

## Economic Insights

# International Student Enrolment in Postsecondary Education Programs Prior to COVID-19

by Marc Frenette, Youjin Choi, and April Doreleyers

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# International Student Enrolment in Postsecondary Education Programs Prior to COVID-19

by Marc Frenette, Youjin Choi, and April Doreleyers

This *Economic Insights* article discusses the share of postsecondary enrolments that are international by program of study and source country. Given the ongoing uncertainties around the COVID-19 pandemic, including the new public health restrictions imposed on international travel and physical distancing guidelines affecting classroom structures, the share of enrolments in various academic programs that are international is of high relevance at the moment.

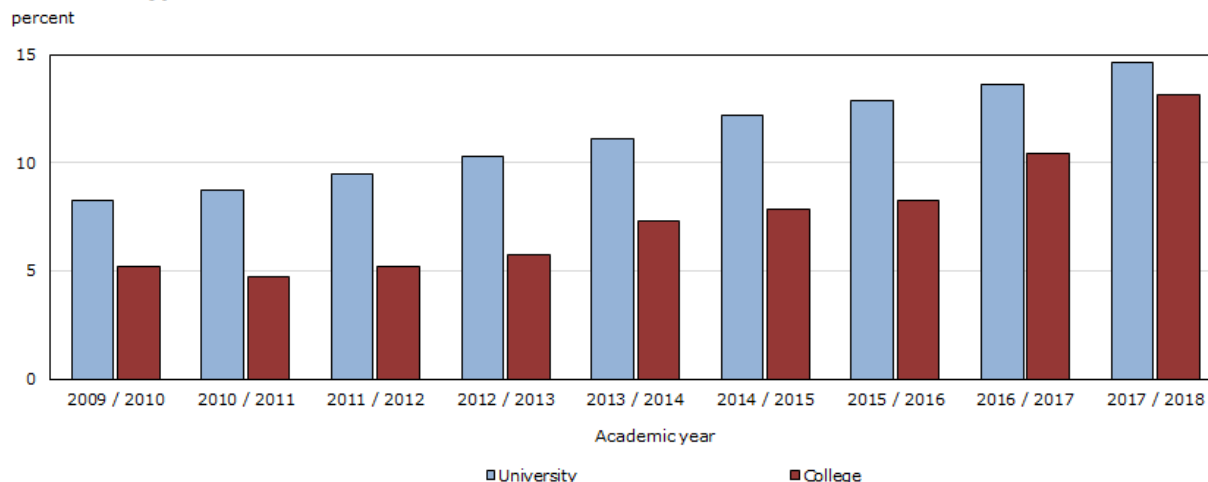
## Introduction

Postsecondary institutions have increasingly relied on tuition fee revenue in recent years. The gap between steadily increasing operating expenditures and stagnant provincial grants increased by \$5.9 billion between the 2007/2008 and 2016/2017 academic years (Usher, 2019). However, domestic tuition fees generally did not increase much beyond inflation during that period, and furthermore, domestic enrolment peaked midway through, perhaps due to demographic factors (Usher, 2019). Instead, colleges and universities increasingly relied on international tuition fee revenue, which increased by \$3.25 billion (55% of the increased gap) during the period (Usher, 2019). This was driven by a large increase in the share of total enrolment coming from international sources. At the university level, 14.7% of total enrolments in 2017/2018 were from international students—up from 8.2% in 2009/2010 (Chart 1). Similarly, the share of enrolment from international sources rose from 5.2% in 2009/2010 to 13.2% in 2017/2018 at the college level.<sup>1</sup>

1. The share of enrolments that were international also varied considerably by province. This was especially the case at the college level, where less than 1% of enrolments in Nova Scotia and Newfoundland and Labrador came from international students in 2017/2018, compared to 21.4% in Ontario. Among universities, the rate varied from 10.3% in Alberta to 21.7% in Prince Edward Island and 22.2% in British Columbia.

## International Student Enrolment in Postsecondary Education Programs Prior to COVID-19

**Chart 1**  
International students, as a percentage of enrolments, by academic year and institution type



Source: Postsecondary Student Information System.

The COVID-19 pandemic has created several uncertainties in many sectors of the economy, including postsecondary education. Public health directives, including physical distancing guidelines have placed limitations on the delivery of in-class learning, and may continue to do so over the course of the summer and falls terms, and possibly even beyond. If institutions must rely on virtual/online delivery of courses, some programs may be more affected than others. For example, students in sciences and engineering programs have laboratory requirements on campus and some arts students require a considerable amount of in-house time for studio work or music recitals. Students in education, medical, or nursing programs are often required to complete off-campus work placements that may not be possible due to COVID-19-related disruptions. International students may not be willing to risk studying in a different country if they feel that the quality of their education is in question. Moreover, international students may face potential challenges related to entering Canada given relevant public health measures such as travel restrictions and quarantine requirements.<sup>2</sup> Even if entering Canada is not necessary to begin or continue a program, some students may prefer in-class instruction over online learning, especially if in-class instruction is available in their own country. Students may also prefer to be closer to home during a pandemic to be with their loved ones, or simply because of the potential for class cancellations. All of these factors may result in reduced international demand for Canadian postsecondary education.

While individual postsecondary institutions collect data on international students and, thus, are aware of their own reliance on this source of enrolment and revenue, there is a need to compile national-level estimates on the detailed international composition of enrolments as relevant public health and immigration policy decisions evolve. These measures may affect the number of future graduates in key areas for innovation, such as STEM (Science, Technology, Engineering, and

2. At the time of this writing, individuals who have a valid international study permit or were approved for one on or prior to March 18, 2020 are exempt from current travel restrictions, but still have to pass health screenings before boarding flights and upon arrival. They are also required to have a plan to quarantine for the first 14 days in Canada. See <https://www.canada.ca/en/immigration-refugees-citizenship/services/coronavirus-covid19/visitors-foreign-workers-students.html#restrictions-students> for more details.

Mathematics), as well as the health care sector. Consequently, the extent to which the supply of these graduates is dependent on international student enrolment is also highly relevant for policy.

This study provides information on the share of total university and college enrolments from international students across field of study and source country. The study is based on the 2017/2018 Postsecondary Student Information System (PSIS), which contains enrolment data from almost all publically-funded postsecondary institutions in Canada. A very small number of institutions did not report on international students, and thus, are excluded from this study. Fields of study are categorized by the 2016 Classification of Instructional Program (CIP), most often into primary groupings.

While this is the first Canadian study reporting on the share of postsecondary enrolments from international sources by both field of study and source country, a small number of earlier studies examined international student enrolment by field of study (McMullen and Elias 2011; Statistics Canada 2016; Gardner Pinfold 2018) or by source country (The Association of Universities and Colleges of Canada 2011; Statistics Canada 2016; Gardner Pinfold 2018).

### **Almost one-third of Mathematics, Computer and Information Sciences enrolments were international**

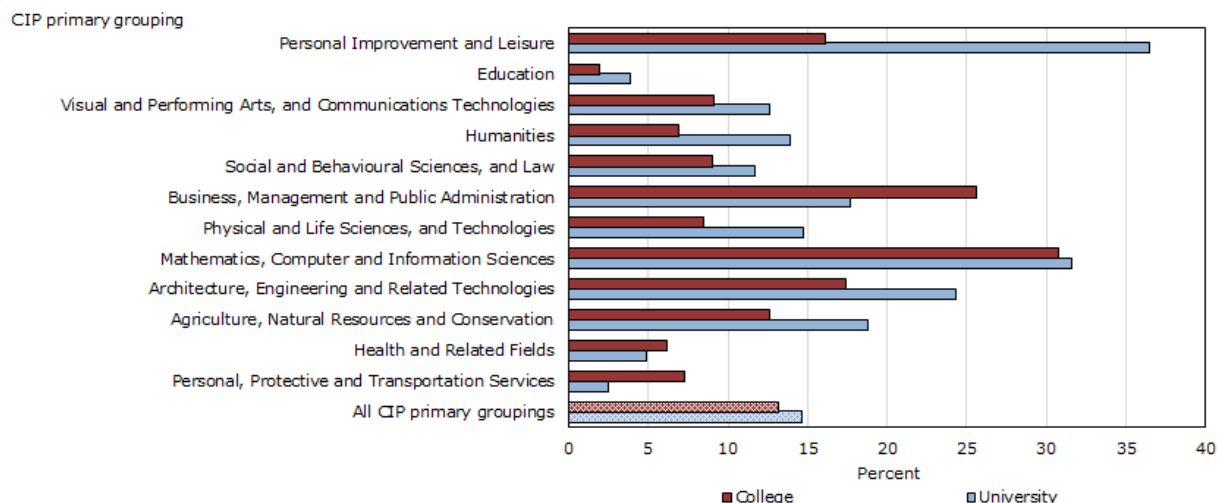
Certain academic programs relied heavily on international student enrolment in 2017/2018 (Chart 2). For example, almost one-third of enrolments in “Mathematics, Computer and Information Sciences” were international at both the college and university level (30.8% and 31.6%, respectively). At the university level, the more detailed programs<sup>3</sup> with the highest share of international enrolments included “Statistics” (49.5%), “Computational Science” (38.5%), “Mathematics” (37.4%), and “Applied Mathematics” (36.3%). In contrast, international enrolment was lower among library-related disciplines (e.g. only 8.2% of “Library Science and Administration” enrolments were international). At the college level, rates were highest in “Data Processing and Data Processing Technology/Technician” (65.2%), “Computer Programming” (40.0%), and “Computer and Information Sciences and Support Services, General” (37.2%).

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3. Based on four-digit 2011 CIP codes.

## International Student Enrolment in Postsecondary Education Programs Prior to COVID-19

**Chart 2**  
International students, as a percentage of 2017/2018 enrolments, by 2016 CIP primary grouping and institution type



**Note:** CIP = Classification of Instructional Programs.  
**Source:** Postsecondary Student Information System.

Other broad university programs with relatively high international student enrolment included “Architecture, Engineering and Related Technologies” (24.4%), “Agriculture, Natural Resources and Conservation” (18.8%), and “Business, Management and Public Administration” (17.7%).<sup>4</sup> International enrolment in college “Business, Management and Public Administration” and “Architecture, Engineering and Related Technologies” programs was also substantial (25.6% and 17.4%, respectively).

In contrast, international student enrolment was relatively low in several university and college programs. At the university level, the share of enrolment from international sources was lowest in “Personal, Protective and Transportation Services” (2.5%), followed by “Education” (3.9%) and “Health and Related Fields” (4.9%). Among college programs, rates were lowest in “Education” (1.9%), followed by “Health and Related Fields” (6.1%), “Humanities” (6.9%), and “Personal, Protective and Transportation Services” (7.3%).

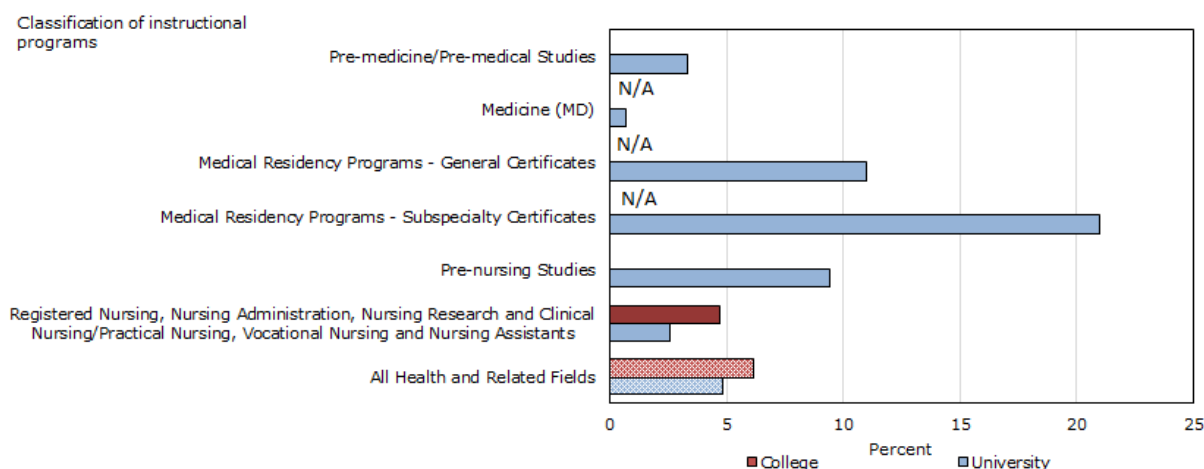
Certain programs may be less amenable to online delivery than others (e.g. those requiring laboratory work, artistic performances, or work terms). The results in Chart 2 showed that many of these programs, including “Education”, “Visual and Performing Arts, and Communications Technologies”, “Physical and Life Sciences, and Technologies”, “Agriculture, Natural Resources and Conservation”, and “Health and Related Fields”, generally did not rank very high with regards to international student enrolment. However, reliance on international enrolment was still notable in many of these programs (often over 10%). Moreover, “Architecture, Engineering and Related Technologies” ranked fairly high as a group, and laboratory work is expected (particularly among engineering students, where rates were particularly high—often over 30%).

4. Although more than one-third (36.5%) of enrolments in university Personal Improvement and Leisure programs are international, these programs comprise a very small portion of overall university enrolment (about 1 in 400).

## One in five medical residents in subspecialties were international students

Although university and college programs in “Health and Related Fields” relied very little on international enrolments overall, a relatively large share of medical residents were international students in 2017/2018. This was especially the case for those registered in “Medical Residency Programs – Subspecialty Certificates”, where one in five (21%) were international students (Chart 3). Among those registered in “Medical Residency Programs – General Certificates”, one in nine (11%) were international students. Although a relatively small share of enrolments in “Medicine (MD)” programs and “Pre-medicine/Pre-medical Studies” were from international sources (0.7% and 3.3%, respectively), all medical doctors must complete a medical residency in order to practice medicine. As such, the share of medical residents who were international students provides a more relevant measure of the internationalization of medical training in Canada.<sup>5</sup>

**Chart 3**  
International students, as a percentage of 2017/2018 enrolments, in selected  
categories of health and related fields, by institution type



**Note:** Four digit, 2016 CIP (Classification of Instructional Programs) are used. N/A = not applicable (there are no college enrolments in these programs).

**Source:** Postsecondary Student Information System.

In contrast to medical training, a smaller share of nursing-related enrolments were international. Only 2.6% and 4.7% of all enrolments in “Registered Nursing, Nursing Administration, Nursing Research” or “Clinical Nursing/Practical Nursing, Vocational Nursing and Nursing Assistants” at the university and college levels were from international sources, respectively. While a larger share of enrolments in “Pre-nursing Studies” at the university level were international (9.4%), international enrolments in “Pre-nursing Studies” at the college level were quite rare (accounting for approximately 0.0% of all enrolments).

5. Of course, there is no guarantee that international students who train to become doctors in Canada will remain in Canada to practice. Future research could shed light into this important issue.

## **China was the top source of international enrolments in most broad university program areas**

The mix of source countries behind international university enrolments varied considerably by the 2016 CIP primary grouping, but there is one constant: China was a key source country in all program areas in 2017/2018.<sup>6</sup> In fact, China topped all countries in 11 of the 12 program areas, coming in second in “Health and Related Fields”, just behind Saudi Arabia. One in six (16.4%) of all students in “Mathematics, Computer and Information Sciences” came from China, which accounted for slightly more than half of all international enrolments in this program area. In “Architecture, Engineering and Related Technologies”, “Business, Management and Public Administration”, and “Agricultural, Natural Resources and Conservation”, China accounted for between 7% and 8% of all enrolments. Even in programs with relatively few international enrolments, Chinese students comprised a substantial share of international students (e.g. almost one-third of international students in “Education” were from China).

The large presence of Chinese students on Canadian university campuses may not be surprising given that China has over one billion people. However, India also has more than a billion people. Although India was one of the top 5 international enrolment source countries in all 12 of the broad program areas in university, in most instances, it only accounted for a fraction of Chinese enrolment (at most, about one-half, and often less than one-quarter). However, India accounted for a substantially larger share of international enrolment at the college level, as the next section describes.

## **In colleges, India was the top source of international enrolment in most broad program areas**

In nine of the 12 broad academic program areas, the top source country for international college students was India in 2017/2018. In fact, in six of the program areas, India accounted for at least half of all international students. One-fifth (20.0%) of all “Mathematics, Computer and Information Sciences” students were from India, accounting for about two-thirds of all international students in this group. India also accounted for 13.6% of all “Business, Management and Public Administration” students (about half of all international enrolments in this program area), as well as 9.9% of all “Architecture, Engineering and Related Technologies” enrolments (more than half of international enrolment in this broad program area).

In the three program areas where India was not the top source of international enrolments (“Personal Improvement and Leisure”; “Visual and Performing Arts, and Communications”; and “Humanities”), China was the top international source country by a narrow margin. In these instances, India ranked second or third.

## **A larger share of new enrolments were international compared to total enrolments**

Although both prospective and current international students may be affected by the pandemic, prospective students may be more likely to stay home during the pandemic since they have yet to invest in Canadian postsecondary education. The data suggest that international enrolments comprise an even larger share of new enrolments than total enrolments. At the university level,

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6. Although the detailed numbers by CIP primary groupings in this section and the next were not amenable to being presented in this short article, they are available upon request.

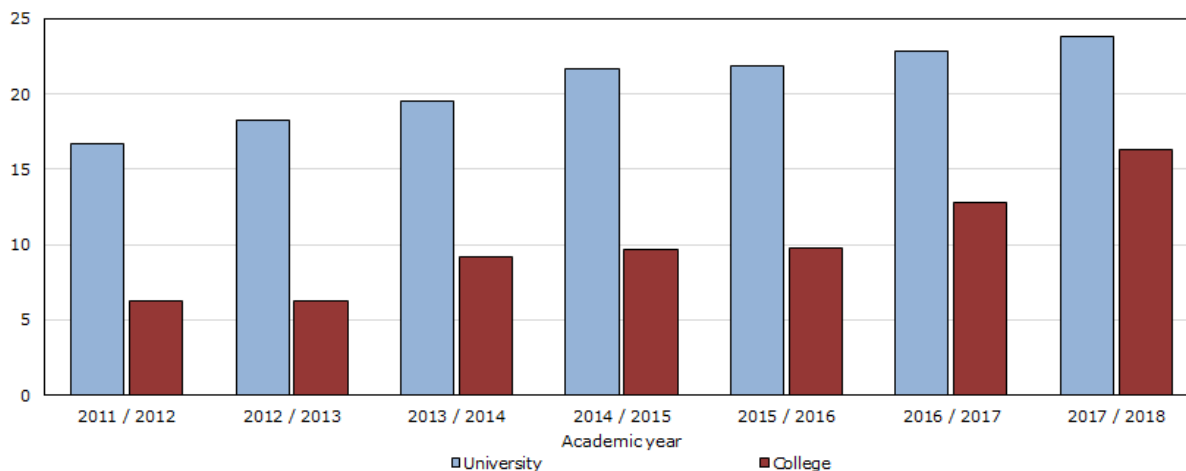


## International Student Enrolment in Postsecondary Education Programs Prior to COVID-19

almost 23.8% of new enrolments were international in 2017/2018 (Chart 4), compared to 14.7% of total enrolments (Chart 1). In colleges, 16.3% of new enrolments were international in 2017/2018 (Chart 4), compared to 13.2% of total enrolments (Chart 1).

**Chart 4**  
International students, as a percentage of new enrolments, by academic year and institution type

percent



Source: Postsecondary student information system.

## Conclusion

An increasing share of total university and college enrolments have come from international sources in recent years. During the 2017/2018 academic year, 14.7% and 13.2% of all university and college enrolments were international, respectively. Given the ongoing uncertainties around the COVID-19 pandemic and the new public health restrictions imposed on international travel, physical distancing guidelines affecting classroom structures, and the real possibility that many programs may have to be delivered online, the share of enrolments in various academic programs that are international is of high relevance at the moment.

This study found that certain program areas relied heavily on international student enrolment, especially “Mathematics, Computer and Information Sciences” (where one-third of enrolments were international), as well as “Architecture and Engineering and Related Technologies” and “Business, Management and Public Administration”. Conversely, a relatively small share of enrolments in programs such as “Education” and “Health and Related Fields” were international. However, a relatively large share of medical residency enrolments were international, particularly in medical subspecialties. This is an important group of future skilled labour, especially in light of possible future pandemics. The main source countries behind international enrolments varied according to institution type. While China was the main source country among international enrolments in almost all university program areas, India topped the list in most college programs. Across many program areas, one or both of these two source countries accounted for a substantial portion of international enrolments. Although both prospective and current international students may be affected by the pandemic, prospective students may be more likely to stay home during the pandemic since they have yet to invest in Canadian postsecondary

education. International students comprise an even larger share of new enrolments than total enrolments.

As Canadian universities and colleges face uncertainty with regards to whether or not in-person classes can be resumed for the 2020 fall term, they are examining and building plans for all scenarios ranging from partial to full online learning, including the potential of having no international students on campus (University Affairs 2020). However, not all areas of study are equally amenable to online learning. In particular, those programs requiring hands-on experience, such as laboratory or studio/recital work, work placements, or residencies, will likely face more challenges to transform into online formats. While this study found that most of these programs do not rank very high in international student enrolment, many do still rely on these sources to a substantial degree. This may impact overall enrolment in programs with such requirements, particularly among international students who must invest heavily to move to Canada and enrol in studies. Moreover, potential restrictions on international travel to Canada may also affect the demand for Canadian postsecondary education. The findings on top international student source countries may inform discussions around international travel restrictions. If international demand does decline this year, this could create delayed demand among international students that may result in compensatory enrolment in the following years, creating more competition for available space even for Canadian residents.

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