving.

Figure 8: 3-Year Retention Rates of Graduates by Previous Residence (University)
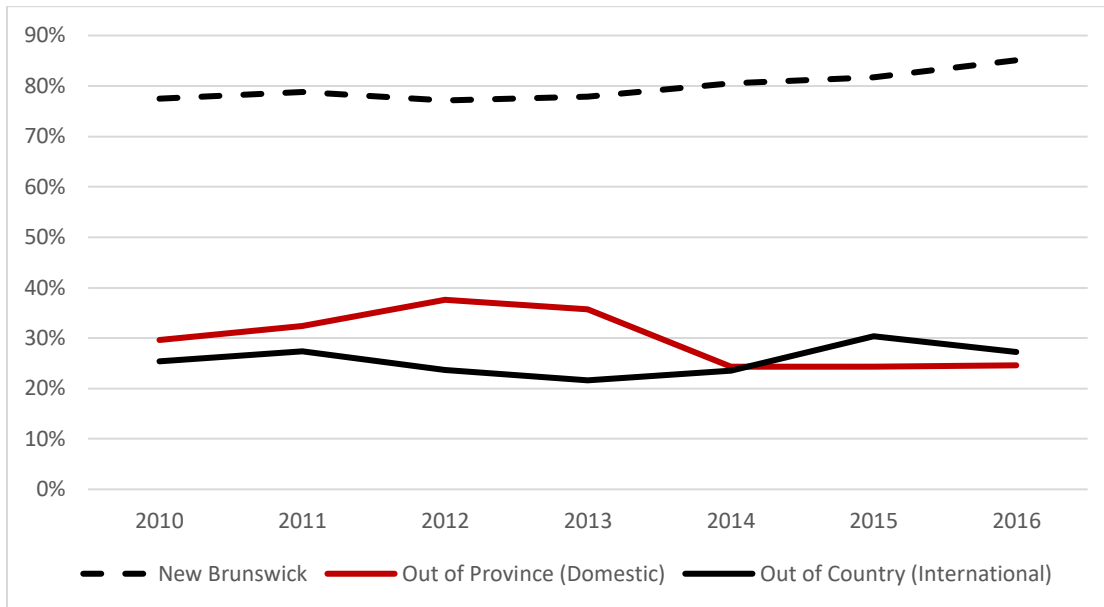
STU and MTA data begin in 2014.

By Student Status

Any graduate whose student status indicates he/she is a Canadian citizen or permanent resident on their graduation day is considered to be a **domestic graduate**.

Anyone without a Canadian citizenship or permanent residency visa is defined as an **international student**.

International students studying overseas without any visa (such as those studying through NB institutions' international programs) are excluded from the sample, and thus not all international graduates from an NB-branded institution are included in our analysis.

Counts

University

Table 9 reveals that the number of international students in the examined universities ranges from 400 to more than 600 over the study period. The number of domestic graduates is about 6 times higher than the number of international graduates.

Table 9: Total Number of Graduates in NB by Student Status (University)

Graduation Years	Domestic	International
2010	3,237	409
2011	3,234	448
2012	3,044	511
2013	3,086	526
2014	4,011	670
2015	4014	658
2016	3,876	678
2017	3,829	603
2018	3,624	558

*STU and MTA data begin in 2014.

College

In NB colleges, the proportion of domestic graduates is 12 times higher than that of international graduates, indicating that mostly Canadian students opt to pursue college education in NB (see Table 10).

Table 10: Total Number of Graduates in NB by Student Status (College)

Graduation Years	Domestic	International
2017	3,199	261
2018	3,202	280

1-Year Retention Rates

The retention rates for international graduates are much lower than the retention rates for domestic graduates (see Figure 9), which is consistent with the assumption that previous residence is an important factor influencing retention.

Around 73% of domestic graduates from university remain in the province 1 year after graduation, while about one-third (32%) of international graduates from university remain in the province after 1 year. Similarly, domestic graduates from colleges exhibit a high retention rate of 95%, while about half of international graduates leave NB within a year of graduation.

Domestic graduates from colleges are much more likely to remain in the province as opposed to international graduates.

Figure 9: 1-Year Retention Rates of Graduates by Student Status
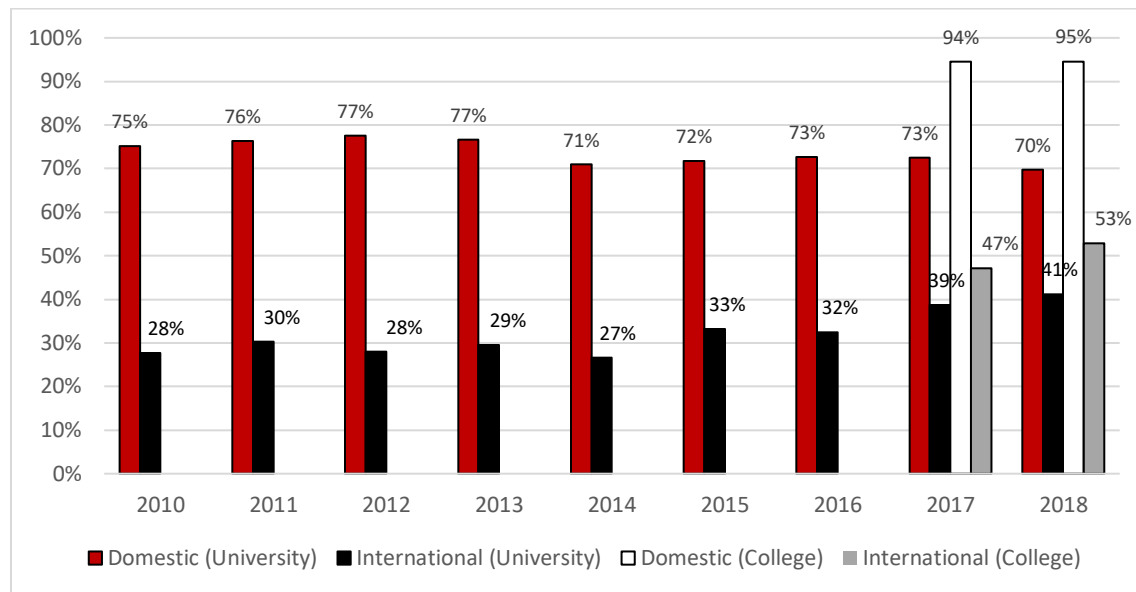
STU and MTA data begin in 2014.

3-year Retention Rates

University

Figure 10 below shows that 3 years post-graduation, less than one-fourth (24%) of international students are still in the province, though the retention rates for 2015 and 2016 are higher than in previous years. The overall 3-year retention rate of domestic graduates is about 67%.

Figure 10: 3-Year Retention Rates of Graduates by Student Status (University)
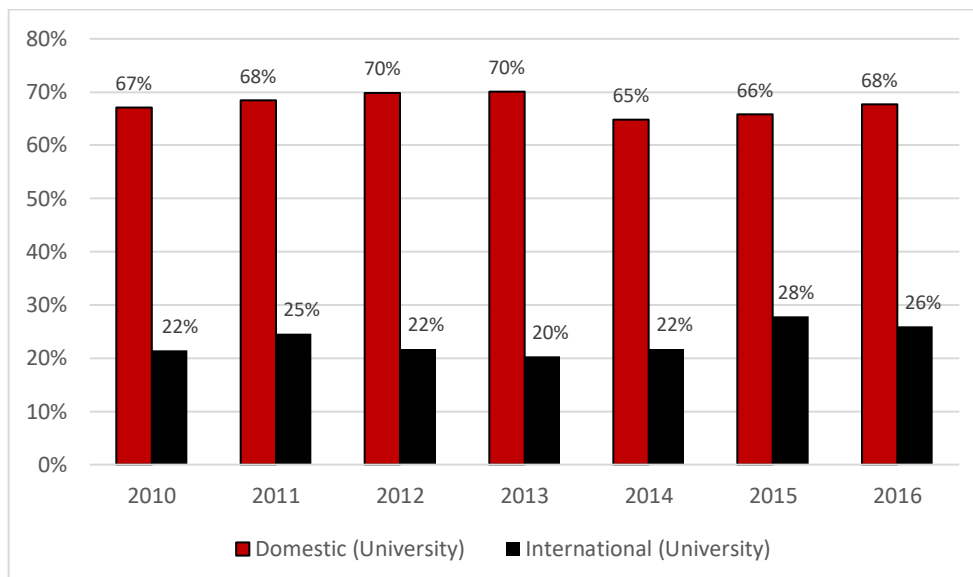
STU and MTA data begin in 2014.

The retention rates for previous residence and student status are similar, showing that domestic graduates, especially those from NB, are more likely to be retained compared to international (Out of Country) graduates. However, findings for recent years show that more international students are being retained in the province compared to earlier periods, implying some effect of the various student and employment programs targeted at them, such as the Atlantic Immigration Pilot Program (AIPP) and Atlantic Canada Study and Stay™ – New Brunswick.

By Field of Study

The tables in this section disaggregate the number of graduates and their retention rates by field of study based on primary groupings of the Classification of Instructional Programs (CIP).[8] Due to low counts, some groups have been combined to meet the disclosure requirements.

Counts

University

In general, "Business, management & public administration" and "Health & related fields" have a higher number of university graduates compared to other groups in Table 11. The spike in numbers for "Social sciences & law" from 2014 onwards can be attributed to the inclusion of graduates from STU and MTA.

Table 11: Total Number of Graduates in NB by Field of Study (University)

Graduation Year	Education	Social sciences & law	Business, management & public admin	Physical & life sciences & tech	Architecture, engineering, & related tech	Health & related fields	Other
2010	704	410	739	318	350	622	382
2011	774	397	736	283	324	639	391
2012	607	347	817	323	355	688	418
2013	602	400	834	302	404	712	358
2014	621	772	973	447	400	657	616
2015	585	876	899	468	390	693	555
2016	556	803	887	512	416	642	559
2017	549	825	872	490	426	617	454
2018	532	676	789	451	400	563	541

a) Physical & life sciences & tech: This field also includes Mathematics, computer & information sciences
b) Other includes: 1) Humanities, 2) Visual and performing arts, and communications tech,
    3) Agriculture, natural resources and conservation

STU and MTA data begin in 2014.

College

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[8] The Classification of Instructional Programs (CIP) 2011 version was jointly compiled by Statistics Canada and the National Center for Education Statistics in the United States.

Over one-third of total college graduates are in the "Architecture, engineering and related technologies" group (Table 12). The "Education" category has the lowest number of graduates among all college students.

Table 12: Total Number of Graduates in NB by Field of Study (College)

Graduation Year	Education	Social sciences & law	Business, management & public admin	Physical & life sciences & tech	Architecture, engineering, & related tech	Health & related fields	Other
2017	33	229	693	252	1,215	552	486
2018	58	265	730	243	1,196	463	527

a) Physical & life sciences & tech: this field also includes Mathematics, computer & information sciences
b) Other includes: 1) Humanities, 2) Visual and performing arts, and communications tech,
  3) Agriculture, natural resources and conservation

1-year Retention Rates

<u>University</u>

The differences in 1-year retention rates between various fields of study among university graduates are relatively minor.

The graduates in "Health & related fields" exhibit the highest overall retention rate of 80%, followed by "Physical and life sciences & technologies" (which includes "Mathematics, computer & information sciences") at 72%, and then graduates in the "Other" category, at 71%.

On the contrary, the lowest retention rates are among "Architecture, engineering and related technologies" graduates, with 64% on average remaining in NB 1 year after graduation.

Table 13: 1-Year Retention Rates of Graduates by Field of Study (University)

Field of Study	2010	2011	2012	2013	2014	2015	2016	2017	2018
Education	73%	69%	64%	67%	65%	66%	67%	66%	62%
Social sciences & law	72%	75%	71%	74%	66%	68%	70%	68%	68%
Business, management & public admin	67%	74%	70%	70%	65%	67%	66%	70%	70%
Physical & life sciences & tech	77%	76%	74%	68%	67%	71%	68%	71%	77%
Architecture, engineering, & related tech	66%	64%	59%	57%	60%	63%	66%	67%	71%
Health & related fields	77%	79%	77%	75%	79%	81%	80%	86%	86%
Other	74%	79%	76%	77%	68%	70%	68%	70%	66%

a) Physical & life sciences & tech: this field also includes Mathematics, computer & information sciences
b) Other includes: 1) Humanities, 2) Visual and performing arts, and communications tech,
   3) Agriculture, natural resources and conservation

*STU and MTA data begin in 2014.

College

For college graduates (Table 14), retention rates are generally very high for almost all groups – either close to or above 90%. However, only approximately 69% of "Physical and life sciences & technologies" graduates remain in the province after 1 year, which is similar to the retention rate of university graduates in the same category.

It is possible that this group has a higher representation of international and Out of Province graduates in both colleges and universities, and this cohort could be very mobile in terms of employment throughout the country.

It is also possible that the proportion of male students in this group is relatively high compared to the proportion of females; and the lower likelihood of male graduates to be retained could be reflected in this field of study.

Table 14: 1-Year Retention Rates of Graduates by Field of Study (College)

Field of Study	2017	2018
Education	94%	97%
Social sciences & law	93%	92%
Business, management & public admin	88%	89%
Physical & life sciences & tech	67%	71%
Architecture, engineering, & related tech	96%	95%
Health & related fields	93%	95%
Other	92%	91%

a) Physical & life sciences & tech: this field also includes Mathematics, computer & information sciences
b) Other includes: 1) Humanities, 2) Visual and performing arts, and communications tech,
3) Agriculture, natural resources and conservation

3-Year Retention Rates

<u>University</u>

Similar to 1-year retention rates, the 3-year retention rates of university students among various groupings are not very different from one another. Over 70% of "Health & related fields" students remain in the province 3 years after graduation. Just about half (53%) of the "Architecture, engineering and related technologies" graduates are retained after 3 years.

Table 15: 3-Year Retention Rates of Graduates by Field of Study (University)

	2010	2011	2012	2013	2014	2015	2016
Education	67%	64%	61%	63%	61%	63%	65%
Social sciences & law	63%	63%	61%	64%	59%	59%	64%
Business, management & public admin	61%	67%	62%	62%	60%	61%	60%
Physical & life sciences & tech	66%	66%	67%	60%	61%	64%	60%
Architecture, engineering, & related tech	54%	52%	47%	47%	51%	56%	61%
Health & related fields	70%	72%	71%	70%	73%	76%	75%
Other	64%	70%	67%	69%	60%	63%	62%

a) Physical & life sciences & tech: this field also includes Mathematics, computer & information sciences
b) Other includes: 1) Humanities, 2) Visual and performing arts, and communications tech,
3) Agriculture, natural resources and conservation
*STU and MTA data begin in 2014.

The retention rates for college graduates in most field of study categories are higher than those of university graduates. However, one field of study ("Physical and life sciences & technologies") appears to exhibit similar retention rates for both university and college graduates, which can probably be attributed to a higher representation of male and/or Non-NB (Out of Province and Out of Country) graduates in this category.

By Field of Study & Gender

The tables below show the disaggregation of fields of study by graduates' gender. To avoid any disclosure requirement issues, the counts for both university and college graduates are pooled across years from 2010-2018. For the exact same reason, only university graduates' retention rates (pooled 2010-2018) are presented in this section.

Counts

<u>University</u>

The distribution of university graduates by gender and field of study in Table 16 shows that the proportion of male graduates (82%) in "Architecture, engineering and related technologies" is significantly greater than the proportion of females (18%). For "Physical and life sciences & technologies" graduates, the male proportion is 10 percentage points higher than their female counterparts. For the rest of the categories, the distribution leans more towards female graduates, especially in "Education," with three-quarters of graduates being female.

Table 16: Total Number of Graduates in NB by Field of Study & Gender (University), Pooled 2010 - 2018

Field of Study	Male	% Male	Female	% Female
Education	1,282	26%	3,571	74%
Social sciences & law	1,811	33%	3,695	67%
Business, management & public admin	3,630	50%	3,616	50%
Physical & life sciences & tech	1,968	55%	1,626	45%
Architecture, engineering, & related tech	2,839	82%	626	18%
Health & related fields	1,180	20%	4,653	80%
Other	1,672	39%	2,602	61%

NOTE: "Unknown" gender category is dropped from the sample, thus sample size by gender is not equal to the sample size in the rest of the study.

In the case of college graduates, several fields of study exhibit a higher ratio of females to males, with 2 noteworthy exceptions (see Table 17). The groups of "Physical and life sciences & technologies" and "Architecture, engineering and related technologies" are mostly comprised of male graduates: 79% and 91%, respectively.

Significantly, there is a high proportion of Non-NB residents in "Physical and life sciences & technologies." Most graduates in "Architecture, engineering and related technologies" are NB residents. Thus, the combination of higher male representation and significant Non-NB residents may have contributed to the lower retention rates of "Physical and life sciences & technologies" graduates in Table 14.

Table 17: Total Number of Graduates in NB by Field of Study & Gender (College), Pooled 2010 - 2018

Field of Study	Male	% Male	Female	% Female
Education	12	13%	79	87%
Social sciences & law	40	8%	454	92%
Business, management & public admin	465	33%	958	67%
Physical & life sciences & tech	391	79%	104	21%
Architecture, engineering, & related tech	2,201	91%	210	9%
Health & related fields	84	8%	931	92%
Other	510	50%	503	50%

NOTE: "Unknown" gender category is dropped from the sample, thus sample size by gender is not equal to the sample size in the rest of the study.

1-Year Retention Rates

College

University

Figure 11 shows that the difference between female and male retention within each field of study is not very significant. The biggest difference is among "Business, management & public administration" students, for whom the female retention rate is 5 percentage points higher than male retention.

Figure 11: 1-Year Retention Rates of Graduates by Field of Study & Gender (University), Pooled 2010 - 2018

NOTE: "Unknown" gender category is dropped from the sample, thus sample size by gender is not equal to the sample size in the rest of the study.

3-Year Retention Rates

<u>University</u>

The comparisons between retention rates for male and female students are similar to 1-year estimates (Figure 12). Like the 1-year retention rate, the 3-year retention rate for female graduates in "Business, management & public administration" is 5 percentage points greater than for male graduates.

Figure 12: 3-Year Retention Rates of Graduates by Field of Study & Gender (University), Pooled 2010 - 2016
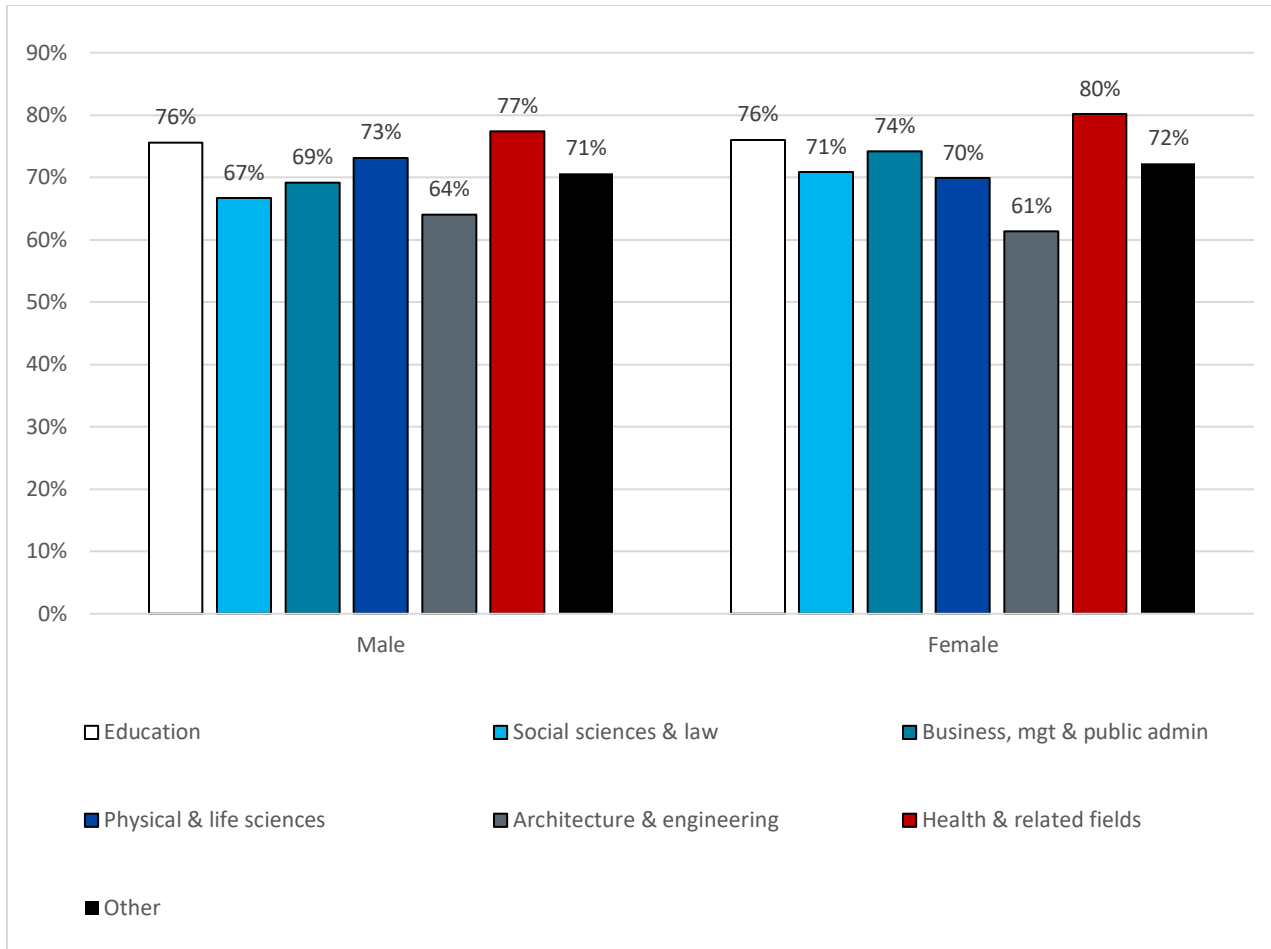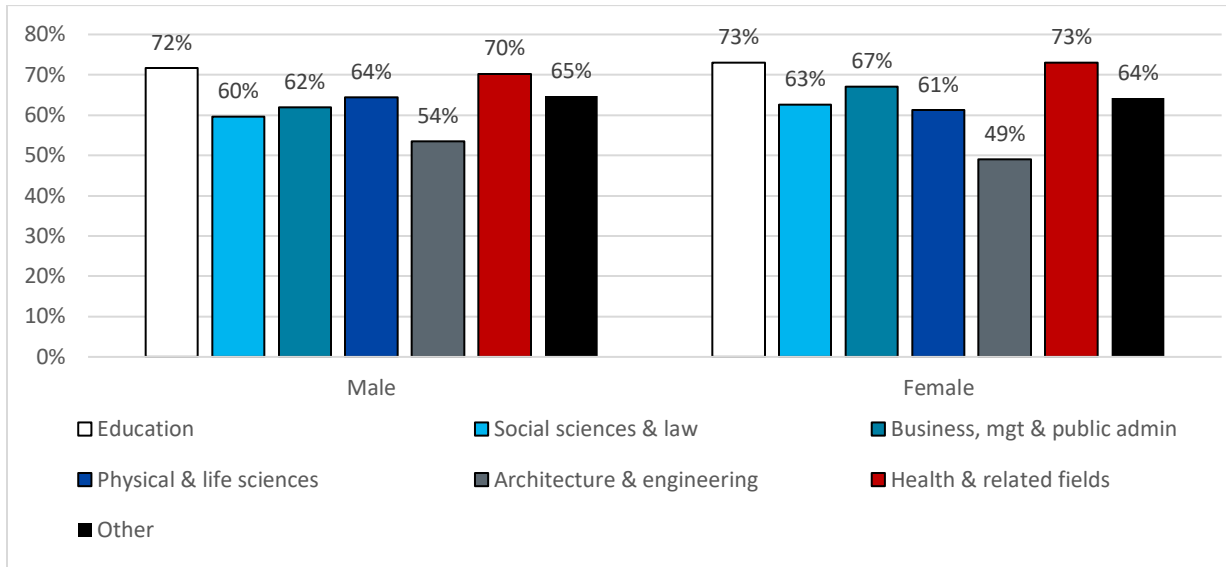

NOTE: "Unknown" gender category is dropped from the sample, thus sample size by gender is not equal to the sample size in the rest of the study.

These findings indicate that, generally, female graduates are marginally less likely out-migrate.

By Nursing & Other Health-Related Fields

Graduate retention among health-related fields of study is of particular interest in New Brunswick, given the shortage of nurses in the province and increased investment and incentives from government to address this problem.

To shed light on the current situation in relation to nursing graduate retention, this section breaks down "Health & related fields" into "Nursing" and "Other" categories for universities (UNB and UdeM) and college graduates. "Other" categories include university degrees such as a Bachelor of Kinesiology, Health Sciences, and other non-nursing health fields. For college graduates, the "Other" category consists of programs such as Personal Support Worker, Acute Care, and other non-nursing programs. Humber College graduates have been removed from this section (see "Data and Methodology"). Due to disclosure requirements, the rates for UdeM are pooled together for 1-year retention (2010-2018) and 3-year retention (2010-2016) rates.

Counts

University

For UNB, the number of individuals graduating with Bachelor of Nursing degrees has been consistently higher than those with other health degrees, such as Kinesiology. However, more UdeM graduates have held other health degrees over the years (see Table 18).

Table 18: Total Number of Graduates in NB by Health-Related Fields: UNB & UdeM

Graduation Year	UNB		UdeM	
	Nursing	Other	Nursing	Other
2010	220	131	122	149
2011	231	151	123	134
2012	236	154	138	160
2013	240	168	131	173
2014	229	165	80	183
2015	237	185	102	169
2016	222	173	112	135
2017	200	178	100	139
2018	155	141	86	181

Note: The number of Health-related fields' graduates across these categories has some discrepancy compared to publicly available data because of the different datasets and methodology used.

College

In the case of colleges, Table 19 shows that about twice as many individuals graduate with other health-related diplomas than those with nursing diplomas (i.e. Licensed Practical Nurses).

Table 19: Total Number of Graduates in NB by Health-Related Fields (College)

Graduation Year	Nursing	Other
2017	190	362
2018	147	316

1-Year Retention Rates

University

The overall 1-year retention rate for nursing graduates from UNB is 74%, whereas about 71% of graduates in other health-related fields remain in the province 1 year after graduation (see Table 20). Similarly, Table 21 shows that UdeM nursing graduates are more likely to be retained, with 1-year retention rates of 92% and 87%, respectively.

Table 20: 1-Year Retention Rates of Graduates in NB by Health-Related Fields – UNB

Graduation Year	Nursing	Other
2010	69%	63%
2011	76%	71%
2012	65%	75%
2013	60%	71%
2014	71%	78%
2015	79%	69%
2016	79%	64%
2017	89%	75%
2018	85%	75%

Table 21: 1-Year Retention Rates (Pooled 2010-2018) of Graduates in NB by Health-Related Fields – UdeM

Graduation Year	Nursing	Other
Pooled (2010-2018)	92%	87%

Note: Data has been pooled across years, as small counts precluded disclosure by year.

<u>College</u>

1-year retention rates for graduates with nursing and other health-related diplomas are over 90%. This is likely due to the fairly high distribution of local students in colleges (Figure 13).

Figure 13: 1-Year Retention Rates of Graduates by Health-Related Fields (College)
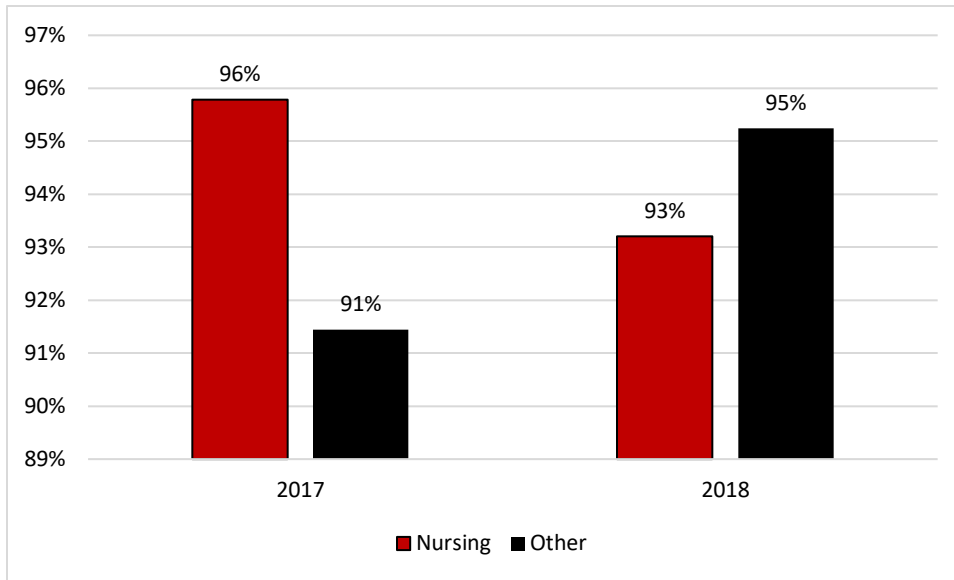
3-Year Retention Rates

University

Overall, the 3-year retention rate for graduates with Bachelor of Nursing degrees from UNB is 66% in Table 22. Over 62% of individuals in other health-related fields (UNB) remain in the province after 3 years. In the case of UdeM, 87% of nursing graduates are retained after 3 years, while 82% of graduates in other health-related fields are retained (see Table 23) .

Table 22: 3-Year Retention Rates of Graduates in NB by Health-Related Fields – UNB

Graduation Year	Nursing	Other
2010	64%	53%
2011	68%	60%
2012	60%	63%
2013	56%	66%
2014	66%	68%
2015	73%	65%
2016	74%	60%

Table 23: 3-Year Retention Rate (Pooled 2010-2016) of Graduates in NB by Health-Related Fields – UdeM

Graduation Year	Nursing	Other
Pooled (2010-2016)	87%	82%

Note: Data has been pooled across years, as small counts precluded disclosure by year.

By Health-Related Fields & Previous Residence

This section provides distributions of graduates in health-related fields by previous residence. Due to disclosure requirements, the categories of Out of Province and Out of Country are combined into Non-NB category, and all the years are pooled together for 1-year retention (2010-2018) and 3-year retention (2010-2016) rates. For college graduates, 1-year retention rates by health-related fields and previous residence have been excluded due to small counts. Like the previous section, this section excludes Humber College data.

Counts

University

Table 24 shows that the majority of UNB nursing graduates are from NB (81%), while the other 19% are Non-NB graduates (Out of Province + Out of Country). Around 67% of graduates in other health-related degrees from UNB have indicated NB as their previous residence.

Table 24: Number of Health Graduates by Previous Residence (UNB: 2010-2018)

Previous Residence	Nursing	Other
NB	1,604	974
Out of Province	353	407
Out of Country	13	65

Note: Data has been pooled across years, as small counts precluded disclosure by year.

Out of all nursing graduates from UdeM, 93% are from the province, while Out of Province and Out of Country graduates constitute 3% and 4%, respectively. Approximately 88% of graduates in other health-related fields are from NB, followed by 9% for Out of Province and 3% for Out of Country (see Table 25).

Table 25: Number of Health Graduates by Previous Residence (UdeM: 2010-2018)

Previous Residence	Nursing	Other
NB	928	1,252
Out of Province	29	128
Out of Country	37	43

Note: Data has been pooled across years, as small counts precluded disclosure by year.

College

For college graduates in health-related fields, over 90% of graduates in both nursing and other categories are from NB (Table 26).

Table 26: Number of Health Graduates by Previous Residence (College: 2017-2018)

Previous Residence	Nursing	Other
New Brunswick	324	639
Out of Province	6	20
Out of Country	7	19

1-Year Retention Rates

University

UNB health graduates from NB exhibit higher retention rates than Non-NB (Out of Province + Out of Country) graduates in both nursing and other degree categories in Table 27. However, it appears that over half of the Non-NB (Out of Province + Out of Country) individuals in nursing remain in the province 1 year after graduation, as opposed to 37% in other health-related degrees.

Table 27: 1-Year Retention Rates of Health Graduates by Previous Residence (UNB: 2010-2018)

Previous Residence	Nursing	Other
NB	79%	88%
Non-NB	51%	37%

Note: Non-NB is Out of Province + Out of Country. Data has been pooled aross years, as small counts precluded disclosure by year.

In the case of UdeM (Table 28), both nursing and other health-related graduates from NB exhibit 1-year retention rates of around 94%. Similar to UNB, more Non-NB nursing graduates (56%) are retained compared to individials in other health-related fields (31%).

Table 28: 1-Year Retention Rates of Health Graduates by Previous Residence (UdeM: 2010-2018)

Previous Residence	Nursing	Other
NB	94%	95%
Non-NB	56%	31%

Note: Non-NB is Out of Province + Out of Country. Data has been pooled across years, as small counts precluded disclosure by year.

3-Year Retention Rates

University

Overall, the 3-year retention rate for UNB graduates with Bachelor of Nursing degrees is 71% (Table 29). About 77% of individuals in other health-related fields remain in the province after 3 years.

Table 29: 3-Year Retention Rates of Health Graduates by Previous Residence (UNB: 2010-2016)

Previous Residence	Nursing	Other
NB	71%	77%
Non-NB	44%	34%

Note: Non-NB is Out of Province + Out of Country. Data has been pooled aross years, as small counts precluded disclosure by year.

After 3 years, the majority (approximately 90%) of UdeM graduates in nursing and other categories who identify NB as their previous residence remain in the province. Almost half of those with Bachelor of Nursing degrees but not from the province (Out of Province + Out of Country) are retained 3 years after graduation.

Table 30: 3-Year Retention Rates of Health Graduates by Previous Residence (UdeM: 2010-2016)

Previous Residence	Nursing	Other
NB	89%	89%
Non-NB	47%	27%

Note: Non-NB is Out of Province + Out of Country. Data has been pooled across years, as small counts precluded disclosure by year.

By Level of Education

This section presents estimates by level of education divided into undergraduate, postgraduate, and college categories. Any certificate or diploma holders from universities are included under the undergraduate category for the purpose of disclosure requirements.

Counts

The jump in undergraduate numbers from 2014 onwards is due to the inclusion of MTA and STU students. However, it is not reflected in the postgraduate category, as STU does not offer postgraduate programs and MTA only has a few postgraduate students.

Table 31: Total Number of Graduates in NB by Level of Education

Graduation Year	Undergraduate*	Postgraduate	College
2010	3,062	584	
2011	3,092	590	
2012	2,804	751	
2013	2,900	712	
2014	3,924	757	
2015	3,970	702	
2016	3,891	663	
2017	3,757	675	3,460
2018	3,539	643	3,482

*Undergraduates include certificate and diploma holders from universities.

1-Year Retention Rates

Even though the number of undergraduate students is much higher than postgraduate students, the overall 1-year retention rates are quite similar: 68% and 67%, respectively (Figure 14). More than 90% of college graduates are retained in NB 1 year after graduation.

Figure 14: 1-Year Retention Rates of Graduates by Level of Education
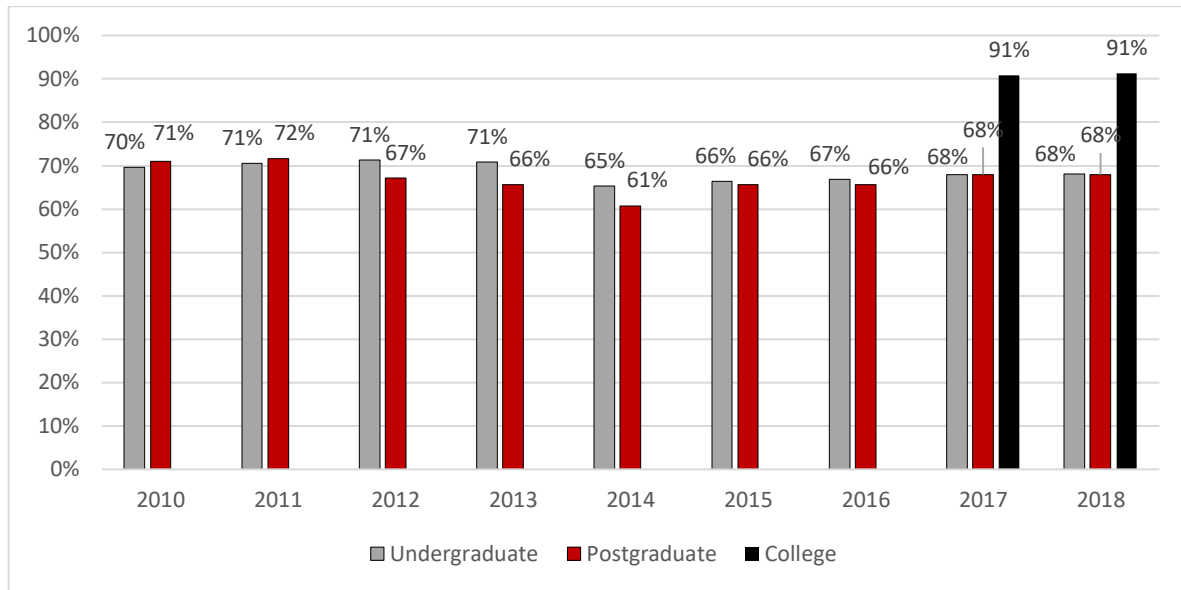
*Undergraduates include certificate and diploma holders from universities.

3-Year Retention Rates

As expected, 3-year retention rates drop in comparison for both undergraduate (55%) and postgraduate (58%) students. The trajectory of retention over the years is quite steady for these categories, with bit of a decline since 2014, which perhaps can be attributed to the presence of MTA and STU graduates in the data.

Figure 15: 3-Year Retention Rates of Graduates by Level of Education
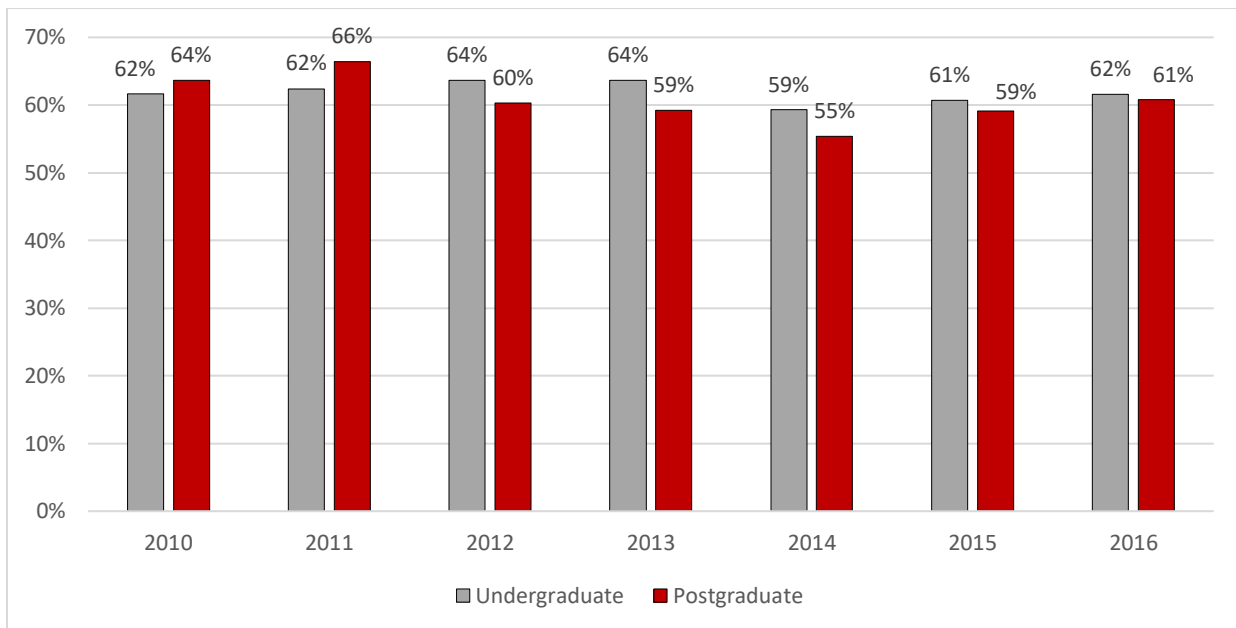
*Undergraduates include certificate and diploma holders from universities.

By Educational Institution

The tables and figures in this section estimate the number of graduates and retention rates by institution. First, only undergraduate students for each institution are presented, followed by the presentation of all graduates by institution. This section also presents the distribution of graduates in each institution by their previous residence.

Counts

Undergraduate-Only Students, by Institution

Table 32 reveals that UNB has the highest number of undergraduates among all universities in NB, with graduating numbers ranging from 1,800-2,000 annually. Certificate and diploma holders from universities have been combined with undergraduate degree holders due to disclosure issues. Based on MPHEC data, the proportion of certificate and diploma holders is less than 5% for most years and most institutions.

Table 32: Total Number of Graduates in NB by Educational Institution (Undergraduate-Only* Students)

Graduation Year	UNB	UdeM
2010	2,146	916
2011	2,142	950
2012	1,867	937
2013	1,893	1,007
2014	1,987	893
2015	2,018	940
2016	1,995	902
2017	1,959	855
2018	1,914	794

*Undergraduates include certificate and diploma holders from universities. These have been combined due to small counts in retention for university certificate and diploma holders.

All Graduates, by Institution

UNB continues to have the largest number of graduates when all categories are considered across all post-secondary institutions in the province (see Table 33). After the colleges (NBCC & NBCCD and CCNB), UdeM is the next largest institution in terms of number of graduates per year. The number of graduates in Table 33 is larger than the number in Table 32 because it accounts for all graduates (undergraduates and postgraduates), rather than undergraduates only.

Table 33: Total Number of Graduates in NB by Educational Institution (All Graduates)

Graduation Year	UNB	UdeM	STU	MTA	NBCC & NBCCD	CCNB
2010	2,573	1,073				
2011	2,600	1,082				
2012	2,446	1,109				
2013	2,471	1,141				
2014	2,624	1,010	521	526		
2015	2,579	1,077	567	449		
2016	2,521	1,035	511	487		
2017	2,501	986	506	439	2,160	1,300
2018	2,413	935	412	422	2,303	1,179

Table 34 (below) exhibits the proportion of students in each institution according to their previous residence. The majority of college graduates are from NB (over 94% for NBCC & NBCCD and 81% for CCNB).

Over half of MTA graduates are from Out of Province, and in total there are about 62% of Non-NB (i.e. Out of Province and Out of Country) graduates from MTA. One-quarter (25%) of UNB graduates are from Out of Province, and Out of Country graduates constitute about 17% of the institute's graduates. Meanwhile, about 20% of UdeM graduates are not from NB, which is the lowest proportion among all universities in NB.

This distribution of graduates by their previous residence likely has an impact on retention rates in the following statistics. However, while a large percentage of Out of Province graduates (i.e. at UNB) may sometimes explain low retention rates, it also shows that NB institutions are educating the students of other provinces, which is a positive thing.

Table 34: Distribution of Graduates in NB by Educational Institution (All Graduates) & Previous Residence

Institution	New Brunswick	Out of Province	Out of Country	% Out of Province	% Out of Country
UNB	13,240	5,729	3,759	25%	17%
UdeM	7,533	673	1,242	7%	13%
STU	1,781	153	43	21%	5%
MTA	891	1,236	196	53%	8%
NBCC & NBCCD	4,183	103	177	2%	4%
CCNB	2,017	98	364	4%	15%

1-Year Retention Rates

Undergraduate-Only Students, by Institution

Among the post-secondary institutions that offer at least undergraduate degrees, UdeM exhibits the highest retention rates, with 84% of the graduates retained after 1 year (see Table 35). Along with having a higher ratio of local students compared to other universities, UdeM is a French university, and Francophones have a lower likelihood of outmigration compared to others (see Emery et al., 2019). For UNB undergraduates, the 1-year retention rate is 63% overall.

Table 35: 1-Year Retention Rates of Graduates by Educational Institution (Undergraduate-Only* Students)

Graduation Year	UNB	UdeM
2010	63%	85%
2011	63%	87%
2012	64%	86%
2013	64%	83%
2014	62%	83%
2015	63%	82%
2016	63%	82%
2017	64%	84%
2018	65%	87%

*Undergraduates include certificate and diploma holders from universities.

Institutions, All Levels

Colleges exhibit the highest 1-year retention rates among all post-secondary institutions in NB, with about 94% of NBCC & NBCCD and 85% of CCNB graduates remaining in NB after 1 year (Table 36). STU graduates are also comprised of a significant portion of NB residents, and the overall 1-year retention rate of STU undergraduates is the second highest, at 75%. In comparison, less than half of MTA graduates (42%) remain in the province 1 year after graduation.

Table 36: 1-Year Retention Rates of Graduates by Educational Institution (All Graduates)

Graduation Year	UNB	UdeM	STU	MTA	NBCC & NBCCD	CCNB
2010	64%	84%				
2011	64%	86%				
2012	64%	84%				
2013	64%	83%				
2014	61%	83%	72%	40%		
2015	62%	82%	74%	43%		
2016	63%	81%	76%	43%		
2017	64%	83%	76%	44%	94%	85%
2018	64%	86%	78%	41%	94%	85%

3-Year Retention Rates

Undergraduate-Only Students, by Institution

Figure 16 shows that, 3 years after graduation, about 56% of UNB undergraduates remain. The 3-year retention rates for graduates from STU and UdeM are higher, at 65% and 78%, respectively.

Figure 16: 3-Year Retention Rates of Graduates by Educational Institution (Undergraduate-Only* Students)
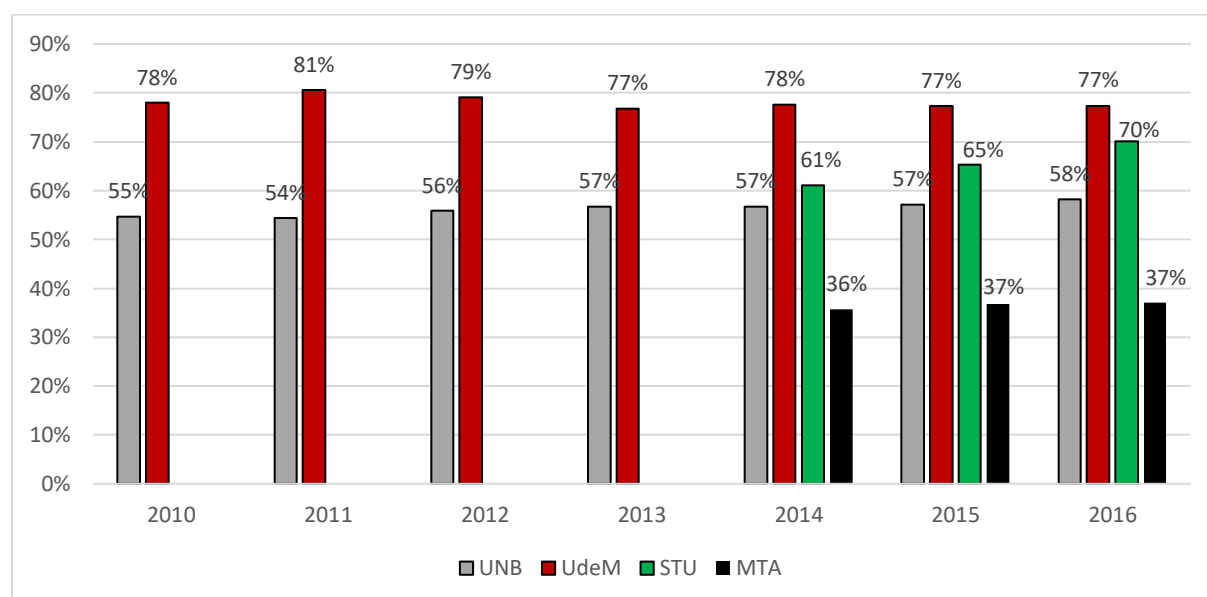
*Undergraduates include certificate and diploma holders from universities.

Institutions: All Levels

The findings presented in Figure 17 below (All Graduates) are very similar to the those in Figure 15 (Undergraduates Only). The 3-year retention rate for MTA graduates is below 40%, while UdeM exhibits the highest rates with an overall 3-year retention of 77%.

Figure 17: 3-Year Retention Rates of Graduates by Educational Institution (All Graduates)
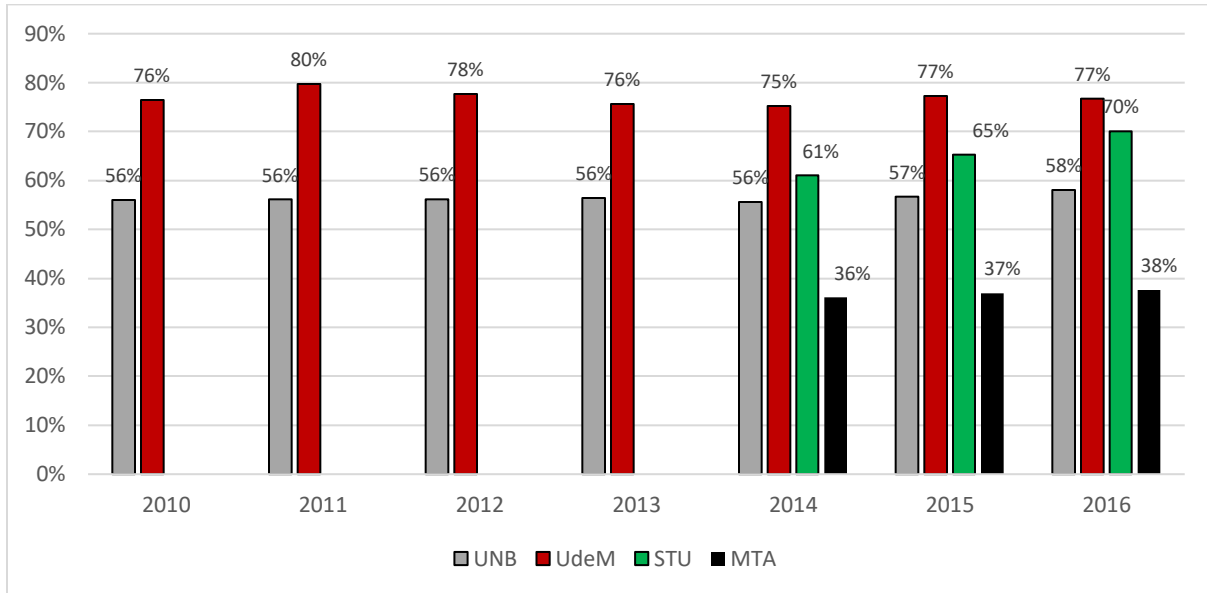
The descriptive statistics in this section further reinforce the notion that the previous residence of graduates plays a significant role in retention rates.

DISCUSSION OF FINDINGS

The objective of this report is to measure the retention rates of graduates from different publicly funded post-secondary institutions in NB. Results are broken down by educational institution, year of graduation, gender, immigrant status, level of education, field of study, and previous residence.

Overall, we find that college graduates have a higher retention rate (1-year retention of 91%) than university graduates (1-year retention of 67%).

Among both college and university graduates, those who were originally from NB before pursuing post-secondary education appear the most likely to remain in NB after graduating. That being said, in recent years the retention rates for Out of Country students have been increasing.

Females have higher retention rates than males, and graduates from UdeM have the highest university retention rates, while graduates from MTA have the lowest.

These key findings are discussed in more detail, and with commentary on their implications, in the subsections below.

University vs Community College

The results of this study may initially seem to imply that university graduates in NB are far less likely to remain in the province as opposed to college graduates, and the comparative findings throughout the paper are quite consistent.

This is not unique to NB, as individuals with higher levels of education are more likely to be geographically mobile in terms of the labour market (Machin et al., 2012; Malamud & Wozniak, 2012). One of the reasons why university graduates move away could be that they are unable to find local employment meeting their expected wage demands (Costa and Kahn, 2000; Davis & Dingel, 2019; Lkhagvasuren, 2014; Wheeler, 2001). University graduates are more spatially integrated in terms of the labour market, meaning they are more versatile in terms of skills and can find employment that better matches their expertise and wage demands elsewhere (Amior, 2019).

Results from 2017 and 2018 (Figures 6 and 7) show that in general the 1-year retention rate for college graduates is about 5 percentage points higher than for university graduates, regardless of previous residence. This difference should be interpreted with caution, as retention can be seen as a "bi-polar" concept in which higher retention could be either positive or negative depending on the rationale.

On the one hand, the nature of community college training may be more in line with local and provincial needs, and that may contribute to higher retention. On the other hand, higher retention may also indicate that skills gained had little market value elsewhere, as graduates failed to find employers (outside NB) who would pay them high enough wages to influence a decision to relocate.

It could also be the case that college graduates settled for other jobs in the province, as there was perhaps little difference between the job they were trained for in terms of wages or conditions in other jurisdictions and the jobs they settled for in NB. At the same time, lower retention rates for university graduates could imply that they are more versatile in terms of skills and are therefore in higher demand.

The composition of students in terms of previous residence largely explains the difference in retention rates between college and university graduates. Community colleges mostly consist of graduates who are originally from NB. Meanwhile, a significant proportion of university graduates are not from the province. When retention rates are disaggregated by previous residence, 1-year rates for NB residents who graduated from universities reaches over 90%.

Previous Residence/Student Status

As suggested in the paragraph above, we find that one of the significant factors affecting retention in NB is the previous residence of graduates.

Graduates who lived in NB before pursuing post-secondary education are more likely to stay in NB after graduating. This is certainly not surprising, and it is quite natural to expect higher retention rates among graduates who were already living in the province, given the family and social ties they likely developed over the years. Conversely, by the same logic, lower retention rates are expected from domestic graduates from Out of Province because of their similar ties to their home province. By this reasoning, unless there are other motivations, such as economic incentives in terms of employment, Out of Province graduates are more likely to leave NB and return to their home provinces.

Out of Country (international) graduates exhibit lower retention rates than NB residents. The migration decisions of international students could perhaps be due to a combination of 2 factors: (i) the availability/existence of compatriot communities and (ii) employment opportunities.

For instance, on the one hand, Haan and Prokopenko (2016) find that a large proportion of immigrants move to Ontario from other provinces with smaller immigrant populations. Krahn et al. (2003) also indicate that interprovincial migration often arises from immigrants moving to the urban centres of Montreal, Toronto, and Vancouver in search of compatriot communities.

On the other hand, Akbari and Sun (2006) find evidence that immigrants in Atlantic Canada choose to settle in smaller areas if they can secure employment and if an existing immigrant population exists. Likewise, Krahn et al. (2003) find that employment opportunities were among the most important factors contributing to the retention of refugee newcomers in Alberta.

An interesting observation in this report is that there is a spike in the retention of international graduates from 2017 onwards. In 2016, the 1-year retention rate for international students is 32%, but in 2017 and 2018 retention rates rose to 39% and 41%, respectively.[9] This spike could be related to the implementation of new incentives to encourage international graduates to stay.

In March 2017, the Atlantic Immigration Pilot Program (AIPP) was introduced. AIPP helps employers in Atlantic Canada hire foreign skilled workers who want to immigrate to Atlantic Canada, as well as international graduates who want to stay in Atlantic Canada after they graduate. Other employment programs aimed at international graduates such as Atlantic Canada Study and Stay™ – New Brunswick could also be impacting the retention of international graduates.

Another policy component that may have improved the retention rates of international students was introduced in October 2017, making international students eligible to apply for NB Medicare. This means that as of October 2017, more international graduates could be matched

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[9] In comparison, Galarneau et al. (2017) find that more than 50% of international graduates stayed in the Maritimes 1
 year after graduating.

with the Citizen Database and could therefore be identified as retained in NB. In previous years, unmatched individuals (i.e. those without Medicare information) were assumed to have left NB even if they stayed in the province for more than a year, resulting in lower retention rates for international students. The extent to which Medicare played a role in increasing retention rates due to improved data matching is yet to be examined and is currently beyond the scope of this study.

While the retention rates of Out of Country and Out of Province graduates are lower than those of NB residents, one factor that should be considered is the economic value these groups of students bring to NB. International students, while less likely to remain in the province, pay greater tuition amounts and also spend money supporting the local economy. In addition to a greater probability of immigrating to NB over those who have never been to the province, international students also make educational institutions more cosmopolitan, bringing different exposures and experiences to the NB post-secondary education system.

Male vs Female and Field of Study

Year-to-year comparisons in this report show that female retention rates (71% overall) are either higher than or equal to male retention rates (69% overall%). Notably, these statistics are similar to those presented by Galarneau et al. in a 2017 Statistics Canada report, with similar rates for females and somewhat higher rates for males.

These findings are not surprising, given previous literature that investigates mobility decisions by gender. Birchall (2016) suggests that an individual's characteristics shape every stage of his/her migration decisions and that men are more mobile compared to women. Results from Emery et al. (2019) also show that NB males have higher rates of moving out of the province, while females show lower rates.

In this report, we break down graduate retention rates by gender and then break them down further by field of study. The difference in 1-year and 3-year retention rates by gender is within 5 percentage points for all fields of study. However, the distribution of male graduates (82%) in "Architecture and Engineering" is significantly higher than female students (18%), while the opposite is true in the case of "Education" (74% female, 26% male) and Health (80% female, 20% male).

When 3-year retention rates are broken down only by field of study, "Architecture and Engineering" categories tend to have the lowest retention rates for most years, while the "Other" category (which consists of Humanities, Visual Arts, and Agriculture) tends to have higher retention rates.

It is possible that the lower retention rates of Architecture and Engineering graduates could reflect the greater versatility of these graduates' skills compared to graduates of the Humanities. Nonetheless, these retention rates by field of study should be interpreted with caution, as some relatively unrelated fields (i.e. Humanities, Visual Arts, Agriculture) were grouped to avoid disclosure issues.

Educational Institutions

Results show that UdeM has the highest retention rate of the universities, with around 84% of its graduates retained after 1 year and 77% retained after 3 years.

The composition of graduates by previous residence is likely an influential factor here, as only 20% of UdeM graduates are from outside NB. Another element at play could be UdeM's status as a French language institution, suggesting that most UdeM graduates are likely Francophones.

Due to lower language barriers, Anglophones have historically been more mobile in Canada relative to their Francophone counterparts. For instance, Emery et al. (2019) show that both unilingual and bilingual Francophone men and women in NB were significantly less likely to emigrate from the province between 2001 and 2016 than unilingual and bilingual English New Brunswickers.

MTA has the lowest retention rate of the universities, with a 1-year retention of less than 50% and 3-year retention of less than 40%. MTA has a significant proportion of students who are not originally from NB – the highest of the NB universities. Thus, the composition of MTA graduates in terms of previous residence likely plays a large part in its lower graduate retention rates.

Similarity with Other Studies

Our report finds that university graduates have an overall 1-year retention rate of 68%, whereas college graduates have a retention rate of 91%. This finding and the results detailed above are similar to those of previous studies, despite differences in data and methodology, which suggests again that the findings are robust.

As mentioned in the earlier literature review, MPHEC (2018) survey data shows a 2-year retention rate of 57% for NB university graduates.[10] Meanwhile, in Galarneau et al. (2017), calculations using linked income tax data show a 1-year retention rate of ~70% for Maritime university graduates. Finally, a forthcoming NB-IRDT (Boco et al., 2020) report using matched administrative data shows a same-year retention rate of 78% and 2-year retention rate of 72% for NB graduates (university and college graduates combined). While these rates are lower than the rates we calculated, Boco et al.'s examination of NB residents finds retention rates of 92% and 84%, respectively, which are higher, putting our findings within the range of their outcomes.

Consistent across the literature is the finding that graduates' previous residence is the most important determinant of retention.

According to MPHEC (2018), 74% of New Brunswickers reside in the province 2 years after graduation, and Galarneau et al. (2017) show that about 80% of Maritimers stay in the Maritimes 1 year after graduation. Boco et al. (2020) show that students residing in NB prior to admission are most likely to remain in the province, averaging a 92% retention rate in the graduation year and 84% 2 years later.

In this report, we find that about 89% of previous NB residents remain 1 year after graduation, followed by 30% retention for Out of Province graduates and 34% for Out of Country graduates. The discrepancy in overall retention rates between universities and community colleges is likely because most graduates from community colleges are originally from NB, whereas a large proportion of university graduates are Out of Province or international students.

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[10] These results are based on survey responses from a sample of the class of 2014. It should also be noted that the MPHEC study (2018) does not differentiate between international and Out of Province domestic students.

Galarneau et al. (2017) find that international students have a 1-year retention rate of about 50%, and Boco et al. (2020) also find that about 50% of international graduates remain in NB by the end of their graduation year, and 35% remain 2 years later.

This report finds that the 1-year retention rate for international university students is about 35%, and the 3-year rate is about 25%.

Galarneau et al. (2017) find the 1-year retention rate to be about 15% for domestic students not from the Maritimes. Boco et al. (2020) show the retention rate is about 18% for those NB graduates previously residing in Nova Scotia and about 10% for those previously residing in Ontario. MPHEC (2018) results show 4% of non-Maritime graduates from NB universities remained in NB 2 years after graduation.

In comparison, this report shows that the 1-year retention rate for Out of Province (domestic) students is about 30% whereas the 3-year rate is about 28%.

It is important to note that, for all the results discussed above, Galarneau et al. (2017) look at retention rates for the Maritimes as a whole, and their results cover all 3 provinces. As it is possible a fair number of NB graduates may go to NS for work opportunities or further study, it is not surprising that Galarneau et al.'s Maritime retention rates differ from ours.

In a similar manner, differences between our results and MPHEC (2018) results on certain measures are to be expected. For instance, MPHEC's estimate of a 2-year retention rate of 4% for non-Maritime graduates from NB universities is much, much lower than our findings for 1-year retention rates of Out of Province university and college graduates (30% and 27%, respectively). Our results are likely much higher because we classify graduates from neighbouring Maritime provinces as Out of Province graduates, and we would expect that a large proportion of retained Out of Province graduates in NB are from Prince Edward Island and Nova Scotia.

Given that the methodology is different across each study,[11] it is possible that the samples of Out of Country and Out of Province students are also different. For instance both Galarneau et al. (2017) and Boco et al. (2020) use tax data to identify individuals residing in different locations, whereas this study uses Medicare information, which is present regardless of whether individuals are paying taxes or not – and as such, the different samples and time periods used across the studies could potentially explain the variation in numbers, where such variation exists.

MPHEC (2018) based its results on the graduating classes of 1999, 2003, 2007, 2012, and 2014, whereas Galarneau et al. (2017) combined 6 cohorts of graduates (classes of 2006-2011) and presented results for the all Maritime provinces as a whole. Retention numbers by Boco et al. (2020) were based on graduates who filed taxes and measured retention until 2016.

Unlike the previous work on student retention, this report presents results by different educational institutions and by year until 2018, utilizing a larger sample size, longer study period, and more accurate method of identifying location than the previous studies.

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[11] For information on methodological differences, see the Literature Review in the Introduction to this report.

Limitations

This report assumes that graduates without Medicare information have left the province. However, due to technical reasons such as inconsistency in naming and birthdates, a portion of individuals could not be matched with Medicare information. This means that these groups of individuals, while still residing in NB, are assumed to have left the province. As such, retention rates are likely understated and may be higher than presented.

We attempt to account for unmatched graduates by identifying what proportion of individuals are unmatched due to technical errors and what proportion are unmatched due to not having Medicare (either being from a different province or being an international student) based on the graduates' previous residence. Results show that among the unmatched, about 12% of individuals are originally from NB, implying that 12% of individuals do not have Medicare information because of technical errors. The remaining 88% do not have Medicare information because they are either from a different province or they are international students.

Another limitation we face in this report is the inconsistency in time periods for which data is available. Analysis in this report only includes years for which the educational institutions collected 12 full months of data. As a result, this report excludes 2016 data for the community colleges, as not all months of data are available for these years.

Looking Forward

In subsequent phases of our analysis, we will evaluate the labour market outcomes of the graduates examined herein and will address questions such as the following:

- How much are these graduates earning?
- Are graduates working in the field(s) they were originally trained in?
- What are the economic returns to different disciplines?

Since the present analysis focuses on post-secondary graduates only, subsequent phases will compare retention rates for these individuals against 2 control groups.

The first control group is comprised of high school graduates who do not attend post-secondary education, which will be analyzed using report card data from Education and Early Childhood Development (EECD).

The second control group is comprised of individuals who enrolled in but did not complete credentials at an NB post-secondary institution.

Future reports will also compare how economic and retention outcomes differ between university and college graduates and those who have completed different apprenticeship and other labour market training programs.

While this report addresses whether graduates remained in NB after graduation, future research at NB-IRDT will expand on this topic to look at intra-provincial migration. While it is important for graduates to remain in NB, it is also important to know the retention of students locally within NB to see which region(s) may be more vulnerable so that better targeted policies can be implemented.

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