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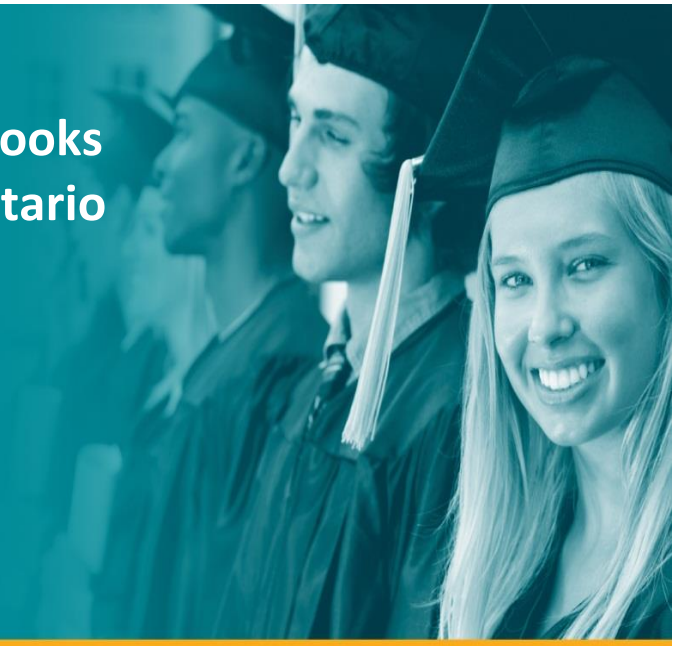
PRISM
ECONOMICS AND ANALYSIS

Labour Market Trends and Outlooks for Regulated Professions in Ontario



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Executive Summary

Since the recession of 2009, concerns have been raised about a possible deterioration in the labour market outcomes of postsecondary graduates. Given the considerable financial and time investment associated with a postsecondary education, this question is of interest to policy makers, students, their families and postsecondary institutions.

The findings of this study reveal the existence of persistent imbalances between supply and demand in the six regulated professions examined in this report. The causes, degree of imbalance and consequences of the imbalance differ across the professions. Long-run demographic, enrolment and economic trends are likely to substantially lessen imbalances in some professions and lead to increases in others.

A key differentiating factor is the marked difference in the proportion of graduates from professional programs who become licensed members and practise in their respective profession. A large proportion of graduates from education, health and law programs pursue licensure, although many law and education graduates work in unrelated occupations. The rates of engineering and architecture graduates obtaining professional licences are significantly lower. In fact, there are as many engineering graduates employed in other occupations that normally require a university degree as there are employed in the engineering profession.

The labour market for professional degree graduates in fields with a narrow range of employment opportunities related to the field of study, as is the case in health and education, are tightly linked to the ratio of available graduates in professional programs to the number of employment opportunities in the profession. In the case of both health and education, government has significant influence over both the supply (number of funded seats in professional programs) and the demand (employment in the profession).

Attempts to manage these labour markets have tended to result in swings between under-supply of new entrants and over-supply without ever achieving a sustainable balance. Lengthy periods of training and long lags in supply responses result in over-reactions to short-term labour market conditions. In the case of teachers, Ontario has produced an estimated 26,000 more qualified teachers than available teaching jobs in the province since 2006. This trend may reverse in the coming decade.

The labour market for graduates from law, engineering and architecture programs is influenced much more by employment demands in the general economy and more broadly related fields. An imbalance between graduation rates and job openings leads to significant employment in fields unrelated to graduates' university training and also to significant under-employment. This trend is expected to accelerate with continued growth in enrolment in these professional degree programs and increased labour market diversification. A significant increase in law school enrolments in recent years is anticipated to result in 1.6 new licensed lawyers for every new practicing position available over the coming decade.

Although long-term employment projections should always be interpreted as scenarios based on assumptions about growth as well as changes in technology, policy and the regulatory environment,

they do serve as a useful baseline for labour market planning. Long-term demographic trends gleaned from labour force statistics and administrative data of professional regulatory bodies show consistent and distinct patterns in retirements and voluntary exits across many regulated professions. Consistent monitoring of these demand-side factors provides a useful tool for tracking short- and medium-term hiring requirements.

The supply side of the equation is determined in large part by changes in enrolment patterns. Enrolments are influenced by swings in attitudes and expectations of prospective students and available program spaces. The latter can be expanded with increased funding, or reduced, although usually with greater resistance. Attitudes and expectations, on the other hand, are deeply rooted and when shifts occur they tend to occur slowly, but markedly; presenting perhaps the biggest challenge to the effective management of labour markets.

Introduction

Since the 2008-09 financial crisis, concerns have been raised about a possible deterioration in the labour market outcomes of postsecondary graduates. Given the considerable financial and time investment associated with earning a postsecondary credential, this question is of interest to policy makers, students, their families and postsecondary institutions. To address part of this question, this report explores the labour market outcomes of graduates from university degree programs in six professional fields of study.

Professional degrees are programs of advanced study that prepare students to practice a specific occupation that is governed by a mandatory regulatory body.[1] As such, professional degrees are often perceived as credentials leading to a defined job. In many cases, tuition fees for professional programs are higher than for other undergraduate or graduate programs, making the question of alignment with labour market needs all the more important.

This report studies enrolment, graduation trends and labour market outcomes for graduates of professional programs in six regulated professions. In particular, it investigates the extent and nature of labour market imbalances that can result in protracted periods of unemployment or under-employment for recent graduates. The six professions examined are:

- education (i.e., primary and secondary school teaching)
- law
- medicine
- nursing
- architecture
- engineering

The practice of each of these occupations is governed by a professional body. The scope of professional practice in each field is defined by law and (subject to specific exemptions) is restricted to persons who are licensed by that professional body or, in some cases, to persons who are supervised by a licensed professional. Those professional bodies also accredit university programs in Ontario and evaluate the equivalency of similar programs in other jurisdictions.

At the root of any labour market imbalance is a protracted asymmetry between the flow of new entrants into a profession's workforce and the employment opportunities in that market. This report explores the extent and nature of past, current and prospective labour market imbalances. To do so, it draws on multiple data sources, including:

- membership data received from professional regulatory bodies

1 This definition is taken from the Ontario Universities' Application Centre (OUAC).

- Statistics Canada's Labour Force Survey
- Statistics Canada's 2011 National Household Survey
- Administrative data compiled by the Ontario Fairness Commissioner
- Enrolment and graduation data from Statistics Canada's Postsecondary Information System (PSIS), the Ministry of Advanced Education and Skills Development (MAESD) and the Common University Data of Ontario (CUDO) database
- Statistics Canada's 2013 National Graduates Survey
- Stokes Economic Consulting's Provincial Occupational Model (POMS)

The report also utilizes supply and demand forecasts developed by Prism Economics and Analysis.

This chapter provides a summary of the methodology and major conclusions from the separate studies of each of the six professions. It also highlights some important implications for policy makers and suggests additional areas for future study. Those interested in a detailed examination of a particular profession can see the following chapters, each of which provides greater detail about the professions, including:

the regulatory framework for licensure, focusing on education and experience requirements

- the trends in new supply based on the number of graduates from Ontario programs and inter-provincial and international migration
- projected replacement demand based on the number of retirements, mortality and voluntary withdrawal from the labour market
- the projected change in overall employment in the profession resulting from economic growth
- the resulting balance or imbalance between projected demand (the sum of replacement demand and the change in overall employment) and projected supply (the sum of new graduates entering the professional labour market plus net inter-provincial and international migration)

Detailed descriptions of the data sources used and the modeling methodology can be found in Appendix A.

Regulated Professions and the Role of Regulatory Bodies

There are 41 occupations in Ontario that are regulated by professional bodies with the statutory authority to establish entry requirements and set standards for their profession.[2] The practice of these professions is restricted to persons licensed or certified by the appropriate professional regulatory body.

Professional regulatory bodies are "self-regulated," meaning that bodies are generally composed of members of the profession elected by their peers and are not directly controlled by government.[3] These bodies have a mandate to protect the public interest, and they can restrict access to the profession by setting the necessary education qualifications, experience and examination requirements for licensing. Regulatory bodies accredit university programs in Ontario and evaluate the equivalency of similar programs in other jurisdictions. They also certify qualified individuals from other provinces and outside Canada to practise in Ontario. Through their authority to set certification requirements, professional regulatory bodies play an important role in determining the supply of labour in their professions.

In Canada, jurisdiction over professions resides with individual provinces and territories. However, the labour mobility provisions contained in the Agreement on Internal Trade (AIT) require that regulatory bodies for all professions ensure full labour mobility within Canada. Professionals certified by a regulatory authority in one province or territory are generally entitled to be certified by the equivalent regulatory authority in any other, though provinces are permitted to set additional requirements to ensure knowledge of provincial codes, regulations or practices. To facilitate mobility, regulatory bodies often issue special permits and restricted licences to professionals from other provinces. For example, in 2008 Quebec enacted a regulation allowing lawyers from other provinces to obtain a "special Canadian legal adviser permit" to provide legal advice in matters under federal jurisdiction and international law (Competition Bureau).

Another determining factor of labour supply is the number of graduates from professional degree programs. The number of spaces in these programs is in large part determined by government funding allocated through operating grants. The annual per-student grant for graduate programs is often double (or quadruple, in the case of medicine and dentistry) that for bachelor's-level general arts and science programs (MAESD, n.d.). Changes in the number of program spaces, length of program and tuition fees can all have an impact on the supply of qualified graduates entering regulated professions.

The professional designations and education programs for the six occupations analyzed in this study are summarized in the following table.

2 According to the Ontario Fairness Commissioner, there are 15 non-health professions covered by the Fair Access to Regulated Professions and Compulsory Trades Act, 2006, and 26 health professions covered by the Regulated Health Professions Act, 1991 (http://www.fairnesscommissioner.ca/index_en.php?page=professions/index).
3 Ontario Regulators for Access Consortium (http://www.regulatorsforaccess.ca/resources/regontario.aspx).

Table 1: Professional Designations and Programs

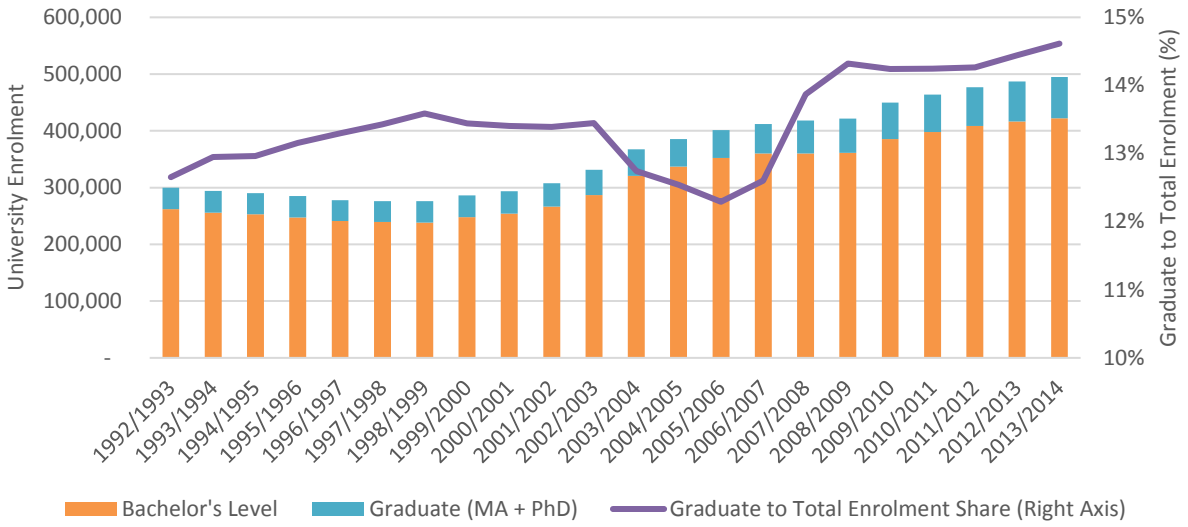
Professional Designation	Regulatory Body	Designation	Degree Programs and Credentials
Teacher	Ontario College of Teachers (OCT)	Teacher	Education (BEd, MEd, MAEd)
Lawyer	Law Society of Upper Canada (LSUC)	Lawyer	Law (LLB, JD)
Medical doctor	College of Physicians and Surgeons of Ontario (CPSO)	Physician (MD)	Medicine (MD)
Registered nurse	College of Nurses of Ontario (CNO)	Registered nurse (RN) Nurse practitioner (NP)	Nursing (RN, ASN, BSN, BScN, MSN, MScN)
Architect	Ontario Association of Architects (OAA)	Architect	Architecture (MArch)
Professional engineer	Professional Engineers Ontario (PEO)	PEng	Engineering (BASc, BEng, MASc, MEng)

Trends in University Enrolments in Professional Programs

University enrolment in Ontario has swelled over the last two decades, rising 68% between 1994 and 2014, well ahead of growth in both the overall provincial population (26.4%) and the 18-to-22 age cohort (30%) (Statistics Canada). Enrolment in graduate programs has grown faster than at the bachelor's level, increasing the proportion of graduate students from 13% to 15% of total enrolments.[4] The "double cohort" of graduating high school students in 2003, which resulted from the elimination of Grade 13, as well as the poor labour market conditions following the 2009 recession, are the main contributing factors to the rise in graduate-level enrolments.

4 "Graduate-level programs" refers to both master's and doctoral programs.

Figure 1: University Enrolment in Ontario, 1993 to 2014



Source: Statistics Canada, table 477-0019

Enrolment Trends in Professional Degrees, Ontario and the Rest of Canada

Enrolment in programs leading to professional degrees at Ontario universities grew at a slightly lower rate (2.5%) compared to the rest of the country (2.9%) from 2009 to 2012. However, the number of students in several professional programs rose at a significantly higher rate than in other provinces. A comparison of average annual growth in enrolment among professional programs in Ontario and rest of Canada is provided in Figure 2.

Figure 2: Average Annual Growth in Enrolment, Selected Professional Programs, Ontario and the Rest of Canada

Source: Statistics Canada, Postsecondary Information System (PSIS), 2015

- Engineering was the fastest growing professional program between 2009 and 2012, with an average annual growth rate in enrolments of 6.2% in Ontario. It is followed by law (4.4%) and medicine (3.6%).
- The number of architecture students grew at an average annual rate of 2.2% in Ontario, while the number fell in the rest of the country.
- Enrolment growth in nursing in Ontario (1.1%) fell far behind the growth rate in the rest of the country (4.2%).
- There was a decline in the number of students in education programs in both Ontario and the rest of the country.

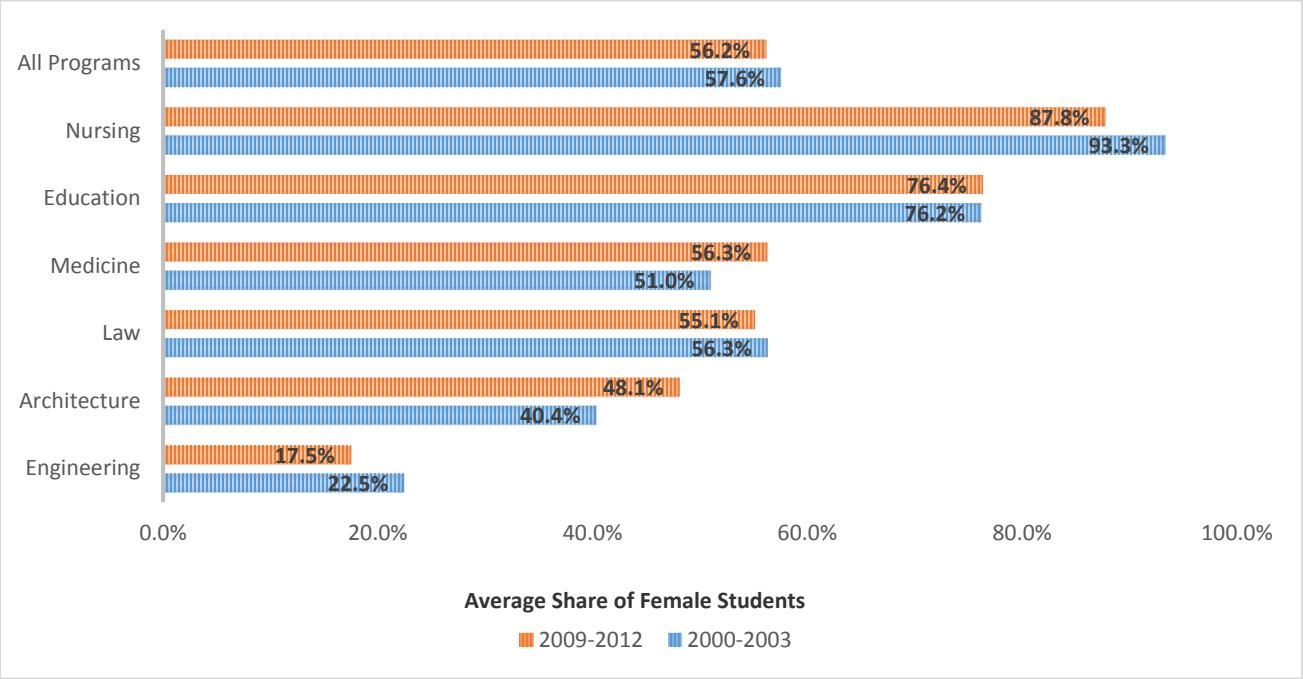
Enrolment Trends in Professional Programs by Gender

From 2000 to 2012, female enrolment in undergraduate programs in Ontario increased at an average annual rate of 4%. On average, women made up 56.4% of total enrolment from 2009 to 2012, though the gender mix varies significantly at the program level. Nursing and education programs have predominantly been comprised of female students, while men have accounted for the majority of enrolments in engineering and architecture programs.

Women represented a shrinking portion of engineering enrolment over the past decade. The share of women in engineering declined by more than 5 percentage points since the early 2000s and accounted for about 17% of total engineering enrolments between 2009 and 2012. On the other hand, the representation of women in architecture programs grew from an average of 40.4% in the early 2000s to more than 48% between 2009 and 2012. Female students have also accounted for a growing share of enrolment in medicine. They made up an average of more than 56% of enrolment from 2009 to 2012, an

increase of more than 5 percentage points compared to the early 2000s. The proportion of women in law programs remained more or less stable since 2000. Women accounted for more than half (55.1%) of total enrolment in law programs in recent years.

Figure 3: Average Share of Total Enrolment of Female Students in Professional Programs, Ontario



Source: Statistics Canada, Postsecondary Information System (PSIS), 2015

Enrolment Trends for International Students in Professional Programs

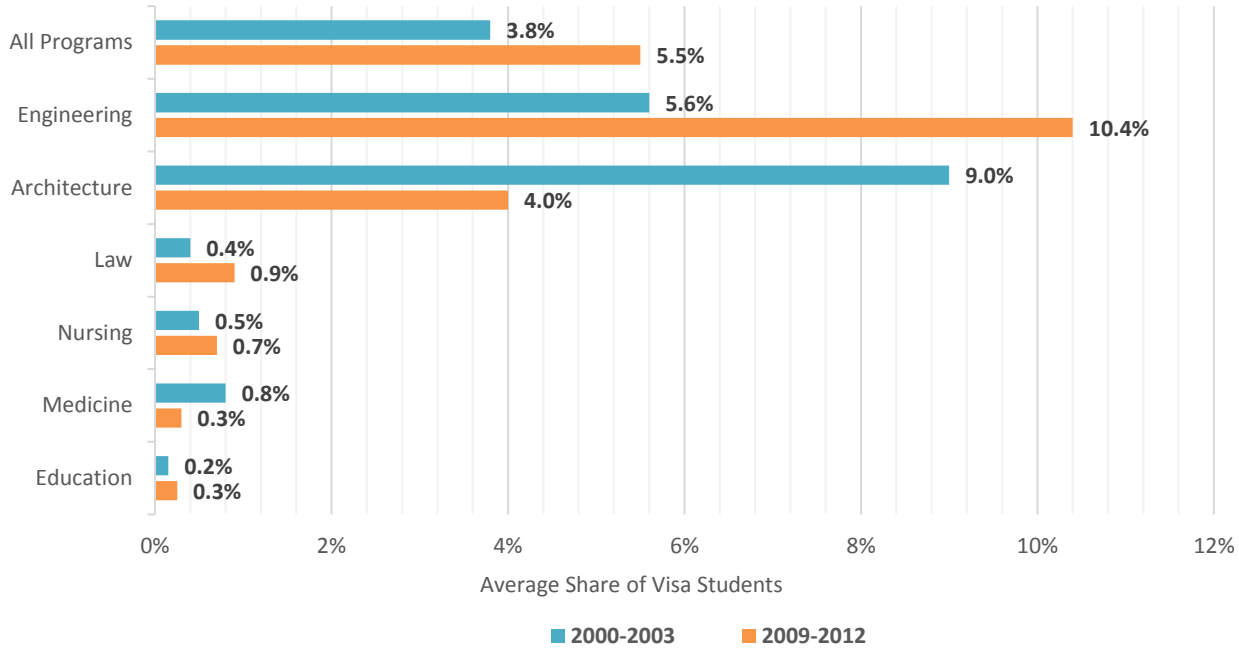
Professional programs at Canadian universities have attracted a growing number of international students over the past decade. The number of visa students enrolled in all undergraduate programs at Canadian universities grew at an average annual rate of 21% since 2000, rising from close to 19,000 in 2000 to almost 66,000 in 2012. Ontario has been the destination of 39% of all visa students on average from 2000 to 2012. The number of international students in bachelor's-level programs grew at an annualized average rate of 20.6% between 2000 and 2012, rising from close to 7,200 in 2000 to 26,300 in 2012.

Among professional programs, engineering programs have attracted the largest number of international students in Ontario. The number of visa students in engineering increased from less than 1,000 in 2000 to more than 3,800 in 2012. This represents an average annual increase of 24%.

Architecture programs have seen a decline in the share of international students over the same period. The number of international students in architecture professional programs (master's level) has lagged resident enrolments, leading to a significant drop in the share of visa students, from 9% between 2000 and 2003 to approximately 4% in recent years.

International students make up less than 1% of total enrolment in each of the other professional programs under study. Higher tuition fees, entrance requirements and international competition associated with programs such as law and medicine may contribute to the low representation of international students in these programs. In nursing, the number of foreign students, while still low, has doubled from below 70 in 2003 to close to 140 in 2012.

Figure 4: Share of International Students in Professional Programs, Ontario

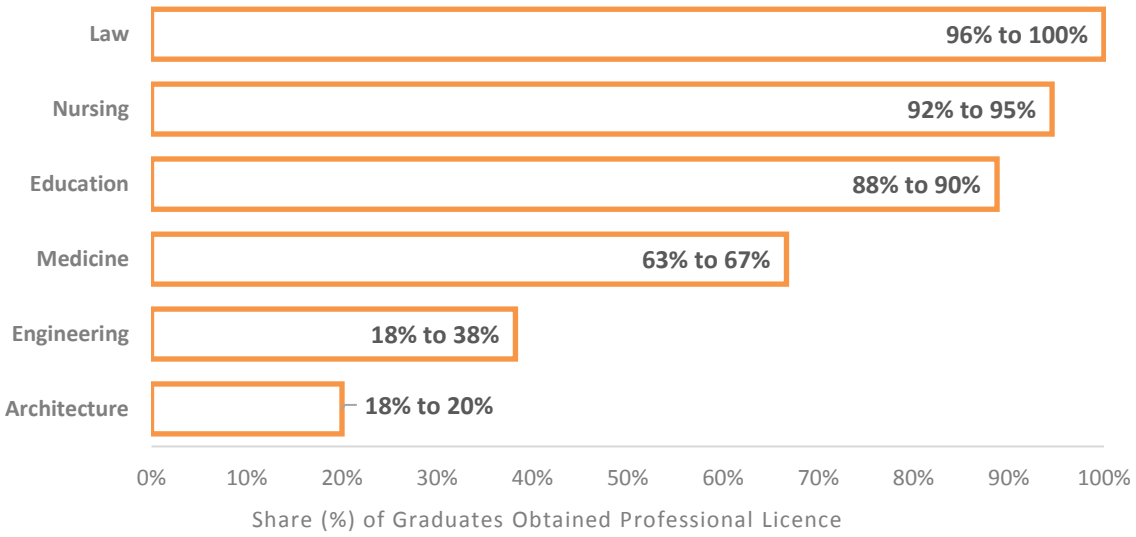


Source: Statistics Canada, Postsecondary Information System (PSIS), 2015

Career Paths for Graduates of Professional Degrees

Professional degree programs are often perceived as educational pathways leading to a licensed profession. However, evidence from the 2013 National Graduates Survey (NGS) suggests that the proportion of professional program graduates who go on to obtain a professional licence varies significantly by field. For example, the NGS shows that in 2009-10, the vast majority of graduates from Ontario law (96% to 100%) and nursing programs (92% to 95%) obtained professional licences in their respective fields within three years of graduation. By contrast, a much smaller proportion of Ontario graduates from engineering (18% to 38%) and architecture programs (18% to 20%) obtained licensure.

Figure 5: Proportion of 2009-10 Professional Program Graduates Who Obtained a Licence within Three Years of Graduation, Ontario



Source: 2013 National Graduates Survey, Statistics Canada
Note: Range due to rounding, national and provincial differences

A graduate's decision to pursue licensure is generally influenced by four factors. The first is the extent to which regulations restrict the scope of practice in a particular profession. Health professions, including medicine and nursing, are strictly regulated and require a licence to practice. The scope of practice among specialist physicians and among types of nurses is clearly delineated. The situation is different in education. Teachers in Ontario's public elementary and secondary schools require a certificate, but teachers in private schools or institutions providing types of vocational training are not necessarily required to be licensed. Professional engineers require a PEng designation to work within an engineer's scope of practice. However, the Professional Engineers Act includes an "industrial exemption" that waives the licence requirement when an individual is employed in the manufacturing sector.[5] The Act also permits an individual to practise engineering without a licence if his or her work is supervised by a professional engineer who takes responsibility for the work. Similar exemptions exist in the regulations that govern architects, allowing many aspects of design work to be done by individuals not licensed by the Ontario Association of Architects (OAA). Exemptions that permit unlicensed individuals to perform many aspects of the engineering and architecture professions likely contribute to the significantly lower proportion of engineering and architecture graduates who obtain licences.

A second factor is opportunities in other occupations. Data from the 2011 National Household Survey (NHS) show that a large proportion of university degree holders work in occupations unrelated to their field of study. Some are unsuccessful at finding work in their intended profession and pursue work in

5 Section 12(3) of the Professional Engineers Act specifies that the requirement for a licence does not apply to "prevent a person… from doing an act that is within the practice of professional engineering in relation to machinery or equipment, other than equipment of a structural nature, for use in the facilities of the person's employer in the production of products by the person's employer."

other occupations, while others may choose to pursue different paths or seek better opportunities in other fields. Voluntary and induced exits from the workforce represent a significant leakage of the supply pool in professional occupations.

A third factor impacting the likelihood of qualified graduates pursuing licensure is barriers posed by practical experience requirements. Certification requirements for many professions include a practical work experience component, but obtaining the necessary work experience is contingent on securing employment in the field. For example, a key hurdle to becoming a licensed lawyer in Ontario is securing an articling position. This has become increasingly difficult in recent years, as a larger number of graduates compete for a limited number of positions. Certification for engineers and architects is also contingent on a graduate's ability to secure employment and meet work experience requirements. Architecture graduates may take between three and seven years to complete the work experience required for licensing. The practical experience requirements for physicians, nurses and teachers are met by work placements most often arranged for candidates by their professional programs.

A final factor is the cost of membership fees required to maintain good standing with regulatory bodies. Annual fees vary significantly among professions and depending on membership category. Although membership fees may have a relatively small impact on an individual's decision to pursue licensure, they may become a decisive factor if a graduate is faced with unfavourable employment prospects or limited financial means.

Labour Market Outcomes of Professional Program Graduates

The labour market outcomes for graduates from professional programs are often obscured by conventional instruments. The Labour Force Survey (LFS), which provides timely estimates of employment and unemployment at an occupational level based on the National Occupational Classification System (NOCS), is often used as the primary source in occupational employment analysis. The LFS is, however, of limited value in assessing labour market outcomes for professional degree holders as it does not account for educational qualifications or the individual's intended occupation. In other words, it does not provide insight as to whether the individuals hold a position that they are trained for or whether they are underemployed. For instance, if a qualified teacher seeking permanent teaching employment happens to be employed temporarily as a barista, the LFS classifies them as an employed barista rather than an underemployed teacher.

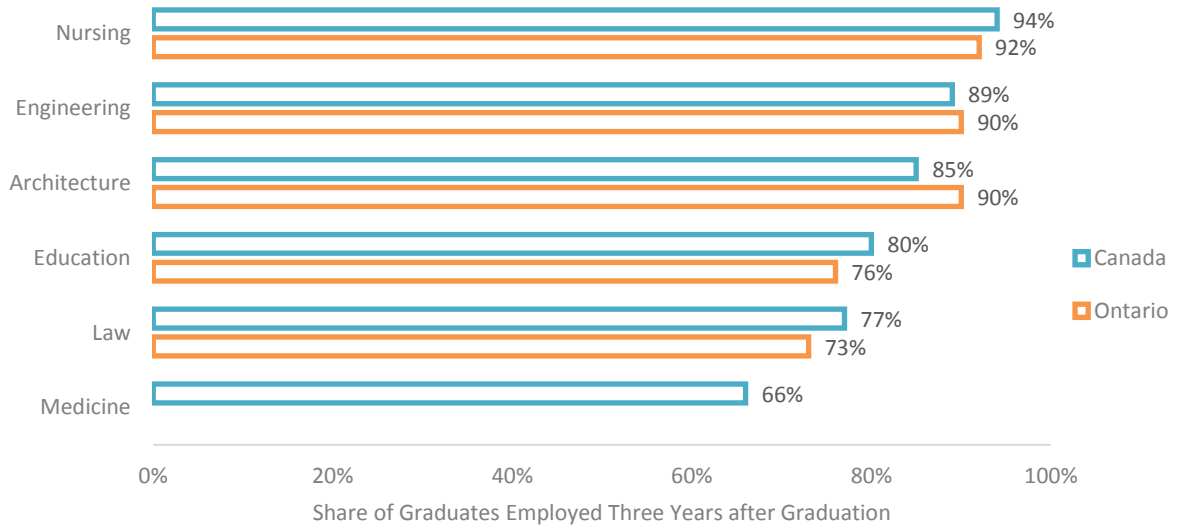
Regulatory bodies' administrative data and membership surveys provide better insights into the labour market status of members of professional bodies, but they tend to exclude non-members who let their licences lapse or are not practicing.[6] While membership data can often provide information about member labour outcomes by tenure and specific area of practice not available from other sources, these data also tend to underrepresent the available workforce for regulated professions because they do not account for otherwise qualified individuals who have not become licensed or have chosen to allow their professional licences to lapse. This "leakage" of qualified individuals from the regulated profession's

6 Many regulatory bodies have various categories of membership based on membership type and status, but they only track fee-paying members.

workforce represents a significant loss to the effective supply. Once individuals choose not to become licensed or leave, the chance of them returning to the available supply pool declines the longer they remain out. In many professions, it is often a permanent loss.

The National Graduates Survey (NGS) and the National Household Survey (NHS) provide additional insights into the labour market outcomes of professional degree graduates, but the data from both sources only provide "snapshots" of labour market conditions. The 2013 NGS serves as an important source of information about the labour market outcomes of 2009-10 university graduates by field of study. Figure 6 shows the share of 2009-10 professional program graduates employed in Ontario and Canada in 2013.

Figure 6: Proportion of 2009-10 Professional Program Graduates Employed Three Years after Graduation, by Program of Study, Graduates from Ontario and Canada



Note: Ontario data for medicine is suppressed. Source: 2013 National Graduates Survey, Statistics Canada

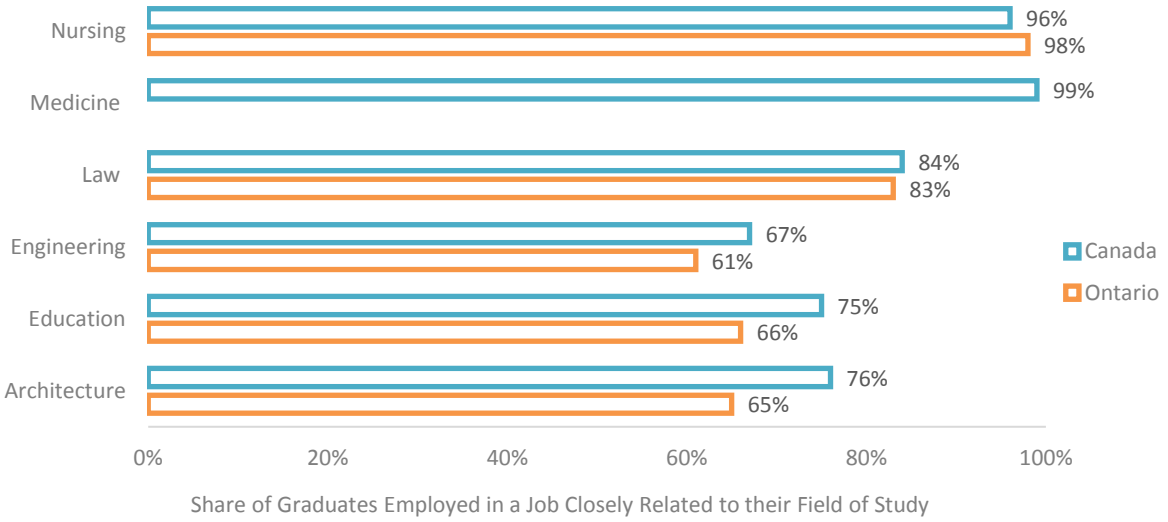
The employment rate in 2013 for nursing, engineering and architecture program graduates from 2009-10 was around 90%, comparable to the rate for all university graduates.[7] The rates of employment among graduates from education, law and medicine were significantly lower. It is important to note that those medical graduates not employed include a significant share who chose to pursue advanced professional training in order to specialize after obtaining a licence.

Looking only at employment rates conceals underemployment among graduates. Data from the same NGS survey show that, of those employed, almost all graduates from nursing and medicine programs

7 The National Graduates Survey of 2009-10 graduates shows that, three years after graduation, the employment rate for university graduates is 91%.

were working in their field of study. However, less than three-quarters of graduates from engineering, architecture and education programs were employed in jobs related to their respective fields of study.

Figure 7: Proportion of Employed 2009-10 Professional Program Graduates Working in a Job Closely Related to their Field of Study, Three Years after Graduation, by Program of Study, Graduates from Ontario and Canada



Source: Ontario data for medicine is suppressed. 2013 National Graduates Survey, Statistics Canada

Combining results from both surveys suggests that more than 90% of graduates from nursing programs were employed in their field in 2013, but as few as half (50%) of education program graduates secured teaching employment.

Table 2: Proportion of 2009-10 Professional Program Graduates both Employed and Working in a Field Closely Related to their Field of Study, Three Years after Graduation

Program	Share of Graduates Employed in a Field Closely Related to their Studies
Nursing	90%
Law	61%
Architecture	59%
Engineering	55%
Education	50%

Source: 2013 National Graduates Survey, Statistics Canada

Analysis by Profession

The following chapters examine the labour market trends and outlook for the six professions under consideration, with a particular focus on identifying any potential imbalances in the supply of graduates and employer demand. Each of the chapters describes:

- the regulatory framework for licensure, focusing on education and experience requirements
- the trends in new supply arising from graduates from Ontario programs and inter-provincial and international migration
- projected replacement demand arising from retirements, mortality and voluntary withdrawal from the labour market
- the projected change in overall employment in the profession arising from economic growth
- the resulting balance or imbalance between projected demand (the sum of replacement demand and the change in overall employment) and projected supply (the sum of new graduates entering the professional labour market plus net inter-provincial and international migration)

Main findings from each of the chapters are outlined below. Detailed descriptions of the data sources used and the modeling methodology can be found in Appendix A.

Summary of Labour Market Trends and Outlook

Teachers

Graduates from Ontario teacher education programs have faced a difficult labour market for much of the last decade. Between 2006 and 2011, Ontario produced an estimated 26,000 more qualified teachers than there are available teaching jobs in the province.

This difficult labour market was in large part created by a response to an overestimated shortage of teachers that began to materialize in the late 1990s. The supply response came too late and lasted too long to address what turned out to be a short-term problem. It is estimated that in the period between 2005 and 2011, there were on average about 1.5 BEd graduates for every available teaching position in Ontario's public education system. The oversupply was compounded over many years (OCT, Transition to Teaching Report, 2011), further degrading employment opportunities for each new cohort of graduates and eventually driving the overall unemployment rate for qualified teachers to nearly 20% in 2013.[8]

Looking forward, the job market for new teachers is expected to improve significantly as supply remains restricted and enrolment and replacement demands rise. Teacher education program enrolments have

8 Prism Economics, Teachers Supply-Demand Forecasting Model (2016).

fallen since 2011, thereby reducing the supply of graduates and improving employment outcomes. Recent changes to teacher education requirements will restrict the number of graduates from 2016 onward to below annual hiring requirements, but the unprecedented oversupply of teachers from previous years may still take a few more years to clear. The annual hiring requirement (public and private systems) is estimated to average 7,000 over the 10-year period between 2015 and 2025, while only 4,900 newly licensed teachers are expected to enter the pool each year on average over the same period. As a result, the unemployment rate for licensed teachers should continue to decline at an accelerating pace, falling back below 10% by 2023.

The big question for the purposes of our forecast is what happens beyond 2025. The current labour market oversupply has transformed the demographic age profile of teachers from what it was a decade ago. The bulge of teachers in their mid-50s approaching retirement has been replaced with a swell of teachers in their late 30s and early 40s. With enrolment restricted over the foreseeable future on one hand and rising retirements and employment demand on the other — in absence of any policy interventions — the teaching workforce may face another shortage in less than two decades. Applications for the new two-year teacher education program are already falling below the number of funded program spaces. Convincing young people to consider pursuing a teaching career may pose the next challenge for Ontario's education system.

If the number of graduates remains at current levels, the profession is headed back to a shortage. There is already evidence of shortages in the French system and for teachers qualified to teach certain subjects, such as math and science. Shortages in the broader system are also likely to emerge in coming years. The magnitude of these shortages may well depend on the number of qualified teachers who have previously been displaced by poor labour market conditions and who will choose to return to the profession.

Lawyers

The legal profession is also experiencing changes that have increased uncertainty for law school graduates. Slowing demand for legal services and a rising supply of law school graduates have weakened labour market outcomes for new lawyers aspiring to enter the profession. Enrolment growth in law programs has outpaced overall graduate enrolment growth, and in recent years the number of law school graduates has exceeded available articling positions. As the supply and demand trends intensify, future cohorts of law school graduates will face greater competition for fewer articling positions and falling earnings; they will increasingly need to leverage their law degree to seek employment outside the legal profession.

Historically, demand for legal services has tended to follow the economic cycle. Since the recent recession, however, growth in legal services has lagged behind overall economic growth. One possible explanation is that the severity of the economic downturn had changed the nature of demand for legal services in certain segments of the market. The efficiencies adopted by corporations and small firms alike to "do more with less" may have diluted demand for certain types of non-essential professional services, including legal. During the same period, employment opportunities in the public sector were limited by declining government revenues, which generally restricted government hiring. In short, the 2009 downturn and the recovery that followed appear to have had a lingering impact on demand for many professional services, including legal.

Work experience requirements limit the number of new licensed lawyers in any given year. The articling requirement imposes an effective ceiling on the supply of new lawyers as the number of positions is limited. The piloting in 2015 of the law practice program (LPP), which allows graduates to meet work experience requirements without articling, lifted the ceiling slightly. The program accepted 225 students in its inaugural year, and the Law Society expects a similar number in 2016. With articling positions limited, the number of new lawyers called to the bar will continue to depend, at least in part, on the future of the LPP.

The cumulative effect of the rising number of graduates and receding growth in employment opportunities is increasing excess availability of qualified lawyers. Based on the Lawyers Supply-Demand projection model developed in this research, it is estimated that over the 10-year period until 2025, there will be 1.6 new licensed lawyers for every new practicing position. This will most likely result in a rising number of law school graduates not practising law. They will likely find opportunities in other professions or leave the province to find legal work elsewhere. Another, more positive outcome may be that new graduates will create their own jobs. New technology enables small firms and sole practitioners to access new and larger markets. Innovation and cultural shifts may also change how legal services are provided or lead to entirely new types of services. For instance, cloud-based technology can be used to deliver unbundled legal services.[9] Handling document drafting through the use of technology — selling legal forms to customers online — using web conferencing tools or real-time chat technologies to handle unbundled coaching, and Online Dispute Resolution (ODR)[10] through web-based software systems are some of the ways that technology is impacting the legal services field (Harvard Journal of Law and Technology, 2013).

Physicians

The complexity of measuring health care supply and demand has created uncertainty about future staffing trends and has led to policies that produced several boom and bust cycles in the supply of physicians in recent years. In the early 1990s, the consensus was that Canada faced an oversupply of physicians because the growth in the number of physicians was outpacing growth in the general population. As part of the national strategy to address this challenge, Ontario reduced medical school class sizes in 1991. In 1992, the one-year rotating internship was eliminated and new graduates were required to complete at least two years of residency to become family physicians. This led to an eventual decline in the number of family physicians. Additionally, in the early 1990s there was a shift among medical graduates away from choosing a career as a family physician to choosing to become a specialist. This shift prolonged the duration of training for physicians and resulted in a decline in the number of physicians available to practice.

Policies implemented in the early 1990s to address a perceived surplus of physicians, combined with provincial cuts to the health care budget, hospital closures and several years of capped physician fees, led to a substantial emigration of Ontario physicians and resulted in a shortage by the end of the

9 Under a limited scope retainer, also known as an "unbundling" agreement, a lawyer or paralegal provides legal services for part, but not all, of a client's legal matter, by agreement with the client (LSUC).
10 Online Dispute Resolution or ODR is a term that encompasses any method of dispute resolution — arbitration, negotiation, mediation and other methods of settlement — that are handled online (Harvard Journal of Law and Technology, 2013).

decade. Once these adverse effects were identified, a concerted effort was made to increase enrolments in the medical field in the late 1990s and early 2000s. These policies boosted numbers in medical schools and increased the intake of graduate-level trainees. Efforts were also made to repatriate physicians who had left the province, facilitate their entry into practice, and integrate international medical graduates living in Canada. Those efforts have continued to this day.

Given the continued rise in enrolment in medical schools, the supply of new physicians is expected to continue to increase modestly, staying ahead of annual hiring requirements. Ontario has historically trained between 38% and 40% of all national post-MD graduates in the country. However, the nature of medical training encourages mobility, as graduates apply for residency positions at any one of the 17 residency medical schools across the country. Residents thus have the choice to move or stay at home for training, and then must choose again to move, stay home or even go abroad once their training is complete. This high level of mobility makes the supply of physicians especially difficult to predict. Given the increased supply of physicians relative to the number of employment opportunities available in Ontario, many new physicians may decide either to leave the province or the country or to pursue further specialization.

The employment outlook for newly certified physicians in Ontario is unclear. Demand has risen due to an aging population and the attrition of practising physicians from the workforce. However, the current levels of graduates from Ontario residency programs and entrants from outside the province still meet or exceed annual requirements. In the current climate, there is evidence that many newly certified physicians are encountering difficulties finding positions, leaving many qualified physicians unemployed, returning to school for further education or exiting the province to find employment. The situation is likely to improve over the next 10 years, but competition for highly sought after specialty residency programs will likely remain strong.

Nurses

The nursing workforce has long faced acute shortages, as the number of nursing graduates has not kept pace with growth in demand for nurses. As a consequence, Ontario's health care system has relied heavily on retention strategies and the over-utilization of the existing nursing workforce or replacing nursing positions with practical nurses who require fewer credentials. In the period between 2005 and 2014, cumulative demand for new nurses exceeded supply by more than 21,000 positions. In the absence of policy interventions, this trend is not likely to be reversed.

The persistent challenges experienced today stem from a decade of health care reform and restructuring in the mid to late 1990s. The downsizing of health care resulted in layoffs, a massive move to part-time and casual work, and the exit of thousands of qualified nurses from the workforce. The health care reforms of the 1990s had a lasting impact on the labour market for nurses in Ontario. Two decades later, Ontario nurses are disproportionately older and facing rising replacement demands.

Investments in health care in the early 2000s attracted many nurses back into the workforce and led to an increase in the number of nursing graduates. However, a change in the education requirement for nurses from a college diploma to a bachelor's degree in 2005 restrained supply further. Over the following years, Ontario's health care system relied on a shrinking pool of qualified nurses returning to the workforce. This pool is running dry and the number of new nursing graduates is persistently lagging behind demand.

Future demand for nurses is expected to continue to grow as an increasing proportion of the nursing workforce reaches retirement age and as Ontario's population continues to grow. The high rate of voluntary exits among nurses adds to demand requirements. Literature suggests a high inactivity rate among nurses due to excessive workload. Based on the demographic characteristics of the nursing labour force and its voluntary exit rates, it is forecast that between 1,600 and 2,300 nurses leave the labour force annually for reasons other than retirement or mortality.

It is estimated that more than 76,000 new nurses will be required over the next 10 years to meet anticipated expansion and replacement demand, with the largest demand coming from the need to replace retiring nurses. Between 2015 and 2025, a total of 32,200 nurses are expected to exit the labour force through retirement or death. A further 21,580 nurses will be needed to cover voluntary withdrawals over the same period. An additional 22,340 new nurses will be required to meet the projected demand for nursing services in Ontario's health care system. Assuming that current enrolment trends hold, the projected 58,000 Ontario nurses graduating until 2025 will meet 77% of the demand for nurses over the next 10 years. This leaves a gap of 17,000 nurses to be filled either by new nurses coming from outside Ontario or the return of nurses who left the profession or the province in previous years.

Architects

Architecture has a global labour market and, as such, the employment outlook for Ontario architects is determined by both domestic and international demand, and the share of the international market held by Ontario architectural firms. An architecture degree can also open doors to a number of related careers. Findings from the 2013 National Graduates Survey indicate that among architecture graduates from the class of 2009-10 in Canada, only 20% had obtained a licence to practice three years after graduation, though the vast majority of Ontario respondents (90%) were employed. Among them, 65% were employed in a job closely related to their education, while more than one-third were working in a field somewhat related or not related to their degree at all. The survey results further indicate that the overwhelming majority of both Ontario (90%) and national graduates (85%) felt that their qualifications matched their job requirements.

Over the next 10 years, there will be approximately 2,310 Master of Architecture graduates in Ontario, and another 495 graduates from bachelor of architecture programs who will enter the labour force. Over this same period, international immigration is expected to add around 1,265 persons to the supply, and inter-provincial migration will add another 1,100. The total supply of new professionals will therefore be around 5,170 persons seeking employment in architecture.

During this same time, the demand for new architects is only projected to reach 4,100 jobs. This imbalance between projected supply and demand is more evident in the next few years and reflects a continuation of recent trends. Over the next five years, about 30% to 40% of MArch graduates will likely be obliged to pursue employment outside of Ontario or in architecture jobs that typically require credentials below the university level (i.e., as technicians or technologists); move into a broadly related field in construction, property management, urban planning or design; or pursue other careers not directly related to their architectural training. In the latter half of the forecast period, the proportion of MArch graduates who are unable to find employment in architecture commensurate with their qualifications is expected to decline.

Engineers

Engineering graduates pursue careers in many related fields where licensure is not required. Engineering graduates are more likely to be employed in a non-engineering occupation that normally requires a university degree than in an engineering occupation. These occupations include jobs in information technology, systems planning, technical sales, technical inspection and approval, as well as general management. Yet the employment data also suggest a significant degree of under-employment among engineering graduates. While 90% of engineering graduates were employed three years after graduation — most often in a permanent position — a substantial portion (39%) were employed in a field not closely related to their education. Data further indicate that 17% of graduates believed they were overqualified for their jobs. The pattern of non-engineering employment and potential under-employment is evident for both graduates of Canadian engineering programs and graduates of non-Canadian engineering programs, although the pattern is more marked for graduates of non-Canadian engineering programs.

Looking ahead to the supply and demand projections from 2015 to 2025, we anticipate approximately 69,600 Ontario engineering graduates over the forecast period. Inter-provincial and international migration will add an additional 29,900 engineering graduates to Ontario's labour force. Total supply will therefore be around 99,500. Hiring requirements in engineering and engineering management are likely to be around 52,300. As a result, close to half of the increase in supply (47,200) will need to take employment in non-engineering jobs.

The evidence from the labour market is that an engineering degree is a valued qualification that can open doors to many different careers that are not covered by the Professional Engineers Act. At the same time, data also suggest that around one-fifth of graduates with a Canadian bachelor's degree in engineering are employed in occupations that do not normally require a university degree. Some of this employment may be "stepping stone" employment. Some may reflect personal preference. It is difficult to believe, however, that these factors fully account for the under-employment of one-fifth of Canadian engineering graduates.

The challenge for universities and for policy makers is to better understand the role of an engineering degree as preparation for a career. An Ontario engineering degree is a professional credential. As such, it qualifies a graduate for admission into the regulated engineering profession. Yet only 35% to 45% of graduates will follow this path. While these graduates appear to be well prepared for these careers, at least half of engineering graduates are likely to pursue career paths that will draw on their training in applied science but which do not involve performing engineering work as it is defined in the Professional Engineers Act. Most of these graduates will not complete and may not even enter the licensure stream. The question for universities is whether engineering schools are also providing these graduates with the preparation they need. The suggestion that one-fifth of Canadian engineering graduates in Ontario may be under-employed makes this question especially relevant.

Observations

The findings demonstrate persistent imbalances between supply and demand in the six regulated professions considered here, though the degree and consequences of these imbalances differ among

them. As a result, it will be important to avoid a one-size-fits-all approach in any attempt to address these challenges. We note below some general observations and comparisons across the six professions considered:

1. There are differences in the nature of the experience requirements across the six professions, pertaining to both duration and degree of specificity. In law, for example, candidates for admission to the bar are required to complete a 10-month articling period with an approved articling principal or an approved equivalent. Alternatively, candidates can now choose to complete the law practice program (LPP) pilot. By contrast, engineering and architecture have substantially longer experience requirements that must cover specific aspects of professional practice.

2. In some professions, there is a clearly defined employment position that is consciously aligned with the experience requirements for licensure (e.g., nursing and teaching). In other professions, the alignment between entry-level jobs and the regulatory body's experience requirement is less clear.

3. In architecture and engineering, individuals with a professional degree may pursue careers in broadly related fields where formal licensure is not required. In other professions, the regulated scope of practice effectively limits most employment to persons with a professional licence.

4. There are marked differences in the proportion of graduates from professional programs who become licensed members of the profession. In engineering, for example, only a minority of graduates enter the licensure stream, and not all of those complete the qualifications. The evidence from the labour market is that a bachelor's degree in engineering is valued by many employers even for jobs that fall outside the scope of the Professional Engineers Act. An engineering degree prepares an individual for a range of potential careers. There is some evidence from the labour market that a degree in law confers similar benefits. By contrast, there may be fewer options to apply teacher training outside of the public education system.

5. Professional degrees in law and medicine are second degrees. In architecture, the professional degree is at the master's level. Graduates from these programs thus already have a first degree upon which to build a foundation. By contrast, professional degrees in engineering and nursing are typically first degrees.

6. The rate of voluntary withdrawal from professions differs significantly. In nursing, shift work has often been cited as a contributor to the high rate of voluntary withdrawal from the profession. In teaching, law and medicine, long-term career commitments appear to be the norm. In engineering and architecture, movement into related fields that are outside the scope of the regulatory statute is common.

7. Licence holders' attachment to their professional designation appears to differ. In all of the professions, there are individuals who are no longer working in the profession but who maintain their membership in the relevant professional body. Some professions require continuing practice as a condition for full licensure, while others do not. Similarly, some professions have continuing professional development requirements to maintain licensure, while others have less stringent requirements.

8. Salaries and average age at retirement differ across professions. Changes in retirement patterns can wreak havoc on supply planning. Lawyers and doctors often work well into their 70s, much longer than in other professions, limiting opportunities for new graduates. Changing patterns of retirement by teachers in the late 1990s and early 2000s contributed to an over-estimation of hiring requirements.

9. Long-term demographic and economic trends will substantially lessen imbalances in some professions but cannot be expected to have a comparable effect on others.

These differences are relevant when interpreting the potential implications of a protracted imbalance between supply and demand in professional labour markets. They also underscore that there is no single policy measure that should be applied across the board to address the situation in all professions. There are, however, a number of questions that it may be useful to consider. Their relevance to specific professions will vary.

1. To what degree should professional regulatory bodies and the university system monitor trends in the employment of graduates from accredited programs?

2. What is a reasonable balance between the expected number of Ontario graduates and the expected number of entry-level jobs in Ontario that would qualify an incumbent to meet the experience requirements for licensure?

3. If the expected number of entry-level jobs that would qualify an incumbent to meet the experience requirements for licensure falls significantly short of a reasonable balance for a protracted period of time, what initiatives should stakeholders in the profession consider?

4. Where regulatory bodies specify particular types of experience for licensure, should there also be an obligation on the part of employers to use their best efforts to give interns an opportunity to obtain that experience? If so, how should this be achieved?

5. What is the appropriate degree of prescription in accreditation procedures when a significant proportion of the graduates of a professional program do not pursue professional licensure? Should universities have greater freedom in establishing curriculum in these circumstances and should students have a greater degree of choice in their courses?

6. In what circumstances should consideration be given to making the professional degree a second degree in those professions where the professional degree is currently a first degree?

1 Teachers

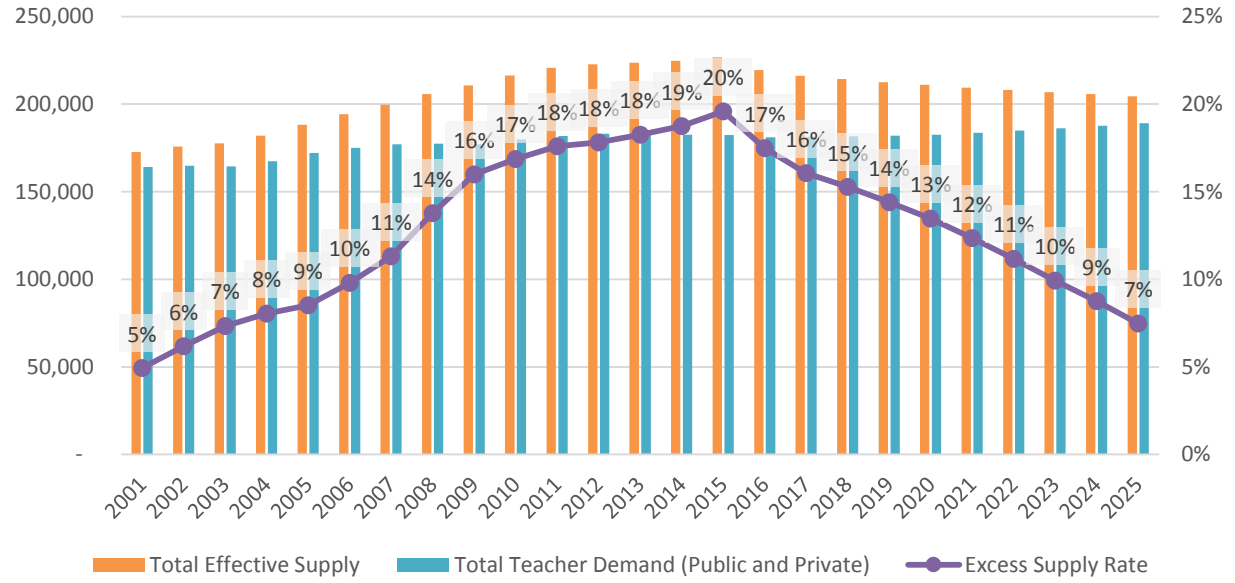
Graduates from Ontario teacher education programs have faced a difficult labour market over much of the last decade. Between 2006 and 2011, Ontario produced an estimated 26,000 more qualified teachers than there were available teaching jobs in the province.

This difficult labour market was in large part created by a response to a shortage of teachers that began to materialize in the late 1990s. The supply response came too late and lasted too long to address a short-term problem. It is estimated that in the period between 2005 and 2011 there were on average about 1.5 BEd graduates for every available teaching position in Ontario's public education system. The oversupply was compounded over many years, further degrading employment opportunities for each new cohort of graduates and eventually driving the overall unemployment rate for qualified teachers to nearly 20% in 2013.

Teacher education program enrolments have fallen since 2011, thereby reducing the supply of graduates and improving employment outcomes, and recent changes to teacher education requirements should further restrict the number of graduates each year to below annual hiring requirements. Even with these measures in place, the unprecedented oversupply of teachers that currently exists may still take another five years to clear.

The big question for the purposes of our forecast is what happens beyond 2025. Current labour market oversupply has transformed the demographic age profile of teachers from what it was a decade ago. The bulge of teachers in their mid-50s approaching retirement has been replaced with a swell of teachers in their late 30s and early 40s. With enrolment restricted over the foreseeable future on one hand and rising retirements and employment demand on the other — in absence of any policy interventions — the teaching workforce may face another shortage in less than two decades. Applications for the new two-year teacher education program are already falling below the number of funded program spaces. Convincing young people to consider pursuing a teaching career may pose the next challenge for Ontario's education system.

Figure 1-1: Supply and Demand for Ontario Teachers, 2001 to 2025



Source: Prism Economics and Analysis

Overview of the Labour Market for Teachers in Ontario

There is strong evidence that individuals who pursue a BEd intend to become teachers. However, not all those who aspire to become teachers succeed in doing so. Data from the 2013 National Graduates Survey (NGS) indicate that 90% of the 7,600 graduates from education programs in 2009 and 2010 went on to obtain a professional licence to teach (Statistics Canada, 2013). However, results from the same survey showed that only 66% of employed education graduates were working in jobs closely related to their field of study three years after graduation. Although poor labour market conditions for new teachers in recent years may explain this relatively low share, data from the 2011 National Household Survey (NHS) that compare occupational employment and field of study show that just over half of BEd holders in 2011 (irrespective of their graduation year) were employed as elementary or secondary school teachers in Ontario. The other half were working across a broad spectrum of occupations, such as early childhood educators and assistants, college and other vocational instructors, and other occupations not related to education.

Table 1-1: Occupations of Individuals with an Education Degree, Ontario, 2011

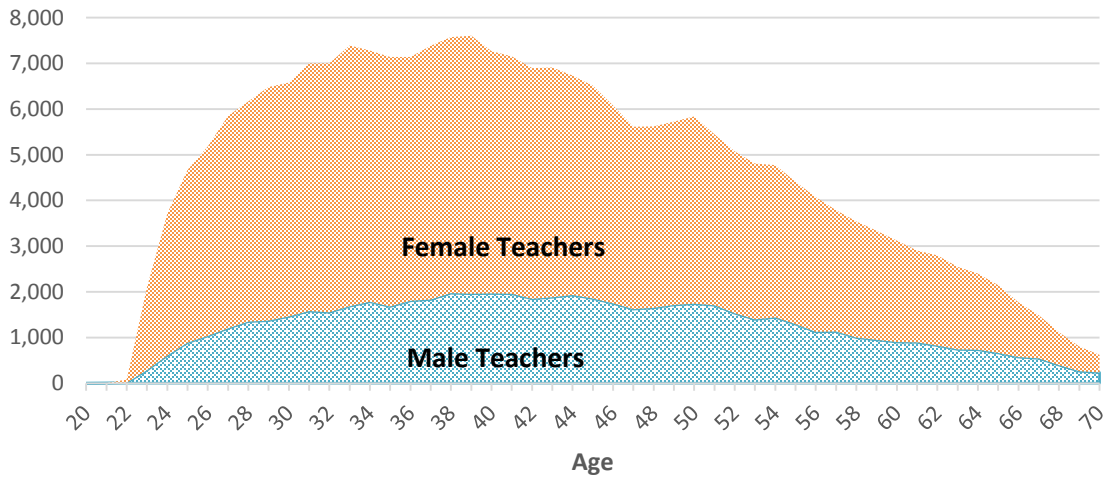
Occupations	% of Total
4032 Elementary school and kindergarten teachers	30.6%
4031 Secondary school teachers	21.9%
4214 Early childhood educators and assistants	4.1%
4021 College and other vocational instructors	2.1%
0422 School principals and administrators of elementary and secondary education	1.9%
6421 Retail salespersons	1.7%
4413 Elementary and secondary school teacher assistants	1.1%
1221 Administrative officers	1.0%
Other Occupations	30.3%

There are few data to explain conclusively what share of individuals qualified to teach do not do so. However, data from the Ontario College of Teachers (OCT) suggest that the number of withdrawals due to poor labour market conditions has grown significantly over the last decade.

Demographic Profile

In 2014, the average age of Ontario teachers was 42.6 years (42 for females and 44.3 for males). The teaching profession remains dominated by women. In 2014, 74% of licensed Ontario teachers were female, a share that has remained unchanged for the last decade.

Figure 1-2: Age Profile of Ontario Teachers, 2015



Source: Ontario College of Teachers membership data, 2015

Regulation of the Teaching Profession in Ontario

To teach in Ontario's public school system, a teacher must be certified by the Ontario College of Teachers (OCT) and obtain a licence through membership in the College. An annual membership fee is charged to maintain membership and certification.

The College is a self-regulatory body governed by the Ontario College of Teachers Act. It licenses, governs and regulates the teaching profession in Ontario in the public interest. Specific responsibilities of the College include setting ethical standards and standards of practice, issuing teaching certificates, accrediting teacher education programs and courses and investigating complaints about members.

The OCT requires candidates to complete a teacher education program before they can apply for certification. This can include:

- a postsecondary undergraduate degree (minimum three years), and
- a four-semester (two-year) teacher education program offered by an accredited faculty of education

Recent Policy Changes

In 2013, the Ontario Ministry of Education extended the length of the teacher education program from one year to two years (four semesters), including a mandatory practice teaching requirement of at least eight weeks. The changes went into effect in September 2015. While concurrent programs continue to be offered at many institutions, the education component of these programs is now equal to four semester equivalents that can be taken concurrently with another undergraduate program or on a consecutive basis. The first cohort under the new requirement will graduate in 2016. Teachers who hold

a teaching certificate from another Canadian province or territory are assessed as labour mobility applicants and are not subject to the new teacher education requirement.

The various education programs that can lead to certification include:

- a bachelor's degree in education (BEd) (two years)
- a Bachelor of Education or Diploma in Technological Education (BEd/DipTechEd) (one year)
- a master's degree (Master of Teaching)
- a Master of Arts in Child Study and Education

The OCT issues qualified applicants a Certificate of Qualification and Registration that must be renewed annually. The certificate with the OCT outlines a teacher's profile, including:

- degree(s)
- program of teacher education
- basic qualifications (BQ)
- additional qualifications (AQ)

The OCT offers additional regulated titles, such as additional basic qualifications (ABQ) and additional qualifications (AQ), for accredited teachers who continue their learning and training.

Elementary and secondary schools in Ontario are divided into four divisions: primary, junior, intermediate and senior. Teachers with a general studies qualification are qualified to teach in at least two consecutive divisions at either the elementary or secondary level. Teachers can be qualified in more than one basic qualification division level and in more than one basic qualification division.

Table 1-2: Division of Teacher Qualifications

Qualification Division Level	Qualification Division
Elementary	1. Primary - Junior Kindergarten to Grade 3
	2. Junior – Grades 4 to 6
Secondary	3. Intermediate – Grades 7 to 10
	4. Senior – Grades 11 and 12

Source: OCT

The teacher of technological education path allows individuals with knowledge or skills in an area of technology and at least five years of work experience, or a combination of postsecondary education and work experience in business or industry, to become certified teachers without a postsecondary degree. The regular teacher education program is required (OCT, 2015).

Labour Market Outcomes of New Teachers

New teacher graduates have faced high rates of unemployment and under-employment for much of the last decade. The OCT's annual Transition to Teaching Survey, which tracks the labour market outcomes of new teachers, has documented the acute difficulty faced by recent BEd graduates in obtaining permanent teaching employment in recent years. In 2015, one-fifth of first-year teachers reported being unemployed, and only about the same proportion (21%) reported securing a permanent teaching contract. The remaining 57% – the underemployed – relied heavily on part-time work and supply teaching contracts.

Although the situation appears to have improved for first-year teachers since unemployment levels peaked in 2013, the employment outlook for teachers early in their career remains discouraging and the cumulative impact of successive years of poor employment outcomes has saturated the labour market with qualified teachers unable to find permanent positions. OCT survey data show that in 2015, 35% of 2010 graduates were still searching to secure permanent teaching positions five years after graduation.

Figure 1-3: Labour Market Outcomes for First-year Teachers, Ontario Graduates

Source: Transition to Teaching Survey, OCT (2015)

Although labour market outcomes appear to be improving, OCT survey data mask the extent of unemployment, as the sample is limited to OCT members and excludes those who have given up their membership and left the supply pool. These otherwise qualified teachers represent a large and growing group not captured by the OCT data or by other conventional labour market instruments such as the Labour Force Survey.

Since 2010, the net number of teachers surrendering their membership (minus those reinstated) has risen substantially. The net number of suspensions peaked at just over 6,700 in 2013, at the same time as peak rates of unemployment for new teachers. OCT member attrition data show that about 6.5% of Ontario faculty of education graduates certified in 2014 did not renew their licence in 2015. Of those first certified in 2010, 16.5% were no longer members five years later in 2015 (OCT, 2015). Though many

of these teachers could technically be reinstated and return to the teaching pool after they secure positions in other occupations or leave the province, the likelihood of returning declines the longer they remain outside the market.

Figure 1-4: Annual OCT Suspensions for Non-payment of Fees, 2005 to 2014

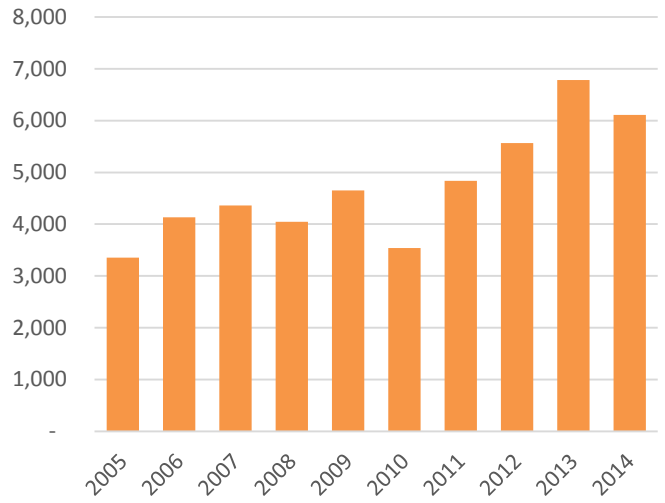
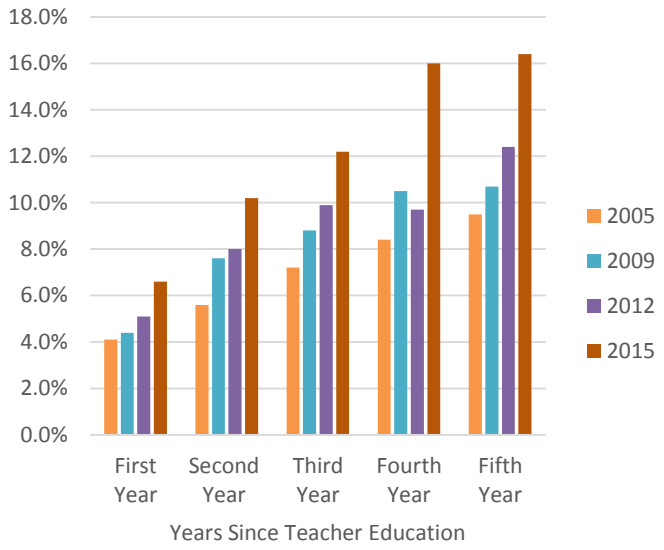


Figure 1-5: Share of Teachers not Renewing Licence by Year of First Certification, 2005 to 2015

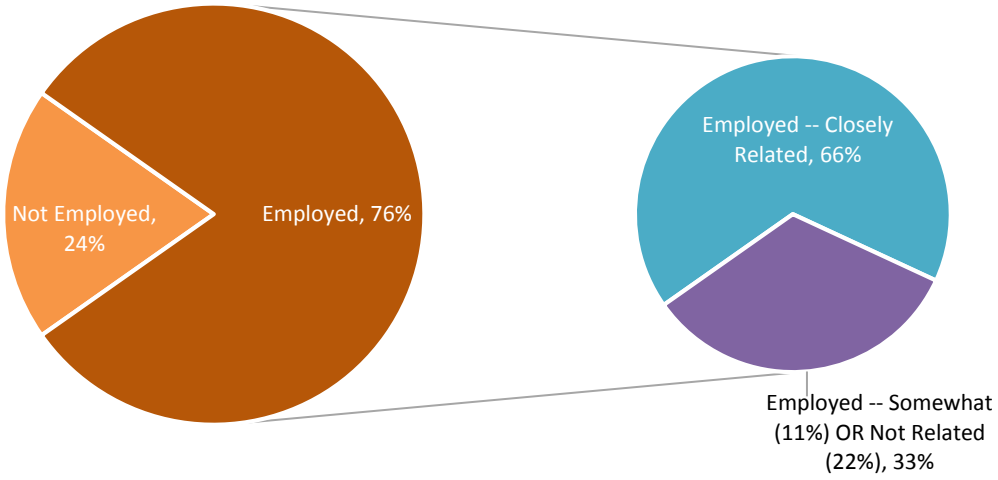


Source: Transition to Teaching Survey, OCT (2015)

Findings from the 2013 NGS confirm relatively poor labour market outcomes for teachers. In 2013, 24% of teacher education graduates from the class of 2009-10 were not employed three years after graduation, and only two-thirds (66%) of those employed held jobs related to their field of study. This means that only about half (52%) of education graduates would have been teaching three years after graduation. Moreover, of those employed, more than one-third were working in a non-permanent position — a seasonal/casual job (31%) or a temporary contract position (68%). These findings are consistent with those from the OCT survey.

The high levels of unemployment among new teacher education graduates have led them to seek employment in other unrelated fields. The findings suggest that about one-quarter (26%) of 2009-10 education program graduates considered themselves overqualified for their jobs.

Figure 1-6: Labour Force Status, 2009-10 Graduates, Ontario, 2013



Source: 2013 National Graduates Survey, Statistics Canada

The next section describes the supply and demand dynamics that precipitated the current situation and provides an outlook for the teacher labour market over the next decade.

Labour Market Outlook for Teachers in Ontario

The current labour market imbalance for new teachers has not occurred spontaneously. Rather, it has been cultivated by a prolonged oversupply of new graduates entering the labour market compared to the limited number of employment opportunities for new teachers. The difficult job market currently faced by new teachers was caused by a response to a shortage that began to materialize in the late 1990s. But the supply response came too late and lasted far too long to address a short-term shortage. Understanding how the market imbalance occurred requires an examination of teacher supply and demand over the last two decades.

Demand

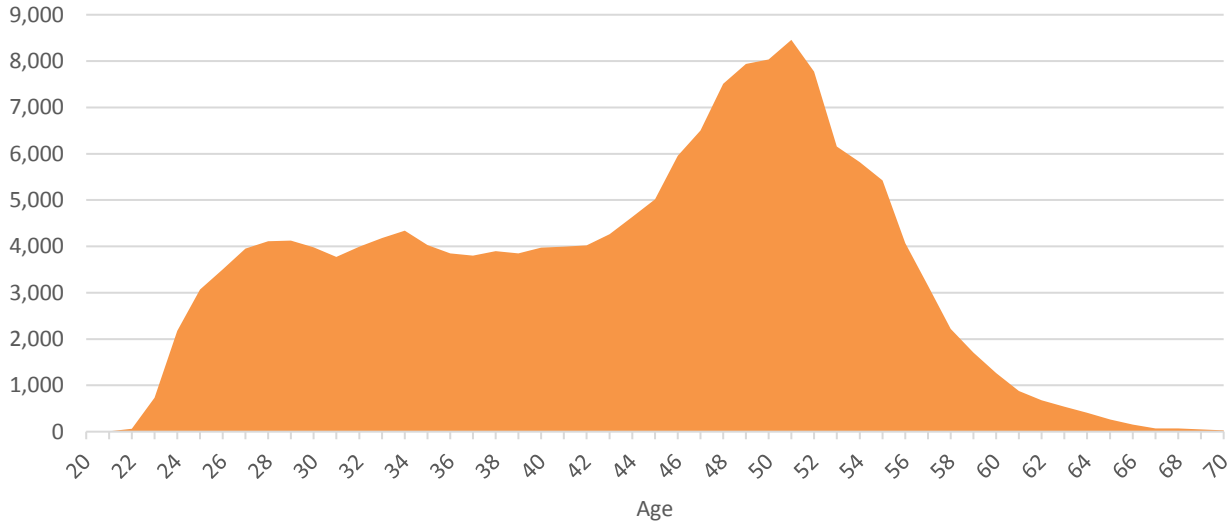
The demand for new teachers is driven primarily by three factors related to age demographics. The first is enrolment demand, which is the change in teacher employment related to fluctuations in the number of students enrolled at the elementary and secondary levels. Beyond changes in the school-aged population, enrolment demand can also be impacted by policy changes that alter the teacher-to-student ratio, such as class size or the introduction of full-day kindergarten. In addition to permanent teaching positions in the public system, a large number of teachers are employed on a contract basis to cover daily supply and long-term leave requirements. A third component of enrolment demand is employment outside the public system, which includes private schools and other government and public institutions (hospitals, correctional facilities, etc.).

The single largest determinant of demand for new teachers is replacement demand, or the number of teachers required to replace those exiting the workforce, primarily due to deaths and retirements but

also non-retirement withdrawals — a much smaller number — which tend to occur early in the career path.

In the mid-1990s, there was widespread concern that an expected wave of retirements and general upgrading of professional qualifications would result in a systemic shortage of teachers. In both Canada and the United States, concerns about a "demographic cliff" prompted a number of forecasts of supply and demand. The unusually large number of teachers hired in the 1960s and 1970s created an apparent demographic tsunami of teachers nearing retirement age. Enhanced early retirement provisions first became available to Ontario teachers in 1998.

Figure 1-7: Age Demographic Profile of Ontario Teachers, 1998



Source: Member age demographics data, OCT

In 1997, the skewed age profile, combined with enhanced early retirement provisions, led the OCT to forecast a "critical shortage" of teachers in Ontario due to the high number of retiring teachers. The OCT predicted that 10,000 more teachers would be exiting the labour force than the new teachers available over a five-year span, leaving a significant shortfall. To increase supply, the OCT recommended expanding training capacity by 2,000 teachers per year for five years. While large numbers of teachers did in fact retire, fewer did so than expected, with the timing of retirements shifting slightly toward the future. The annual number of retirements fell from more than 7,000 in 2001 to an average of 4,700 between 2004 and 2014.

The demographics certainly supported the original estimates, but behaviour was likely impacted by changes in government policy. By many accounts, conditions in the public school system deteriorated in the late 1990s when the Harris government passed Bill 160, which resulted in labour unrest and uncertainty that may have contributed to a spike in retirements during this period. Teachers who would have otherwise continued to teach chose to retire early. The tide turned in 2003 when the new Liberal government introduced measures to reduce class sizes and improve working conditions for teachers. In 2003, only 30% of primary classes had 20 or fewer students. Over the following four years until 2007-08, as more schools made classes smaller, this percentage increased significantly and reached close to 90%

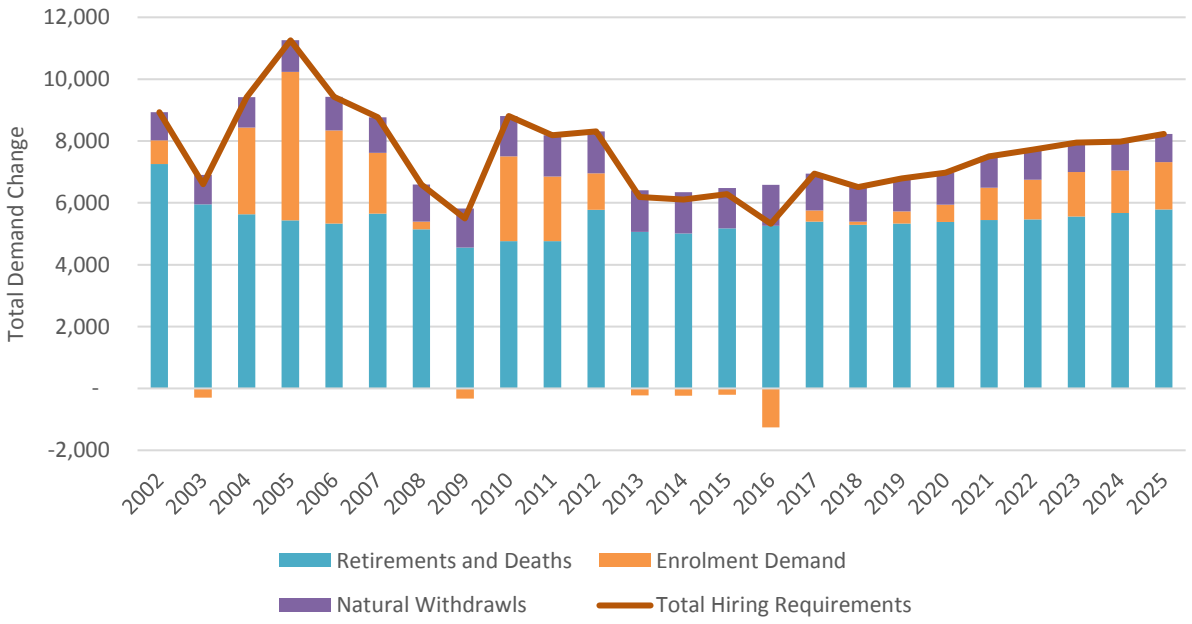
in 2007 (Ontario Ministry of Education, 2012). Though the decline in retirement rates cannot be attributed to decreased class sizes alone, the change in government policy did coincide with the trend and could have played a role.

The reduction of class sizes also increased demand for teachers just as enrolment began to decline. A decline in Ontario's school-aged population resulted in a downward trend in enrolment in 2003. By 2014, school enrolment had fallen by 6%. The implementation of policies to reduce class sizes resulted in a rise in annual hiring requirements for teachers, which would have otherwise fallen. From 2003 to 2008, the Ontario government funded more than 5,000 additional primary teacher positions to meet smaller primary class targets (Ontario Ministry of Education, 2012). Similarly, annual hiring requirements were bolstered between 2010 and 2012 by the implementation of full-day kindergarten.

The year 2016 marks an inflection point in annual hiring requirements. In 2017, it is anticipated that public school enrolments will begin to rise for the first time in well over a decade, following an increase in the population under the age of 5. The pace of enrolment will continue to rise as this cohort moves through the school system, adding significant demand after 2020. At the same time, retirements peaked in 2012 and continue to rise steadily. Overall annual hiring requirements are forecast to increase by about one-third, from 6,000 in 2015 to more than 8,000 by 2024 and 2025.

Figure 1-8 shows the historical and projected components of change in the annual demand for qualified teachers between 2002 and 2025.

Figure 1-8: Annual Hiring Requirements for Teachers in Ontario, 2002 to 2025



Source: Prism Economics and Analysis

Supply

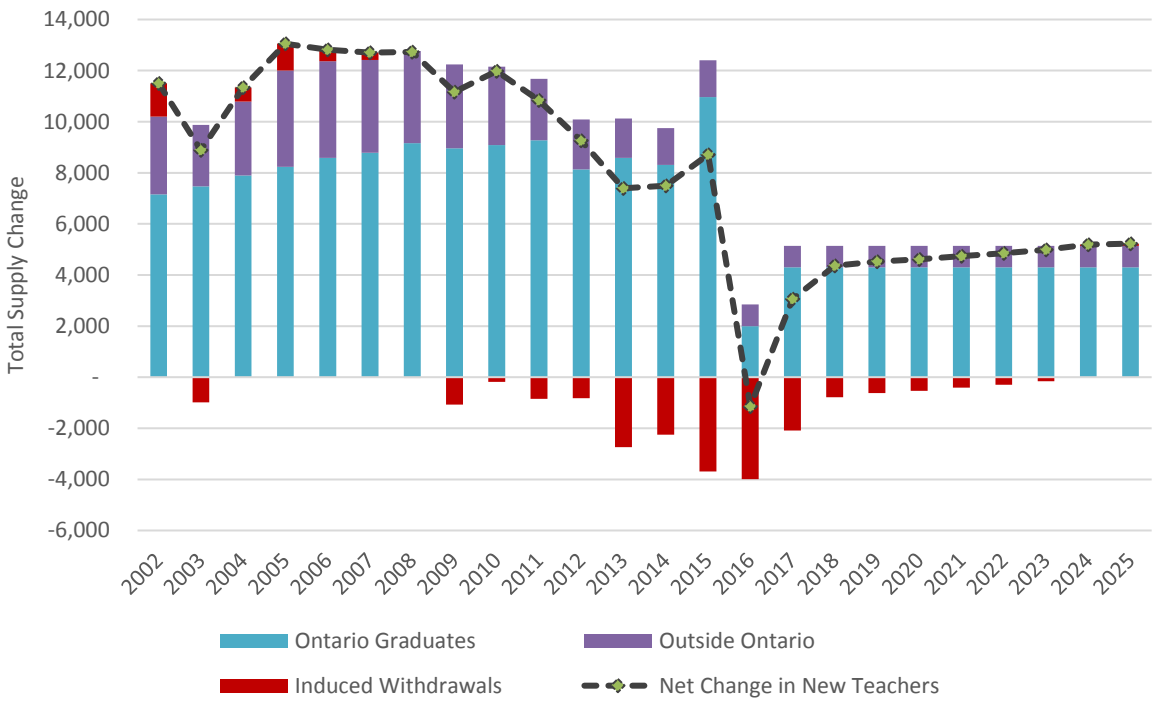
Despite policies that increased hiring requirements over the last decade, it was the sustained opening up of the supply of new teachers in the mid-2000s that tilted the labour market out of balance.

The supply response was slow to materialize. The OCT and Ontario's faculties of education began lobbying the government to fund additional teacher education spots since the sounding of the initial shortage alarm in 1997. In 1999, the Minister's Task Force on Teacher Recruitment and Renewal was established to respond to the purported shortage. During this time, many teachers were being lured back to teaching. It was not until six years later in 2003 that 1,500 new (temporary) teacher education spots were established, bringing the total to 6,500. Meanwhile, enrolment in four- and five-year concurrent teacher education programs also increased, and the total number of teacher education spots climbed to 8,000 by 2005. This was the same year the OCT declared the shortage over.

Aspiring teachers were undeterred by the end of the shortage and applications for teacher education programs continued to soar. Capacity at US "border colleges" expanded to meet the demand of 1,700 teaching graduates per year, while many students went further abroad to gain teaching qualifications. By 2008, the OCT was admitting 12,000 new members each year, with only 6,500 new teaching positions available annually.

Figure 1-9 illustrates the historical and projected change in the annual supply of qualified teachers between 2002 and 2025.

Figure 1-9: Annual Supply of New Teachers, 2002 to 2025

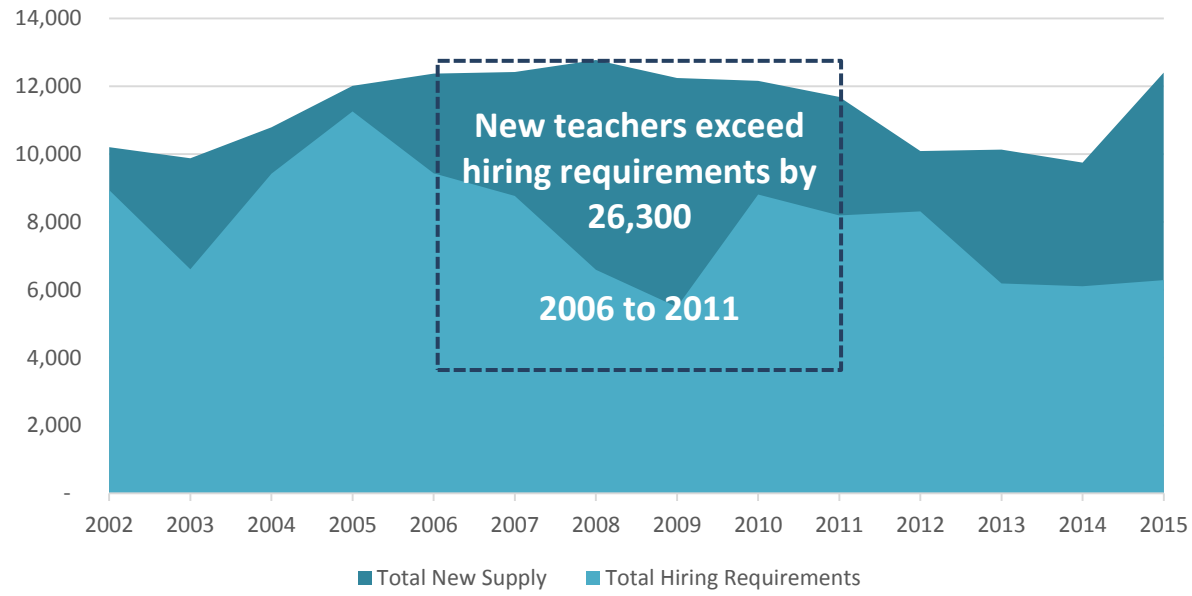


Source: Prism Economics and Analysis

The supply response from the province to curtail the number of teacher education spots was slow. The number of graduates from outside Ontario began to decline in 2009, but there was no reduction in the

number of teacher education spots until 2011. Ontario universities resisted any change. During the six-year period between 2005 (when the shortage was declared over) and 2011 (when the reduction in spots at faculties of education began) the 73,600 new graduates entering the supply pool exceeded available employment opportunities by 26,300. The result has been a dramatic increase in the unemployment rate for qualified teachers, from 6% to 8% in the early 2000s to 20% in 2015.

Figure 1-10: Annual Change in Supply and Demand for Ontario Teachers, 2002 to 2025



Source: Prism Economics and Analysis

Though many unemployed and underemployed teachers continue to hold on to their licences or have taken non-teaching employment, many others gave up searching for teaching positions and left the OCT. In the 10 years between 2006 and 2015, an estimated 10,200 qualified teachers left the teaching labour force.

In 2013, the Ontario government extended the length of the teacher education program from one year to two for students starting in September 2015. This change allowed education faculties to maintain the same 9,000 spaces, but the additional year reduces the cohort to only 4,500 students a year. This change will have a significant impact in 2016, the "gap year" in which the number of graduates will be significantly reduced. The reduced number of newly licensed teachers that will begin to emerge in 2016 is expected to increase opportunities for teachers from previous cohorts to find permanent jobs and footholds in part-time teaching positions.

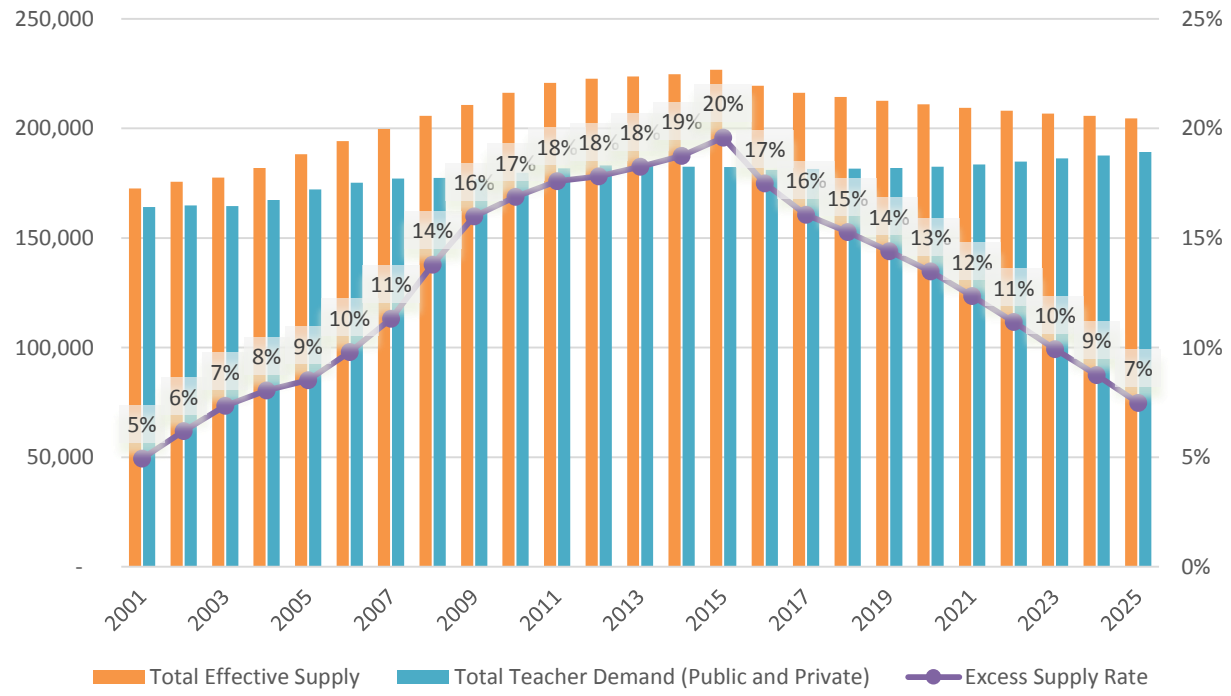
Looking Forward

Looking forward, the job market for new teachers will improve significantly as supply remains restricted and enrolment and replacement demands rise. Applications for the new two-year teacher education program are already falling below the number of funded program spaces. Convincing young people to pursue a teaching career may pose the next challenge for Ontario's education system.

The annual hiring requirement for both the public and private systems is estimated to average 7,000 over the 10-year period between 2015 and 2025, while only 4,900 newly licensed teachers are expected to enter the pool on average each year over the same period. As a result, the unemployment rate for licensed teachers should continue to decline at an accelerating pace, falling back below 10% by 2023.

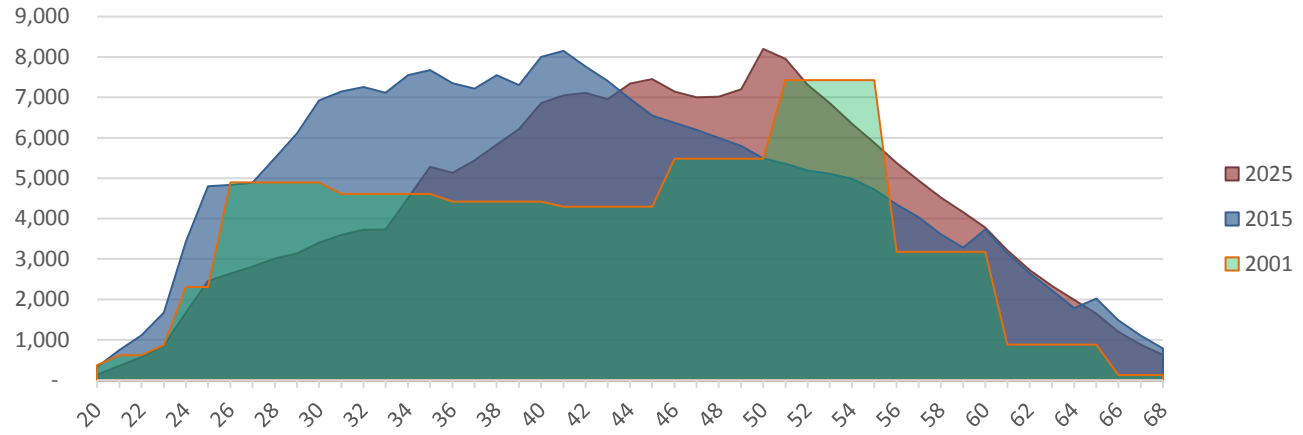
The big question is what happens beyond 2025. The labour market oversupply of the past decade has transformed the demographic age profile of teachers. The bulge of teachers approaching retirement in their mid-50s has been replaced with a new swell of teachers in their late 30s and early 40s. With enrolment restricted over the foreseeable future on one hand and rising retirements and employment demand on the other — in absence of any policy interventions — the teaching workforce may face another shortage in less than two decades. Although this might seem like a long time, the delay in supply responses witnessed over the last two decades provides evidence that by the time the alarm is sounded it is usually too late.

Figure 1-11: Labour Supply and Employment for Ontario Teachers, 2001 to 2025



Source: Prism Economics and Analysis

Figure 1-12: Age Demographic Profile of Ontario Teachers; 2001, 2015, 2025



Source: Prism Economics and Analysis

Table 1-3: Supply and Demand for Ontario Teachers, Ontario, 2015-2025

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Employment (Public and private)	182,381	181,120	181,478	181,585	181,975	182,533	183,581	184,857	186,294	187,670	189,199
Change	-200	-1,260	358	107	390	558	1,047	1,277	1,437	1,376	1,529
Replacement demand (Death and retirement)	6,484	6,584	6,584	6,406	6,403	6,422	6,457	6,450	6,513	6,603	6,700
Retirements	4,696	4,800	4,902	4,767	4,777	4,795	4,825	4,812	4,869	4,954	5,049
Death	475	456	491	525	556	586	622	656	686	715	741
Voluntary withdrawals	1,313	1,328	1,191	1,115	1,070	1,041	1,011	982	958	934	910
Total demand change	**6,284**	**5,324**	**6,942**	**6,513**	**6,793**	**6,980**	**7,504**	**7,726**	**7,950**	**7,979**	**8,229**
Effective supply	226,797	219,517	216,202	214,308	212,588	210,963	209,450	208,095	206,824	205,677	204,500
Change	2,090	-7,280	-3,315	-1,894	-1,720	-1,625	-1,514	-1,355	-1,271	-1,147	-1,177
New teachers	12,399	2,850	5,146	5,146	5,146	5,146	5,146	5,146	5,146	5,146	5,146
Ontario graduates	10,965	2,000	4,296	4,296	4,296	4,296	4,296	4,296	4,296	4,296	4,296
Other provinces	352	300	300	300	300	300	300	300	300	300	300
International graduates	847	500	500	500	500	500	500	500	500	500	500
Border colleges	235	50	50	50	50	50	50	50	50	50	50
Induced withdrawals	3,691	3,996	2,087	781	626	532	410	291	161	-39	-83
Net withdrawals	4,896	3,885	2,006	1,781	1,580	1,560	1,363	1,254	1,149	1,043	1,020
Supply change in teachers	**8,708**	**-1,146**	**3,059**	**4,365**	**4,520**	**4,614**	**4,736**	**4,855**	**4,985**	**5,185**	**5,229**
Excess supply	44,417	38,397	34,724	32,723	30,613	28,430	25,869	23,237	20,529	18,007	15,301
Change	2,290	-6,020	-3,673	-2,001	-2,110	-2,183	-2,561	-2,632	-2,708	-2,523	-2,706
Excess supply rate	20%	17%	16%	15%	14%	13%	12%	11%	10%	9%	7%

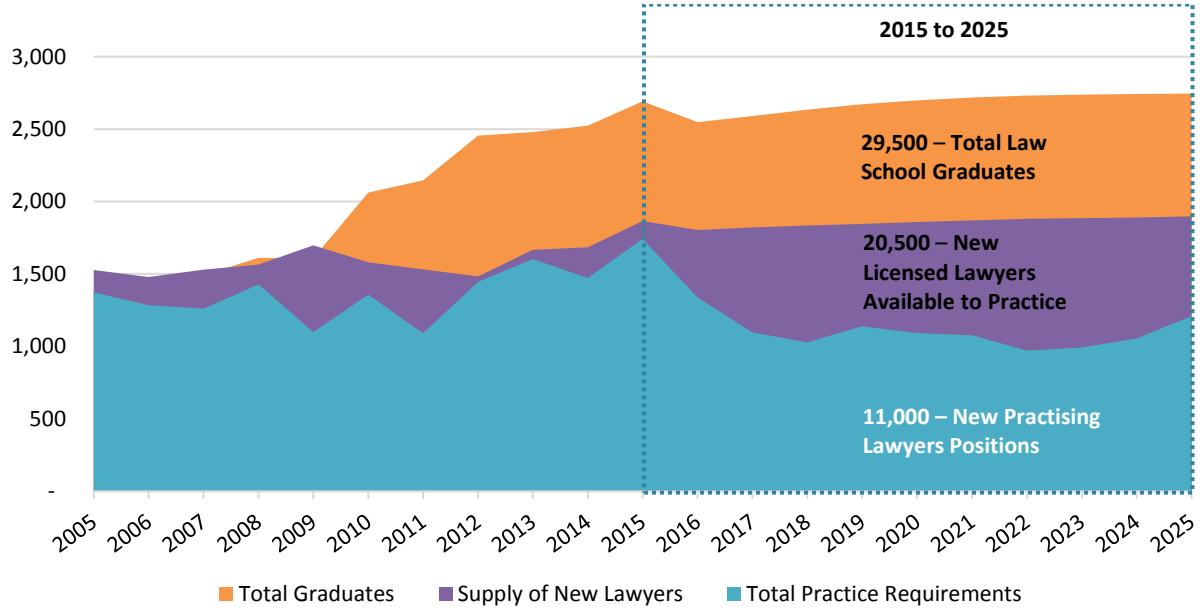
Source: Prism Economics and Analysis

2 Lawyers

The legal profession is experiencing changes that have increased uncertainty for law school graduates. Slowing demand for legal services and a rising supply of law school graduates have weakened labour market outcomes for new lawyers aspiring to enter the profession. Enrolment in law programs has outpaced overall graduate enrolment at Ontario universities, and in recent years the number of graduates has exceeded available articling positions. As the supply and demand trends intensify, future cohorts of law school graduates will face greater competition for fewer articling positions and falling earnings. They will increasingly need to leverage their law degree to seek employment outside the legal profession.

Expected growth in the annual number of retirements over the next 10 years will increase hiring requirements, but the high number of Ontario and international law graduates is expected to run well ahead of demand. Over the next 10 years, it is estimated there will be 1.6 new licensed lawyers for every new practicing position. The cumulative number of law graduates (both from Ontario and outside Ontario) between 2015 and 2025 is expected to total approximately 29,500, exceeding new practicing positions by close to 16,800.

Figure 2-1: Annual Change in Supply and Demand for New Lawyers in Ontario, 2005 to 2025



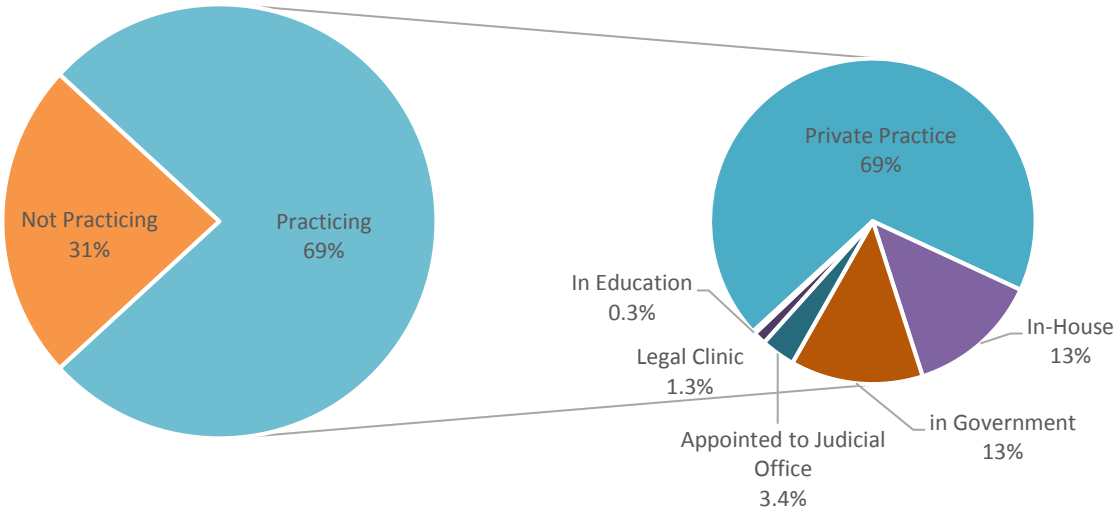
Source: Prism Economics and Analysis

Overview of the Labour Market for Ontario Lawyers

In 2011, the National Household Survey (NHS) estimated that there were 22,800 persons employed in Ontario as lawyers or judges. The majority of Ontario's lawyers are employed in the professional services industry (75%) and the government sector (14%).

The 2014 membership data from the Law Society of Upper Canada (LSUC) show that more than two-thirds (69%) of licensed lawyers are practicing law, with most (69%) working as sole practitioners (in private practice). The remaining one-third (31%) are not practising. This includes those not working, retired, or working in other occupations but maintaining their membership with the Law Society.

Figure 2-2: Profile of LSUC Membership, 2014



Source: Membership data, LSUC, 2014

While the overwhelming majority of law school graduates pursue licensure, data from the 2011 NHS show that four in 10 Ontario law school graduates work in occupations other than lawyers or judges. A relatively small number of law graduates work in related occupations, including paralegals (1%) and police officers (1%), but the majority are spread across various business, legal and government occupations.

Table 2-1: Occupations of Individuals with at Least a Bachelor's Degree in Law (LLB, JD, BCL), Ontario, 2011

Occupations	#	%
Total – Occupation (based on the NOC 2011)	38,240	100%
4112 Lawyers and Quebec notaries	**22,165**	**58%**
4111 Judges	**635**	**2%**
4211 Paralegal and related occupations	550	1%
4311 Police officers (except commissioned)	400	1%
0013 Senior managers – financial, communications and other business services	370	1%
1121 Human resources professionals	300	1%
1221 Administrative officers	290	1%
1114 Other financial officers	285	1%
1242 Legal administrative assistants	285	1%
0012 Senior government managers and officials	265	1%

Source: 2011 NHS, Statistics Canada

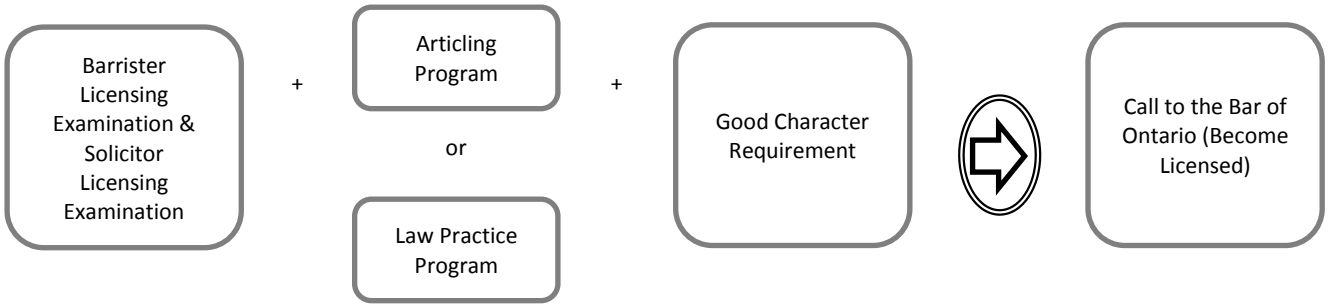
Regulation of the Legal Profession in Ontario

The Law Society of Upper Canada (LSUC) is the regulatory body licensing both lawyers and paralegals in Ontario. The professions are distinct, with separate scopes of practice. The LSUC accepts the three following educational paths in order to enter the lawyer licensing process:

- Graduates of an accredited law school (common law) holding a Bachelor of Laws (LLB) or Juris Doctor (JD) credential
- Internationally-trained or educated lawyers
- Lawyers from outside Ontario

The LLB and JD credentials are generally pursued following the completion of an undergraduate degree. The minimum length of these degrees is three years. International degree holders must apply to the National Committee on Accreditation (NCA) to have their law degree assessed for equivalency to Canadian requirements. Lawyers holding Canadian credentials from outside Ontario are allowed to practise law temporarily or permanently in accordance with the rules and regulations outlined in the National Mobility Agreement.

Figure 2-3: The Path to Licensure for Lawyers in Ontario



Source: Law Society of Upper Canada

The licensing process starts with examinations and continues with a work experience requirement that candidates can satisfy in one of two ways:

1. Articling program: The articling program is a 10-month work assignment under an approved articling principal. Candidates need to find their own articling assignment. They also need to complete the online professional responsibility and practice course and take the course assessment at the end of their assignment.
2. Law practice program: The LPP is made up of a four-month training course followed by a four-month work placement. It is currently being piloted by two universities (Ryerson University for the English LLP and the University of Ottawa for the French LLP). Work placements can be paid or unpaid.

After completing either the LPP or the articling program, the candidates will be called to the Bar of Ontario for their licence, provided that they fulfill the good character requirements. The Law Society requires all licensing applicants to disclose, among other things, criminal convictions, whether they have been subject to a penalty imposed by a court, administrative tribunal or regulatory body, or whether there are other matters in their past or present circumstances that may place their character at issue.

The Law Society administers two open-book exams to candidates who wish to be licensed:

- The barrister examination
- The solicitor examination

The barrister examination assesses knowledge, application and critical thinking in the following topics:

- Ethical and professional responsibilities
- Knowledge of the law, including areas of civil litigation, criminal procedure, evidence, public law and family law
- Establishing and maintaining the barrister-client relationship
- Problem/issue identification

- Analysis and assessment
- Alternative dispute resolution
- Litigation process
- Practice management issues

The solicitor examination assesses knowledge, application and critical thinking in the following topics:

- Ethical and professional responsibilities
- Knowledge of the law, including areas of real estate law, wills, trusts and estates, and business law
- Establishing and maintaining the solicitor-client relationship
- Fulfilling the retainer
- Practice management issues

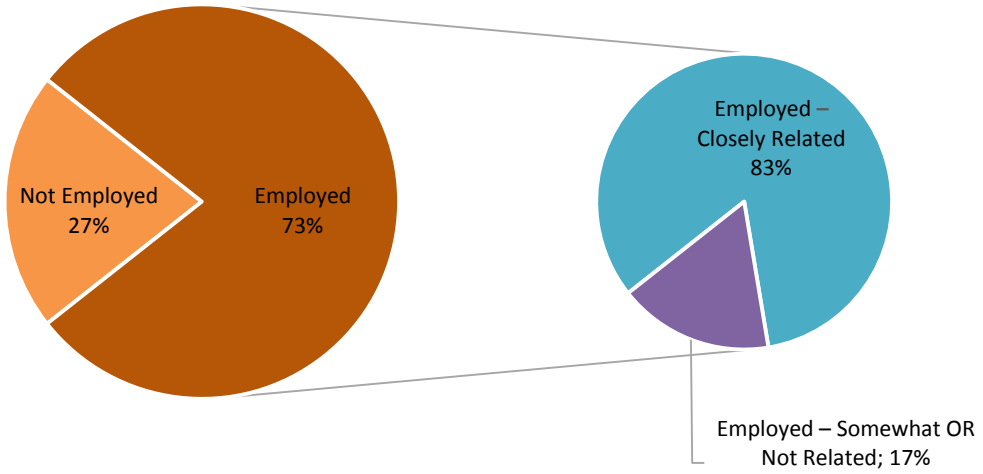
Candidates must pass both exams, each seven hours in length.

Labour Market Outcomes of Law Graduates

After graduation from law school, securing an articling position is the critical step in becoming a licensed lawyer. Not only is articling a mandatory requirement to practise law, but it also provides an opportunity to earn much-needed income after years of paying tuition. A strong majority (83%) of 2009-10 law graduates were employed as lawyers or in other closely related occupations three years after graduation. However, finding an articling position has become increasingly difficult as a growing number of graduates compete for a static number of spots. The piloting of the new law practice program (LPP) offers an alternative path to licensure. However, because some LPP spots are unpaid, the shorter (four-month) work term does not alleviate the financial burden law graduates face. It also effectively increases the level of competition in the labour market.

Results from the 2013 National Graduates Survey suggest that only 73% of law graduates from the 2009-10 cohort were employed three years after graduation. The remaining 27% may have gone back to school for further education or are unemployed. Of those employed, a strong majority (83%) were working in a law-related field, leaving approximately six in 10 total new law graduates employed in the legal field.

Figure 2-4: Labour Force Status, 2009-10 Law Graduates, Ontario, 2013



Source: 2013 NGS, Statistics Canada

It has been observed that, faced with growing competition, law students are increasingly combining traditional law degrees with more specialized credentials, such as an MBA, in order to apply law to a specialized niche. An alternative path is to find work outside of law. A law degree signals to employers a broad set of marketable skills. The aptitude for problem solving, and the strong analytical, presentation, negotiation and conflict resolution skills often associated with law graduates are highly transferrable and sought after by employers in business, insurance and finance (Canadian Bar Association, 2014).

An important signal of labour market strength is salaries for new lawyers. The annual compensation survey for Canadian Lawyer magazine found that first-year associate salaries have dropped back to 2013 levels following a spike in 2014, with median earnings across the country standing at $65,000, down from $80,000 in 2014 (Canadian Lawyer, 2015). The survey found that wages for newly hired in-house counsel have also dipped sharply, with the median 2015 call earning $64,000, compared to $89,000 in 2014.

The next section describes the determinants of demand and supply and provides an outlook for the labour market of practising lawyers over the next decade.

Labour Market Outlook for Practising Lawyers in Ontario

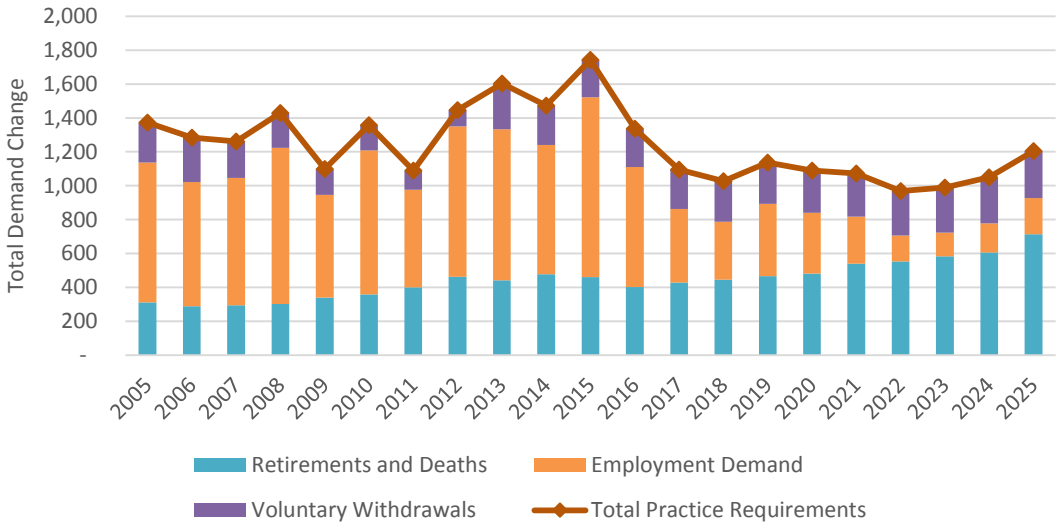
The number of licensed lawyers in Ontario has grown by one-third over the last decade, well ahead of growth experienced by most other professions and the general population. This growth trend isn't confined just to Ontario. The Canadian Bar Association, through its ongoing "Legal Futures Initiative," reports that between 2000 and 2010 the number of lawyers across the country increased at a rate almost five times higher than the rate of increase in the general population (CBA Legal Futures Initiative, 2013).

Demand

However, a closer look at LSUC membership data suggests that growth in the number of practising lawyers has been much slower. The estimated number has increased from 26,000 in 2005 to just over 34,000 in 2014, an average increase of 2.6% annually. This is about 20% lower than the growth rate of total LSUC membership growth during the same period. The implication is that both the number and the proportion of non-practising lawyers maintaining a licence is increasing significantly. Though there is no conclusive information about where the growing number of non-practising lawyers are working, data suggest that many are simply non-practising older lawyers, while others are maintaining their licences but working outside the profession or outside the province.

These trends have important implications for the employment outlook and annual hiring requirements for new practising lawyers. The two principal determinants of annual hiring requirements are economic expansion demand — the number of new lawyers required to meet the growth of legal services in the economy — and replacement demand — the number required to replace workforce retirements, deaths and voluntary withdrawals. The figure below shows a breakdown of annual hiring requirements between 2005 and 2025.

Figure 2-5: Annual Hiring Requirements for Practising Lawyers in Ontario, 2005 to 2025



Source: Prism Economics and Analysis

Expansion Demand

Though modest, employment growth has been the primary source of new hiring requirements over the last decade. The rate of annual employment growth is projected to slow, averaging only 1% to 2% annually between 2016 and 2025. This is because demand for legal services is driven largely by economic cycles and population growth. The expansionary period from the mid-2000s to 2008 drove significant growth for a variety of professional services. The 2009 recession led to a strong pullback in spending on professional services as companies reined in expenditures, resulting in turn in a pullback on demand for legal services. Figure 2-6 shows an index of growth in total GDP compared to the GDP for

legal, accounting and related services. GDP values for each industry represent the monetary value of all goods and services produced by that sector within a given geographical area over a specific period of time.

Figure 2-6: Index of Gross Domestic Product (GDP) by North American Industry Classification System (NAICS)

Source: Statistics Canada, CANSIM Table 379-0031, 2016

Although demand grew sharply during the recovery period between 2010 and 2011, growth in legal services lagged growth in the broader economy. One possible explanation is that the severity of the economic downturn changed the nature of demand for legal services in certain segments of the market. The efficiencies adopted by corporations and small firms alike to "do more with less" may have diluted demand for certain types of non-essential professional services, including legal.

During the same period, employment growth for lawyers in the public sector also slowed.[11] In short, the 2009 downturn and the recovery that followed appear to have had a lingering impact on demand for professional legal services.

Projections of slowing economic growth combined with increasing globalization, the adoption of new technologies, and rising competition will likely constrain the pace of employment growth for practising lawyers over the next decade. The forecasted demand for practicing lawyers will likely rise by an additional 3,200 to 38,290 by 2025, a 9% increase from 2015.

11 LSUC administrative data show that the number of lawyers practising in government grew at a much slower pace (1.8%) from 2008 to 2009 than in previous years (estimated 5.8% average annual growth from 2004 to 2008).

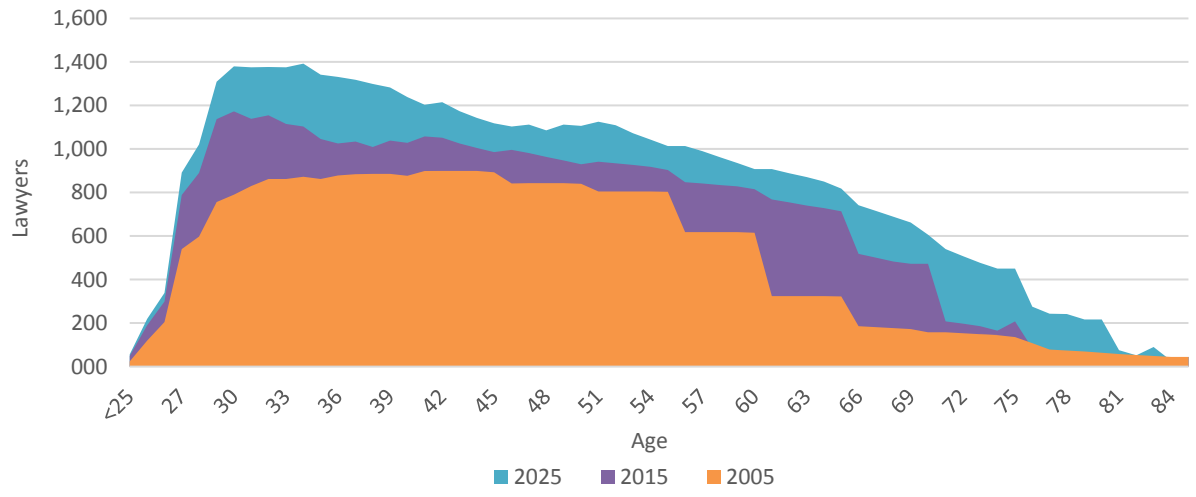
Replacement Demand

The "greying of the bar" has been a concern for the law community for over a decade. With the average retirement age around 75, lawyers work much longer than most other occupation groups. The baby boom cohort of lawyers is still hard at work, while their peers in other occupations are already well into retirement. According to the Labour Force Survey, the average retirement age across all occupations was 63.4 in 2015, while the LSUC membership data suggest that many lawyers practice into their 80s. The higher than average retirement age among lawyers creates fewer opportunities for new lawyers to enter the profession. The good news for the younger cohort is that lawyers will retire — eventually. The number of annual retirements has been on the rise in recent years as a growing number of lawyers reach their 70s. By 2025, the annual number of age-related exits (deaths and retirements) is expected to rise by 55% above the 460 estimated in 2015.

LSUC replacement demands are expected to be disproportionately greater among small firms and sole practitioners, which tend to have older age profiles than large firms. The Law Society also observes that many of these smaller firms are concentrated in rural communities outside Toronto. Higher wages paid by big GTA-based firms attract the lion's share of young law school graduates.

After 2018, replacement demand will be the dominant driver of hiring requirements for new lawyers. Although this should provide improved opportunities for young lawyers, managing the transfer of knowledge, mentorship and succession planning will become important. Figure 2-7 shows the shift in the age profile of practising lawyers in Ontario between 2005 and 2025. In 2005, the profile was distributed evenly between lawyers in their 30s and mid-50s and a large number spread from 60 to their mid-80s. In 2015, the proportion of practicing lawyers in their 60s swelled and the number of young lawyers also increased. The trend is expected to continue into 2025, with a significant number of lawyers in their 70s and 80s and a rising number of new lawyers skewing the age profile toward lawyers in their early- to mid-30s.

Figure 2-7: Age Profile of Practising Lawyers in Ontario, 2005 to 2025



Source: Prism Economics and Analysis
Note: Profile excludes members in retired and other status

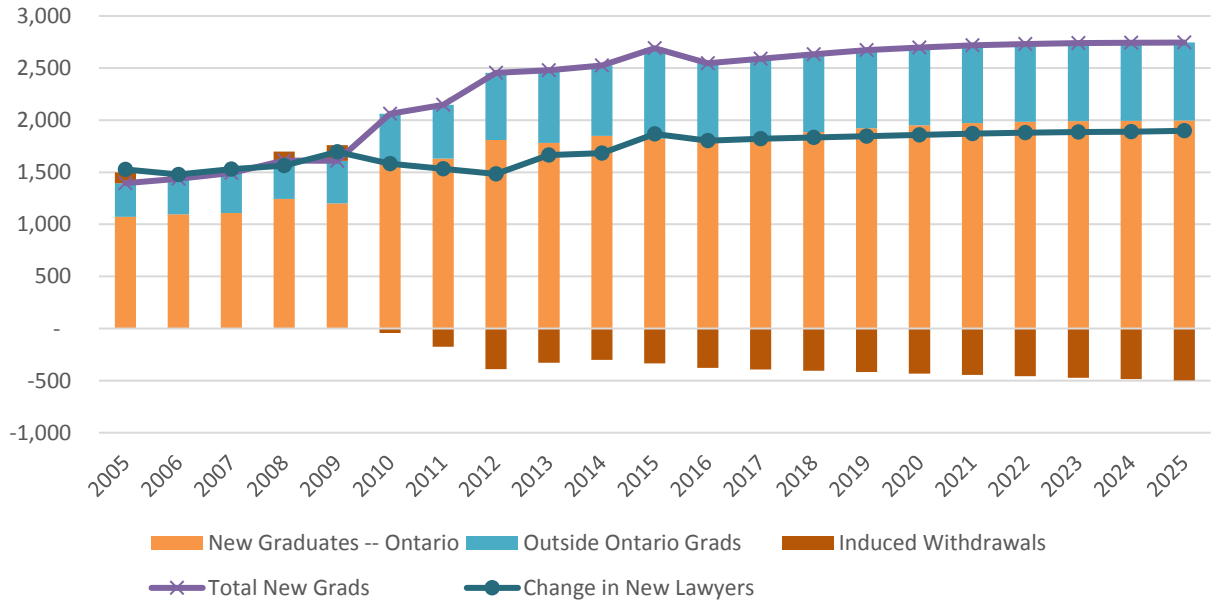
Supply

Graduates from Ontario law programs provide the largest supply of new lawyers in the province. The number of graduates began to rise in 2008 with the addition of programs and growth in the number of available spots. By 2012, the number of Ontario graduates surpassed 1,800, a 60% increase above 2007 levels. Over the same period, the number of new international graduates and those from other provinces also increased significantly. In 2012, the number of new law graduates approached 2,500, 1,000 more than five years earlier.

Despite the higher number of total graduates, the number of new licensed lawyers in Ontario remained steady at approximately 1,500 per year during the same period. The articling requirement imposes an effective ceiling on the supply of new lawyers as the number of positions is limited. The piloting of the law practice program (LPP) in 2015 lifted the ceiling slightly. The program accepted 225 students in its inaugural year, and the Law Society expects a similar number in 2016. With articling positions limited, the number of new lawyers called to the bar may well depend at least in part on the ability of the LPP to affect supply.

Figure 2-8 presents components of the supply of new lawyers from 2005 to 2025. The number of graduates is extrapolated using historical data obtained from Statistics Canada's Postsecondary Student Information System (PSIS). The rising number of law graduates set against the limited number of paid legal positions is leading to a growing number of qualified lawyers leaving the supply pool. This includes those taking opportunities outside the legal profession, returning to school or leaving the province. The number of induced withdrawals is projected to continue to rise as the number of graduates runs ahead of the number of articling positions and employment practice opportunities.

Figure 2-8: Annual Supply of New Lawyers, 2005 to 2025

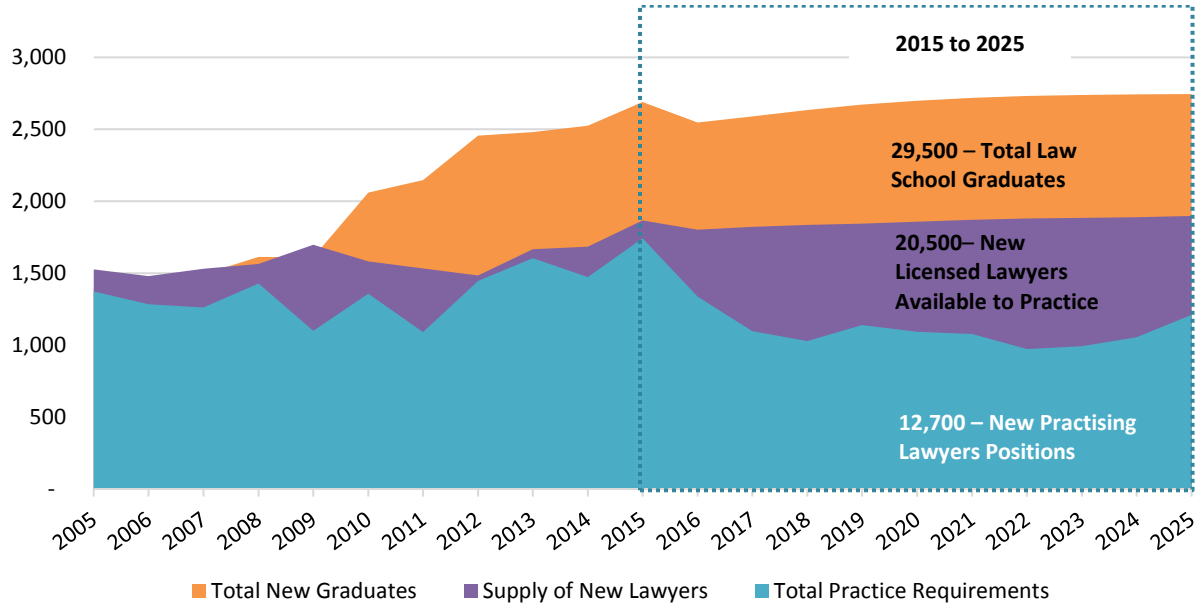


Source: Prism Economics and Analysis

Looking Forward

The cumulative effect of the rising number of graduates and receding growth in employment opportunities is an increasing excess availability of qualified lawyers. Based on the Lawyers Supply-Demand projection model developed in this research, it is estimated that over the 10-year period between 2015 and 2025, there will be 1.6 new licenced lawyers for every new practicing position. The cumulative number of law school graduates (both from Ontario and outside Ontario) is expected to total approximately 29,500, exceeding the number of new practicing positions by 16,800 over the same period.

Figure 2-9: Annual Change in Supply and Demand for Practising Lawyers in Ontario, 2005 to 2025



Source: Prism Economics and Analysis

Table 2-2: Projected Supply and Demand for Practising Lawyers, Ontario, 2015 to 2025

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Practising lawyers	**35,062**	**35,770**	**36,204**	**36,547**	**36,973**	**37,332**	**37,610**	**37,764**	**37,902**	**38,074**	**38,289**
Change	1,060	708	434	343	426	359	278	154	138	172	215
Replacement demand (death and retirement)	**461**	**402**	**429**	**445**	**466**	**481**	**540**	**553**	**585**	**606**	**714**
Retirement	303	246	264	280	298	312	358	374	399	419	464
Death – demographic model	158	156	165	165	169	168	181	179	185	188	249
Voluntary withdrawals	221	228	234	240	247	253	259	265	271	276	282
Total practice requirements	**1,742**	**1,338**	**1,097**	**1,028**	**1,139**	**1,093**	**1,076**	**971**	**994**	**1,055**	**1,210**
Effective supply	**41,758**	**42,931**	**44,090**	**45,239**	**46,371**	**47,496**	**48,568**	**49,630**	**50,660**	**51,667**	**52,570**
Change	1,184	1,173	1,159	1,149	1,132	1,125	1,072	1,062	1,030	1,007	902
New lawyers (LSUC)	**2,201**	**2,181**	**2,213**	**2,240**	**2,264**	**2,291**	**2,316**	**2,339**	**2,357**	**2,375**	**2,395**
New lawyers Ontario graduates	1,332	1,434	1,466	1,492	1,516	1,544	1,569	1,592	1,610	1,628	1,647
New lawyers from other provinces	396	321	321	321	321	321	321	321	321	321	321
New lawyers international	473	427	427	427	427	427	427	427	427	427	427
New lawyers from outside Ontario	869	747	747	747	747	747	747	747	747	747	747
Induced withdrawals	**- 335**	**- 378**	**- 392**	**- 405**	**- 419**	**- 432**	**- 445**	**- 459**	**- 472**	**- 485**	**- 497**
Net withdrawals	**- 556**	**- 606**	**- 626**	**- 646**	**- 665**	**- 685**	**- 704**	**- 724**	**- 743**	**- 761**	**- 779**
Available stock	**6,696**	**7,161**	**7,886**	**8,692**	**9,398**	**10,164**	**10,958**	**11,867**	**12,758**	**13,593**	**14,281**
Change	**124**	**465**	**725**	**806**	**706**	**7l66**	**794**	**909**	**891**	**835**	**688**
Availability rate	**16%**	**17%**	**18%**	**19%**	**20%**	**21%**	**23%**	**24%**	**25%**	**26%**	**27%**
Change in new lawyers	**1,866**	**1,803**	**1,822**	**1,835**	**1,845**	**1,859**	**1,871**	**1,880**	**1,885**	**1,890**	**1,898**
Supply less practice requirement	**124**	**465**	**725**	**806**	**706**	**766**	**794**	**909**	**891**	**835**	**688**

Source: Prism Economics and Analysis

Excess availability of lawyers will most likely result in a rising number of law school graduates not practising law. They will find opportunities in other professions or leave the province to find legal work elsewhere. However, the number of opportunities in other provinces is also limited and opportunities in the US, a popular destination for Canadian graduates in previous years, are not much better. Law schools in the US are laying off faculty and decreasing enrolment by as much as half as new lawyers struggle to find jobs (Gillis, 2013).

Another, more positive outcome may be that new graduates will create their own jobs. New technology enables small firms and sole practitioners to access new and larger markets. Innovation and cultural shifts may change how legal services are provided or lead to entirely new types of services. Whatever the future holds, the growing excess supply of lawyers will certainly have an impact on the legal industry as increased competition among new graduates and suppliers of legal services provide a catalyst for

change. For instance, cloud-based technology can be used to deliver unbundled[12] legal services. Handling document drafting through the use of technology — selling legal forms to customers online — using web conferencing tools or real-time chat technologies to handle unbundled coaching, and Online Dispute Resolution (ODR)[13] through web-based software systems are among examples of how technology is impacting the legal services field (Harvard Journal of Law and Technology, 2013).

3 Physicians

The complexity of measuring health care supply and demand has created uncertainty about future staffing trends and has led to policies that have produced several boom and bust cycles in the supply of physicians in recent years. Policies implemented in the early 1990s to address a perceived surplus of physicians resulted in a shortage by the end of the decade. Once these adverse effects were identified, a concerted effort was made to increase enrolments in the medical field in the late 1990s and early 2000s. These policies boosted numbers in medical schools and increased the intake of graduate-level trainees. Efforts made to repatriate physicians who had left the province, facilitate their entry into practice, and integrate international medical graduates living in Canada have also continued to this day.

The employment outlook for newly licensed physicians in Ontario is unclear. Demand has risen due to an aging population and an attrition of practising physicians from the workforce. However, the current levels of graduates from Ontario residency programs, combined with entrants from outside the province, still meet or exceed annual requirements.

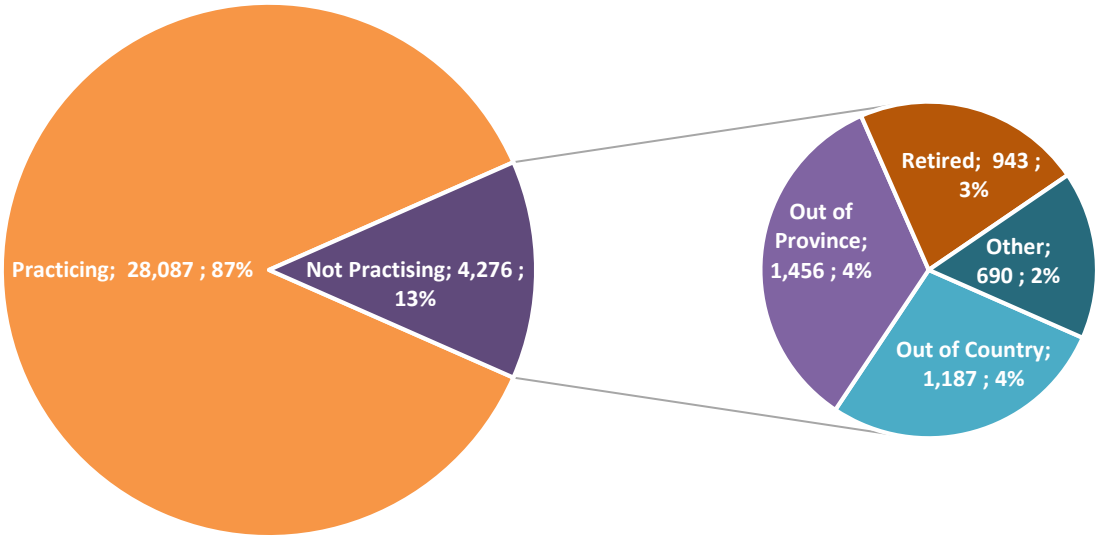
In the current climate, there is evidence that many newly licensed physicians are encountering difficulties finding positions, leaving many qualified physicians unemployed, returning to school for further education or searching for employment outside of the province. The situation is likely to improve over the next 10 years, but competition for highly sought after specialty residency programs will remain strong.

Overview of the Labour Market for Ontario Physicians

The number of physicians in Ontario has been on the rise over the last decade. In 2014, there were about 28,000 physicians in active practice in Ontario. This number has increased at an average annual rate of 2.6% since 2004, ahead of annual growth in the Ontario population, which averaged 1% over the same period (Statistics Canada, 2015). Of the total number of physicians licensed with the College of Physicians and Surgeons of Ontario (CPSO), a substantial number (4,276, or 13%) were not in active practice in Ontario in 2014. They included physicians who were out of the province (4%) or out of the country (4%), followed by phycians who were retired but kept their licences active (3%).

Figure 3-1: Share of Practising and Non-Practising Licensed Physicians, Ontario, 2014

12 Under a limited scope retainer, also known as an "unbundling" agreement, a lawyer or paralegal provides legal services for part, but not all, of a client's legal matter, by agreement with the client (LSUC).
13 Online Dispute Resolution or ODR is a term that encompasses any method of dispute resolution — arbitration, negotiation, mediation, and other methods of settlement—that are handled online (Harvard Journal of Law and Technology, 2013).



Source: Ontario Physician Human Resources Data Centre (OPHRDC)

According to the 2011 National Household Survey (NHS), 70% of university graduates with a medical degree in Ontario work as physicians, either as general practitioners and family physicians (45%) or as specialist physicians (25%). A relatively small percentage of MD graduates (2.4%) are engaged in other professions, such as health policy researcher, consultant or program officer, university professor and lecturer, or health care manager. The remaining 23% are spread across various occupations that do not require a medical degree, including registered nurses, medical sonographers and nurse aids. This could include individuals who might not have pursued a licence to practice.

Table 3-1: Occupations of Medicine Graduates with Average Wages and Salaries, Ontario, 2011

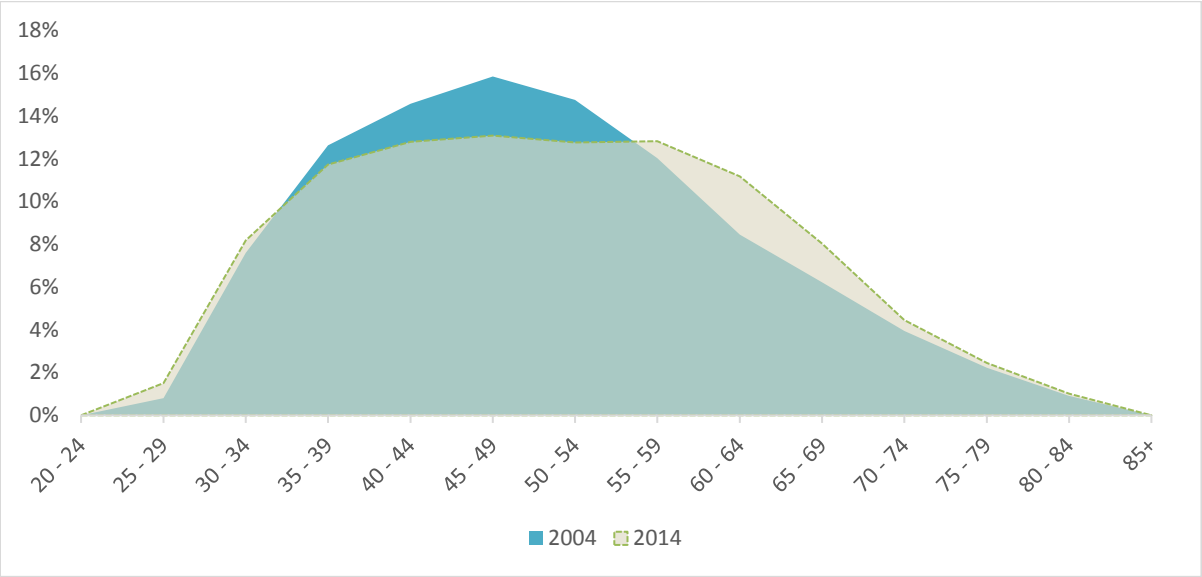
Occupations of Individuals with a Bachelor's Degree or above in Medicine	Share of Employment	Average Wages and Salaries
3112 General practitioners and family physicians	44.9%	$107,272
3111 Specialist physicians	25.2%	$125,298
3012 Registered nurses and registered psychiatric nurses	1.5%	$62,118
4165 Health policy researchers, consultants and program officers	1.0%	$72,114
3216 Medical sonographers	0.9%	$53,130
4011 University professors and lecturers	0.8%	$104,267
3413 Nurse aides, orderlies and patient service associates	0.7%	$35,989
4012 Post-secondary teaching and research assistants	0.6%	$29,080
0311 Managers in health care	0.6%	$144,136
Other	17.8%	

Source: 2011 NHS, Statistics Canada

Demographic Profile

Physicians today have a somewhat older age profile compared to a decade ago. More than one-quarter (27%) of Ontario's doctors were aged 60 or older in 2014, a slight increase from 22% in 2004. The average age of physicians has remained relatively stable at approximately 50 years of age for the past five years (Canadian Institute for Health Information, 2015).[14]

Figure 3-2: Age Profile of Ontario Physicians[15], 2004 and 2014



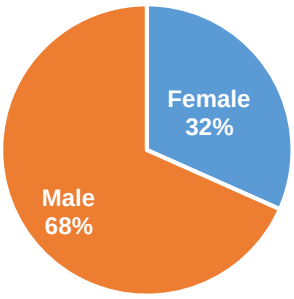
Source: Ontario Physician Human Resources Data Centre (OPHRDC)

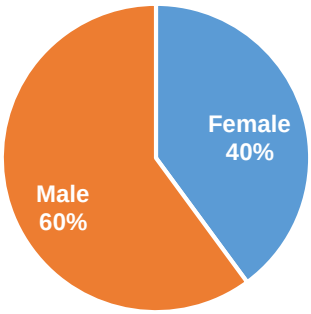
Female physicians were responsible for more than 70% of the increase in the number of CPSO licences over the past decade. The rising number of women entering the field has increased the share of female physicians from just over 30% in 2004 to 40% in 2014. In 2014, women accounted for 43.8% of family medicine physicians and 34.0% of specialists. The change in the gender mix of physicians may impact demand, as results from the National Physician Survey in 2014 suggest that female physicians work fewer hours per week than their male counterparts, 46.3 hours on average compared to 50.1 for men. The survey results suggest that female physicians are also more likely to restrict their work hours during childbearing years.

Figure 3-3: Increasing Share of Female Physicians

2004 **2014**

14 The average age of physicians in Ontario was 50 in 2010 and 50.1 in 2014.
15 Excludes residents and physicians above 85.





Source: Ontario Physician Human Resources Data Centre (OPHRDC), 2015

Regulation of Physicians in Ontario

All practising physicians in Ontario must be licensed by the College of Physicians and Surgeons of Ontario (CPSO) in order to practise medicine. The duties of the College are set out in the Regulated Health Professions Act (RHPA), the Health Professions Procedural Code (Schedule 2 to the RHPA) and the Medicine Act. These roles include:

- issuing certificates of registration to doctors to allow them to practise medicine
- monitoring and maintaining standards of practice through peer assessment and remediation
- investigating complaints about doctors on behalf of the public
- conducting disciplinary hearings when doctors may have committed an act of professional misconduct or may be incompetent (CPSO, n.d.)

The CPSO issues two classes of certification: practice certificates and postgraduate education certificates (PEC). Practice certificates include various classes of licences, such as the independent practice certificate, which permits physicians to practise independently in the areas of medicine in which they were educated.[16] This category accounts for the largest group of practice certificates issued. Other types of practice certificates include restricted practice, academic practice, short duration and academic visitor certificates, which are limited in their duration and/or impose conditions on practice.

The postgraduate education certificate (PEC) is issued to individuals enrolled in a postgraduate (post-MD) clinical training appointment at an Ontario medical school. The training appointments include the following:
Residency: Lasting two to five years, residency appointments prepare the trainee for the specialist examination requirements of either the College of Family Physicians of Canada or the Royal College of Physicians and Surgeons of Canada.

16 The certificate does not designate a medical area for the holder to practise. However, certified physicians are expected to practise in their area of education and expertise.

Clinical fellowships: Fellowships are advanced training opportunities pursued after completion of residency and the specialist examination. Clinical fellowships can last one to three years.

Elective: Electives are short-term (i.e., up to 15 weeks) training appointments taken in Ontario by residency trainees from another province.

Residents make up by far the largest group of PEC holders.

Path to Licensure

To be licensed by CPSO, applicants must have a degree in medicine from an accredited medical school or an "acceptable unaccredited" medical school. An accredited medical school is certified by the Committee on Accreditation of Canadian Medical Schools or by the Liaison Committee on Medical Education of the United States of America, and requires its students to complete an undergraduate program of medical education that includes a clerkship complying with the Medicine Act, 1991. An "acceptable unaccredited" medical school is considered equivalent to an accredited school if:

- It teaches medical principles similar to those taught in accredited schools
- It includes at least 130 weeks of instruction over three years and is listed in the World Directory of Medical Schools published by the World Health Organization

Graduates from an acceptable unaccredited medical school are referred to as international medical graduates (IMGs) regardless of their citizenship or legal status in Canada. Therefore, IMGs include three groups of physicians: immigrant physicians, Canadians who completed their MD abroad and physicians on a visa for postgraduate training in Canada. The majority of visa physicians return to their home country after completing their postgraduate training. Their education is usually sponsored by their country of origin and they do not compete for residency spots through the Canadian Residency Matching Service (CaRMS). As a result, visa physicians are excluded from this study. Immigrant physicians may already qualify for entry to practice or may try to qualify through postgraduate training programs. Canadians who completed their MD abroad usually have no previous postgraduate training and will try to compete for residency positions through the CaRMS (Walsh et al., 2011).

In order to obtain an independent practice certificate, individuals must meet the following requirements set out by CPSO:

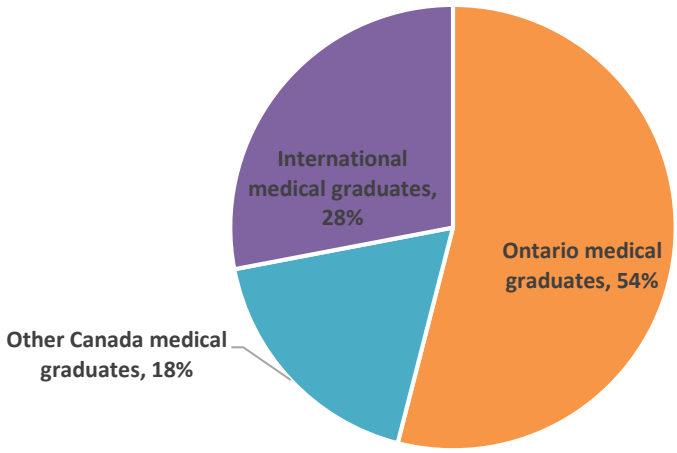
- Possess a degree in medicine from an accredited medical school or an acceptable international medical school
- Complete part 1 and part 2 of the Medical Council of Canada Qualifying Examinations or an acceptable alternative examination
- Achieve certification by examination by either the College of Family Physicians of Canada (CFPC) or the Royal College of Physicians and Surgeons of Canada (RCPSC)
- Complete one year of postgraduate training in Canada or active medical practice, or complete a full clinical clerkship at an accredited Canadian medical school
- Have Canadian citizenship or permanent resident status

In May 2014, CPSO approved an amendment that would drop the Canadian citizenship or permanent residency requirement for IMGs who meet all other criteria for certification.

Mobility

Mobility plays a central role in facilitating the supply of new physicians in Canada. While more than half (54%) of Ontario's physicians are medical graduates from the province, an increasing share is comprised of international medical graduates (28%). Medical graduates from other provinces made up the remaining 18% of physicians practicing in Ontario in 2014.

Figure 3-4: Share of Physicians by Place of MD Attainment, Ontario, 2014



Source: OPHRDC

Table 3-2: Share of Ontario Physicians by Place of MD Attainment, Ontario, 2004 and 2014

	2004	2014
Ontario medical graduates	57%	54%
Other Canadian medical graduates	19%	18%
International medical graduates	24%	28%

Source: OPHRDC

Medical graduates from outside Ontario could include qualified doctors moving to Ontario from other provinces or countries, or university graduates from other provinces or countries who have completed their residency in Ontario and have obtained a practice certificate.

Agreement on Internal Trade (AIT)

The Agreement on Internal Trade (AIT), which was signed in 1995, includes provisions enabling unrestricted mobility between provinces for eligible candidates who are licensed to practise medicine in Canada. The AIT became law in Ontario in December 2009 with the passage of Bill 175, which required CPSO to license applicants who hold an equivalent certificate in a Canadian jurisdiction. These provisions allow individuals to apply for certification based on their holding an out-of-province licence, rather than possessing the specific Canadian postgraduate qualifications that would otherwise be required.

In April 2009, the Collège des médecins du Québec and the College of Physicians and Surgeons of Ontario also signed an agreement to facilitate mobility between the two provinces. The agreement applies to those physicians in Quebec and Ontario who hold a full, unrestricted, unconditional licence for independent practice.

Policy Changes

In recent years, CPSO has approved a number of policies to facilitate the entrance of new physicians into Ontario's labour force. These range from agreements on the freedom of interprovincial movement of physicians to creating alternative certification methods for some qualified candidates. Some of these policy changes are described below.

Four New Pathways

In an effort to improve access and reduce barriers for qualified physicians, CPSO's council approved four new registration pathways that came into effect on December 1, 2008. These paths for accreditation remove the need to obtain RCPSC or CFPC certification and facilitate entry into practice for qualified individuals with Canadian or US postgraduate training.

The first two pathways apply to individuals who possess a Canadian (pathway one) or an international (pathway two) medical degree who have completed their postgraduate training in Canada. Eligible applicants have the option of applying for an independent practice certificate of registration without achieving RCPSC or CFPC accreditation provided they undergo an assessment after the first year of practice and abide by CPSO's quality assurance committee enhancement/remedial recommendations.

The third and fourth pathways apply to Canadian or US medical graduates (pathway three) or IMGs (pathway four) who have completed their postgraduate training in the US. Under this policy, eligible candidates have a route to an independent practice certificate of registration, subject to an initial one-year period of practice under supervision (or with a mentor) and successful completion of an assessment after the first year of practice. This pathway does not require that the Accreditation Council for Graduate Medical Education (ACGME) residency be comparable in content and duration to a Canadian training program in the same discipline.

Trends in Medical Postgraduate Education

Medical school graduates compete at the national level to be matched through the Canadian Resident Matching Service (CaRMS) with a postgraduate training program at one of Canada's 17 medical schools. Postgraduate medical education (PGME) offices determine which programs participate in the match and assign a number of available positions (quota) to each participating program. PGMEs can move quota from one program to another any time prior to the running of the match. The algorithm attempts to

match applicants with their preferred program, based on a ranked list that candidates submit. At the end of the matching process, each applicant has either been matched to a program on their list or has exhausted their options. In 2015, a significant proportion of Canadian MD graduates (95.4%) were matched in the first iteration; this percentage was 96.1% after the second iteration. Among graduates from Ontario medical schools, 94.8% were matched in the first iteration in 2015.

Out of 3,321 residency positions available across the country, 2.2% or 73 residency spots remained unfilled after the second iteration of the matching process in 2015. There was only one unfilled position in Ontario in 2015.

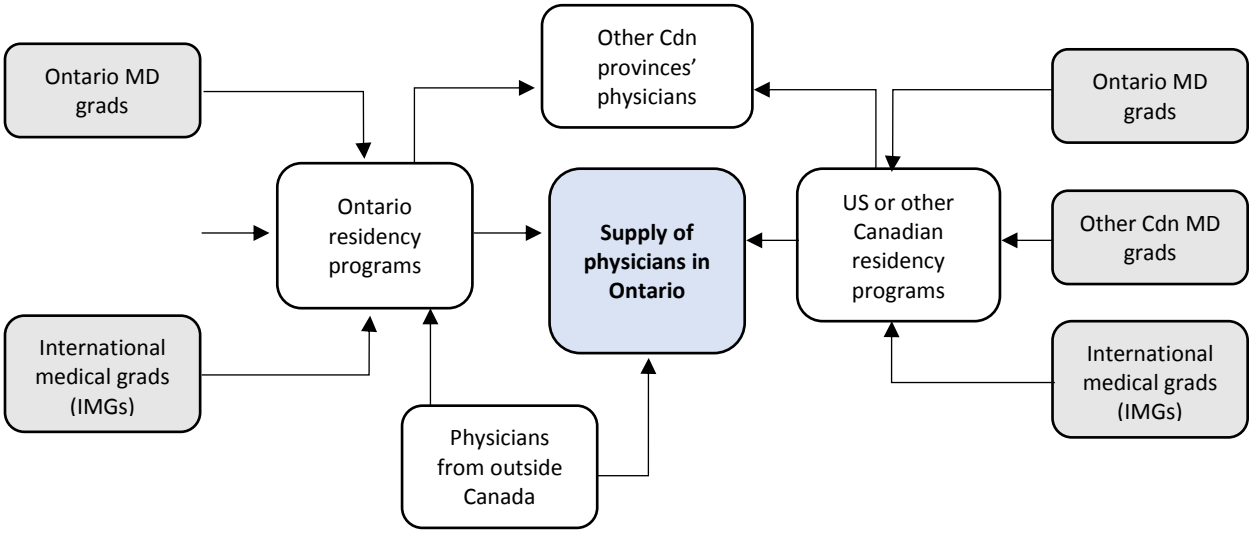
Table 3-3: Number of Available Residency Positions, Filled and Unfilled Ratios, Ontario, Canada, 2015

	School of Residency	Positions Available	Percentage Filled	Percentage Unfilled
First iteration results	Ontario	1,211	95.5%	4.5%
	Canada	**3,321**	93.5%	6.5%
Second iteration results	Ontario	55	98.2%	1.8%
	Canada	**216**	66.2%	33.8%

Source: CaRMS, 2015

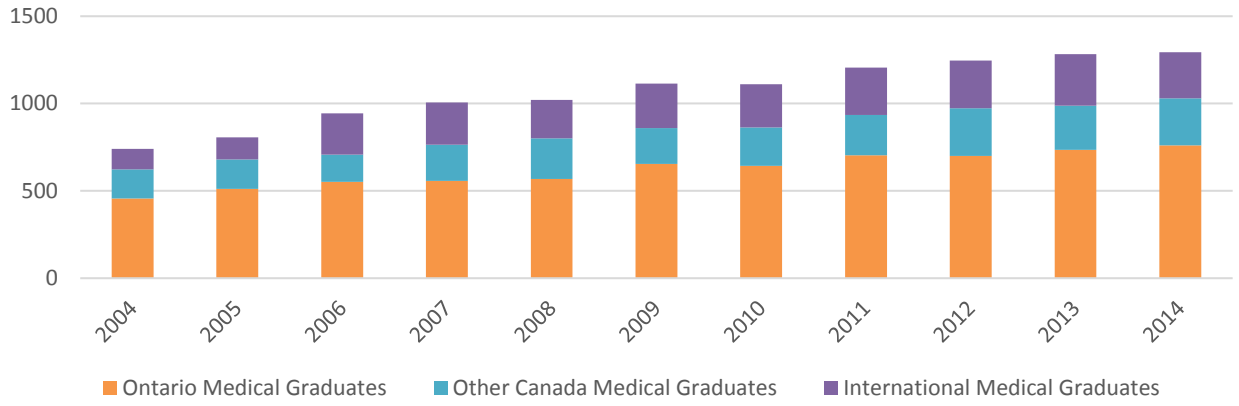
The national residency matching system increases the movement of medical graduates. Ontario medical graduates can be matched with residency programs outside of Ontario and return to the province at the end of their postgraduate studies. Similarly, MDs from outside Ontario may complete their postgraduate studies in Ontario and then either stay, return home or move elsewhere.

Figure 3-5: Physician Supply Dynamic



While five provinces have only one medical school, Ontario has six of Canada's 17. In 2015, Ontario accepted 1,211 medical graduates into postgraduate training, more than 37% of the total Canadian population of postgraduate trainees. Entry into residency in Ontario has significantly increased since the mid-2000s, and a growing number of postgraduates in Ontario include IMGs, whose number has more than doubled, rising from 117 in 2004 to 264 in 2014. They accounted for 20% of entrants into Ontario residency schools in 2014, up from 16% in 2004.

Figure 3-6: Entrants into Ontario Residency Spots by Place of MD Attainment, 2004 to 2014



Source: OPHRDC

Family medicine is the most common first-choice residency specialization among postgraduate trainees across Canada, followed by internal medicine; 38.5% of Canadian medical graduates, 40.1% of Ontario medical graduates and 54.1% of IMGs selected family medicine as their first choice for residency. Surgery ranked third among both Ontario and Canadian graduates, while IMGs preferred psychiatry as their third choice in 2015.

Table 3-4: First Choice Residency Specialization of Ontario Medical Graduates, Canadian Medical Graduates (CMG) and International Medical Graduates (IMG), 2015

	Ontario MD Graduates	CMG	IMG
Family medicine	40.1%	38.5%	54.1%
Internal medicine	13.1%	13.6%	11.4%
Surgery	12.4%	9.0%	4.7%
Psychiatry	5.2%	6.0%	6.8%
Other specialties	28.6%	32.9%	23.0%

Source: CaRMS, 2015

Labour Market Outcomes of Medical School Graduates

Estimating labour market outcomes for medical school graduates is surprisingly challenging. Medical school graduates are highly mobile, and residency requirements blur the line between education and employment. The length of residency also limits the usefulness of the National Graduates Survey, which tracks graduates three years after graduation, when those who chose to pursue postgraduate training are still studying. Despite these confounding factors, results from a recent study conducted by the Royal College of Physicians and Surgeons of Canada suggest that outcomes for many newly licensed physicians are less than optimal.

The results of the study, which included a survey of new specialists and subspecialists who were certified in Canada in 2011 and 2012, found that 16% of respondents were unable to secure employment, while a further "31.2% chose not to enter the job market, opting to pursue further training" (Fréchette, Hollenberg, Shrichand, Jacob & Datta, 2013). Among 472 Ontario respondents, 29% were employed and nearly half (47%) had planned additional training. A further 20% did not have a job placement at the time of the survey. Although the study focused exclusively on specialists, the findings suggest weak employment outcomes for newly licensed physicians in Ontario.
The next section describes the supply and demand dynamics for practising physicians and provides an outlook for the labour market over the next decade.

Labour Market Outlook for Physicians in Ontario

The overall demand projections for practising physicians are divided into economic demand and demographic demand. The change in projected employment of practising physicians is an approximate measure of economic demand. Demographic demand comprises the sum of projected retirements, deaths and voluntary withdrawals from the physician labour force.
Supply projections are based on historical enrolment and graduation trends in Ontario medical school programs, historical data on international migration, and an estimate of inter-provincial migration based on historical patterns.

Demand

Demand for physicians is driven primarily by demographics, especially population growth and the relative size of the older and younger age groups. As Ontario's population ages, demand for long-term care, chronic disease care and disability health care is expected to rise.

Since 2004, Ontario's population aged 60 and older has increased by close to 40% and it is expected to increase by another 40% by 2025. To meet rising demand requirements, approximately 600 new doctors were hired each year between 2004 and 2014. Overall employment growth averaged 2.6% per year since 2004, well ahead of the annual growth of the Ontario population, which averaged 1% over the same period. The rate of growth increased the ratio of Ontario physicians from 180 per 100,000 population in 2004 to 214 in 2014.

Though population growth and physician-to-population ratios provide an important indicator of demand, the nature of Canada's public health-care system makes government expenditure on health care, technology and the way in which health care services are delivered the true determining factors of demand for physicians. The physician supply-demand forecasting model developed as part of this study estimates that annual expansion of demand-related hiring requirements for new physicians will average between 500 and 600 per year over the next decade.

Replacement Demand

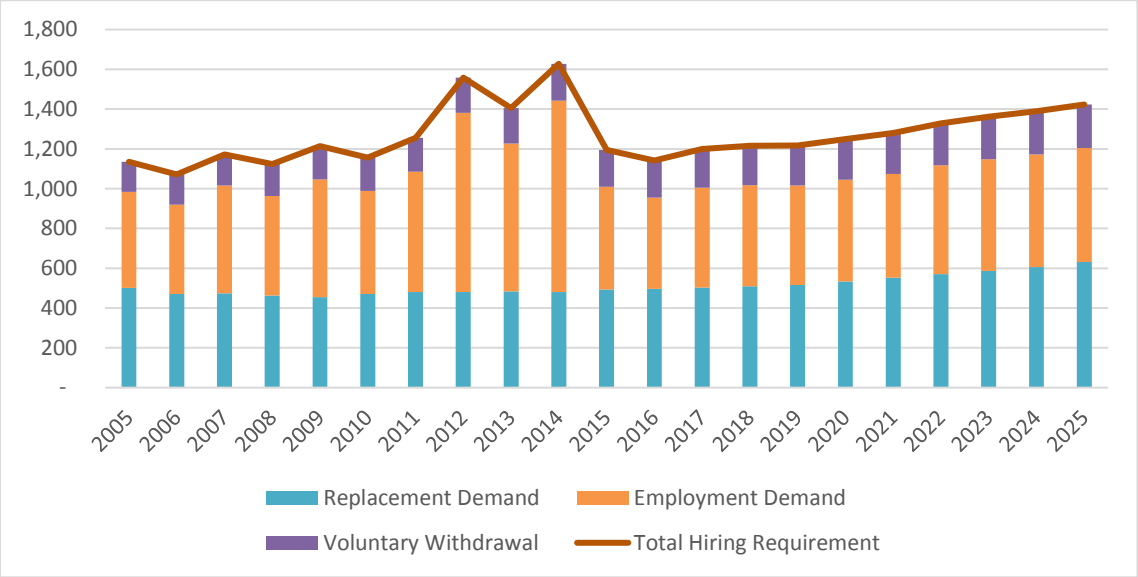
Attrition of physicians from the workforce due to death, retirement and voluntary withdrawal is another source of demand. Physicians tend to retire later than those in other occupational groups. Based on the statistics published by the Canadian Medical Association, 15% of all physicians in Canada were above the age of 65 in 2016.[17] This is significantly higher compared to the average share of this age group across all occupations (4%) based on the Labour Force Survey data (2015). Similarly, the College membership data suggest that many physicians in Ontario choose to remain in clinical practice later in life while reducing working hours – the membership data indicates that between 12% and 16% of Ontario physicians are above 65.

The number of physicians retiring has remained steady since 2004, averaging just under 500 each year. This number is expected to rise in coming years, growing to approximately 600 per year by 2025. The number of voluntary withdrawals from the physician workforce is expected to remain steady at around 200 per year.

As a result of these factors, the total hiring requirements are expected to rise steadily from 1,100 in 2016 to just under 1,400 per year by 2025, and the total employment of practicing physicians is projected to rise from 28,600 in 2016 to 33,850 in 2025.

17 https://www.cma.ca/Assets/assets-library/document/en/advocacy/02-physicians-by-specialty-age-e.pdf.

Figure 3-7: Annual Hiring Requirements for Ontario Physicians, 2005 to 2025



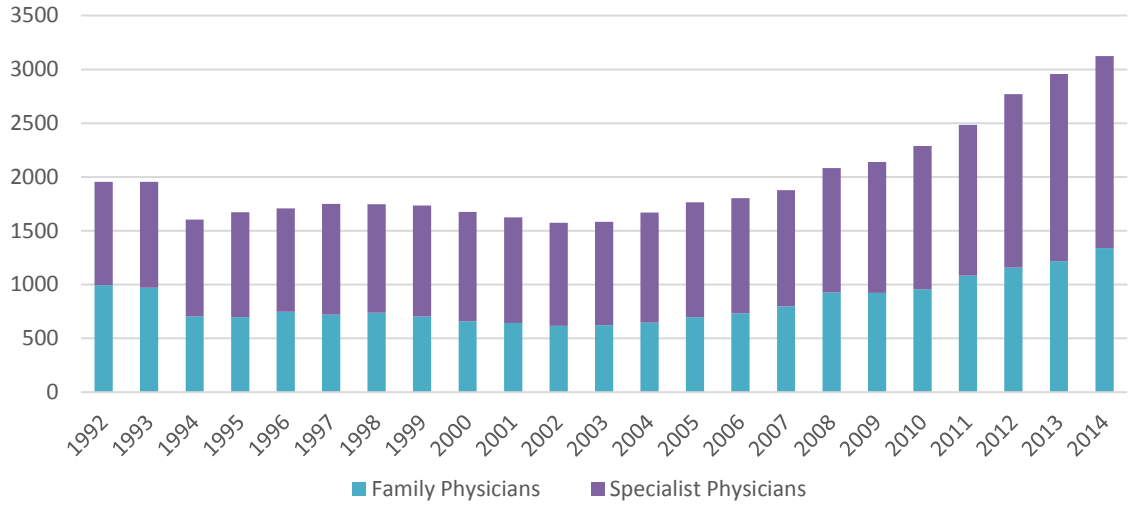
Source: Prism Economics and Analysis

Supply

The complexity of measuring health care supply and demand has created uncertainty about future trends and has led to policies that have produced several boom and bust cycles in the supply of physicians in recent years. In the early 1990s, the consensus was that Canada faced an oversupply of physicians because the growth in the number of physicians was outpacing growth in the general population. To address this concern, the federal government implemented a (cumulative) 10% cut to medical school enrolments across the country (Chan, 2002).

As its part of the national strategy, Ontario reduced medical school class sizes by 10% to 15% in 1991 (Rosser, 1999). In 1992, the one-year rotating internship was eliminated and new graduates were required to complete at least two years of residency to become family physicians. This led to an eventual decline in the number of family physicians. Additionally, in the early 1990s there was a shift among medical graduates away from choosing a career as a family physician to becoming a specialist. This shift prolonged the duration of training for physicians and resulted in a decline in the number of physicians available to practise.

Figure 3-8: Number of Post-MD Graduates,[18] Canada, 1992 to 2014



Source: Annual Census of Post-MD Trainees (CAPER, 2015)

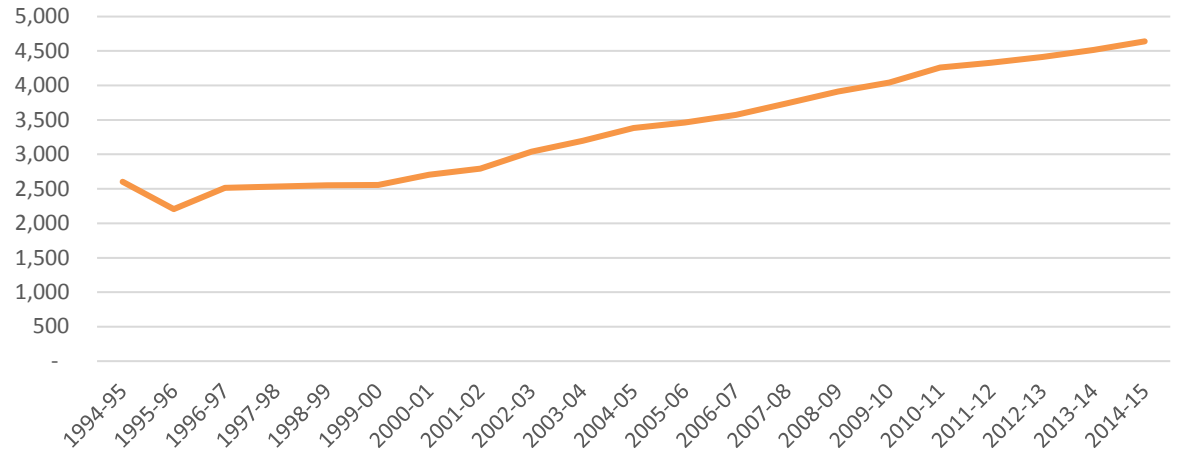
To avoid the predicted surplus and to limit further the supply of physicians, new licensing criteria in the 1990s required the completion of at least one year of postgraduate training at a Canadian residency school, thereby restricting entry for internationally trained physicians. At the same time, provincial cuts to the health care budget, hospital closures and several years of capped physician fees led to a substantial emigration of Ontario physicians to other Canadian jurisdictions and to the US (Rosser, 1999).

The perceived surplus of physicians turned into a shortage in less than a decade. The number of physicians in Ontario per 100,000 population declined from 193 in 1993 to 179 in 1999 (Canadian Institute for Health Information, 2015). As a result of enrolment cuts in the early to mid-1990s, the number of post-MD graduates entering practice declined by 10% across Canada between 1997 and 2003. The reduced supply led to reported increases in physician workloads and increased wait times for specialist services. In 1999, the Canadian Medical Forum predicted an impending shortage of physicians and recommended increasing enrolment in medical schools and the intake of postgraduate trainees, repatriating physicians who had left, and training international medical graduates living in Canada.[19]

Provincial governments responded by increasing the number of spots available for both undergraduate and postgraduate medical students. Enrolment in Ontario medical schools grew by 25% between 1999 and 2003, from about 2,550 to close to 3,200. By the mid-2000s, the declining trend in postgraduates entering the labour force had reversed as a result of increased enrolment. The number of post-MD graduates from Ontario's faculties of medicine has more than doubled since the early 2000s, increasing from 600 in 2002 to more than 1,280 in 2014.

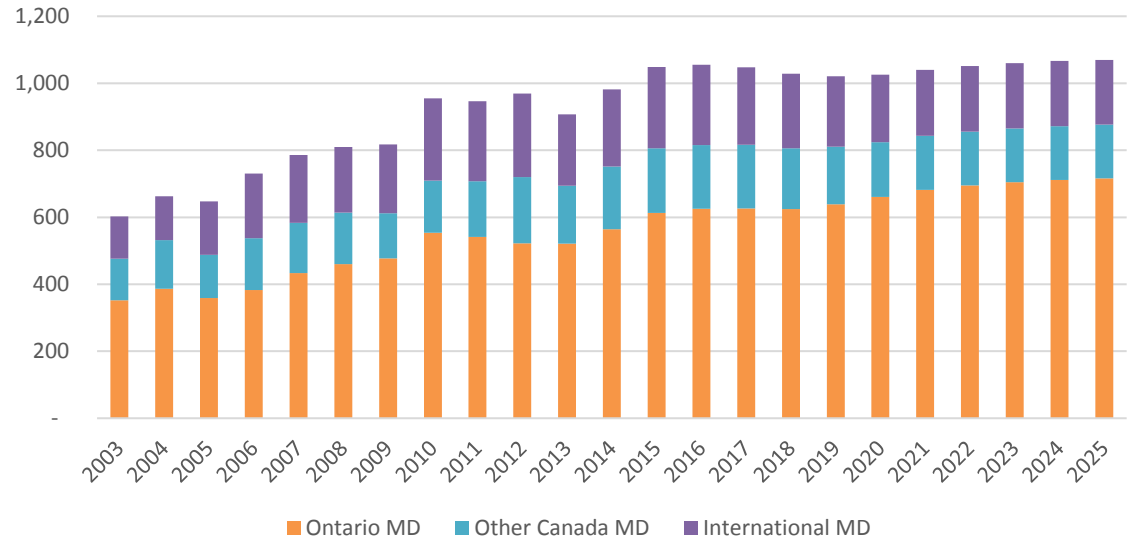
18 Graduates of Canadian faculties of medicine exiting post-MD training after having proceeded directly through their training after graduation, plus graduates of foreign medical schools who were Canadian citizens or permanent residents.
19 Medical workforce policy update.

Figure 3-9: Total Enrolment in Medical Schools, Ontario, 1995-2014



Source: Ontario Ministry of Advanced Education and Skills Development

Figure 3-10: Residency Graduates Entering Practice by Place of Medical Degree Attainment, Ontario, 2004 to 2025



Source: OPHRDC and Prism Economics and Analysis

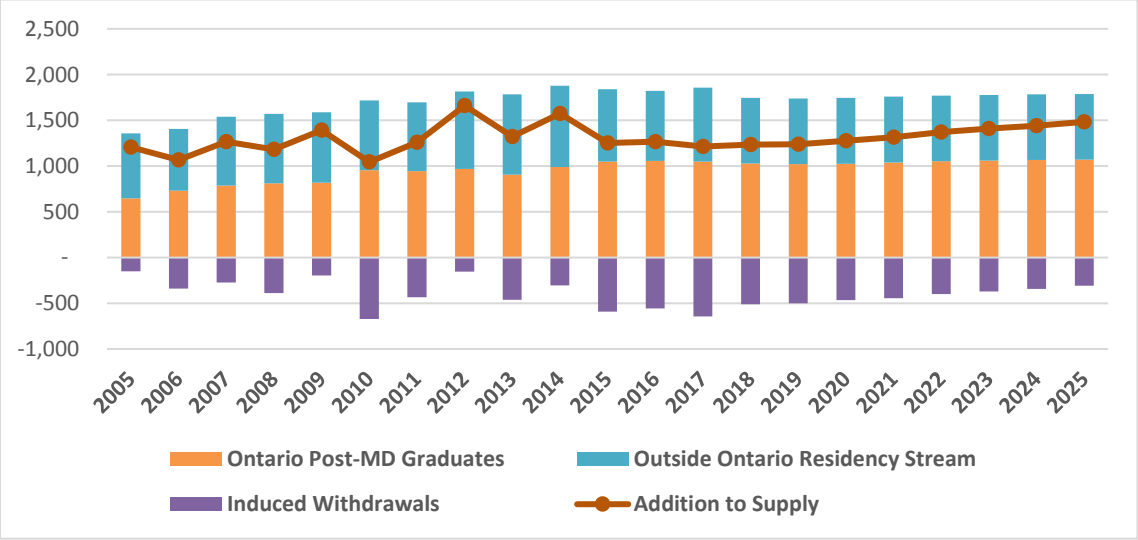
Post-MD graduates from Ontario residency schools account for more than half the supply of new doctors in Ontario. From 2010 to 2014, an average of about 900 post-MD trainees entered Ontario's labour force on an annual basis. This level rose by 23% from the average annual levels of 740 in the mid-2000s, driven by increased medical school enrolment in the early 2000s. The number of new physicians from the Ontario residency stream is expected to stay relatively stable from 2015 to 2025 at just over 1,000 per year.

Physician migration to Ontario from other provinces or countries is another source of supply. Migrant physicians are more likely to move to large provinces such as Ontario, Quebec, British Columbia and

Alberta. Neighbouring provinces such as Ontario and Quebec also seem to experience significant exchange of health care workers (Pitblado, 2007). Estimates show that between 500 and 890 qualified physicians from outside the province came to Ontario annually from 2004 to 2014. It should be noted, however, that many have also left the province.

Ontario has historically trained between 38% and 40% of all national post-MD graduates in the country. Given the increased supply of physicians relative to the number of employment opportunities available in Ontario, many new physicians may decide either to leave the province or the country or to pursue further specialization. Estimates show that over the past 10 years, an annual average of 300 physicians have left Ontario's labour force. Given the continued rise in enrolment in medical schools and the alternative registration policies adopted by CPSO, the supply of new physicians is expected to continue to rise modestly, staying ahead of annual hiring requirements. Excess supply will thus continue to rise as well and many newly certified physicians will continue to leave Ontario's physician workforce.

Figure 3-11: Annual Supply of New Physicians in Ontario, 2005 to 2025



Source: OPHRDC and Prism Economics

Looking Forward

Over the next 10 years, it is estimated that 14,000 new physicians will be required to meet expansion and replacement demand in Ontario. The demand is expected to be met through graduates from Ontario residency programs and physicians from outside the province. The total potential supply of new physicians available to the workforce between 2015 and 2025 is estimated at 19,600. Close to 11,500 postgraduate trainees are likely to graduate over the next 10 years, and about 8,100 physicians may come to Ontario from elsewhere through immigration or interprovincial migration. This suggests a potential excess of approximatey 5,600 physicians above anticipated requirements who will likely exit Ontario's physician workforce over the next ten years.

The detailed supply and demand projections are summarized in Table 3-4.

Table 3-5: Projected Supply and Demand for Practising Physicians, Ontario, 2015 to 2025

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Demand											
Physicians in practice	28,603	29,061	29,563	30,071	30,571	31,083	31,604	32,152	32,712	33,279	33,851
Change	516	458	502	508	500	511	521	548	560	566	573
Replacement demand (death and retirement)	**493**	**497**	**503**	**510**	**515**	**534**	**552**	**570**	**587**	**606**	**632**
Retirements	382	385	391	396	401	419	437	454	470	486	508
Death	111	111	112	113	114	114	115	116	117	120	124
Voluntary withdrawals	185	188	194	198	202	205	207	211	214	217	218
Total practice requirements	1,194	1,142	1,199	1,216	1,217	1,250	1,280	1,329	1,361	1,389	1,423
Supply											
Effective supply	29,059	29,642	30,157	30,683	31,206	31,745	32,300	32,889	33,497	34,117	34,748
change	573	583	515	526	522	539	555	589	608	619	632
New doctors	1,841	1,823	1,856	1,746	1,739	1,744	1,759	1,770	1,779	1,785	1,788
New doctors (Ontario residency Grads)	1,048	1,055	1,048	1,028	1,020	1,026	1,040	1,052	1,060	1,067	1,070
New doctors (Outside ON residency stream)	793	768	809	718	718	718	718	718	718	718	718
Induced labour force change	-590	-555	-644	-512	-499	-466	-444	-400	-370	-343	-306
Net withdrawals	-775	-743	-838	-711	-701	-671	-651	-611	-584	-559	-524
Available stock	456	581	594	612	635	663	697	737	785	838	897
Change	57	125	13	18	22	28	34	41	47	53	59
Availability rate	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	3%
Additions to supply of physicians	1,251	1,268	1,212	1,234	1,240	1,278	1,314	1,370	1,409	1,442	1,482
Supply less practice requirement	57	125	13	18	22	28	34	41	47	53	59

Source: Prism Economics and Analysis

4 Nurses

The nursing workforce has long faced acute shortages, as the number of nursing graduates has not kept pace with growth in demand for nurses. As a consequence, Ontario's health care system has relied heavily on retention strategies and the over-utilization of the existing nursing workforce including high rates of excessive workload, overtime, and injury. Additionally, full-time nursing positions seem to be being replaced by practical nurses who require fewer credentials and account for more part-time positions; the share of full-time employment among nurses dropped by 2.5 percentage points from 2011 to 2015 while part-time employment increased by close to 3 percentage points over the same period. In the period between 2005 and 2014, cumulative demand for new nurses exceeded supply by more than 21,000. In the absence of policy interventions, this trend is not likely to be reversed.

The persistent challenges experienced today stem from a decade of health care reform and restructuring in the mid to late 1990s.[20] The reduction in health care spending resulted in "layoffs, a massive move to part-time and casual work and the exit of thousands of qualified nurses from the workforce."[21] The statistics obtained from the College of Nurses of Ontario (CNO) verify this trend. CNO membership losses rose 28% during that time, from less than 4,800 in 1995 to more than 6,100 in 1998. The number of nurses registered with CNO fell by 6.5% from 1995 to 2001.

Investments in health care in the early 2000s attracted many nurses back into the workforce and led to an increase in the number of nursing graduates. However, a change in the education requirement for nurses from a college diploma to a bachelor's degree in 2005 restrained supply further. Over the following years, Ontario's health care system relied on a shrinking pool of qualified nurses returning to the workforce. This pool is running dry and the number of new nursing graduates is persistently lagging behind demand. This trend is expected to continue into the foreseeable future.

Overview of the Labour Market for Nurses in Ontario

Registered nurses (RNs) and nurse practitioners (NPs) provide care in a variety of settings. More than half of Ontario's nurses are employed in acute care hospitals, with the other half spread across a wide range of facilities, including long-term care facilities, colleges and universities, community care access centres, public health units, and other public and private institutions. Table 4-1 shows the distribution of nursing employment in Ontario (RNs and NPs) by place of employment in 2015.

20 Ontario government health expenditure on hospitals declined by 4.5% from 1992 to 1995. Based on statistics released by the Canadian Institute for Health Information (CIHI).
21 JPNC Implementation Monitoring Subcommittee, 2003.

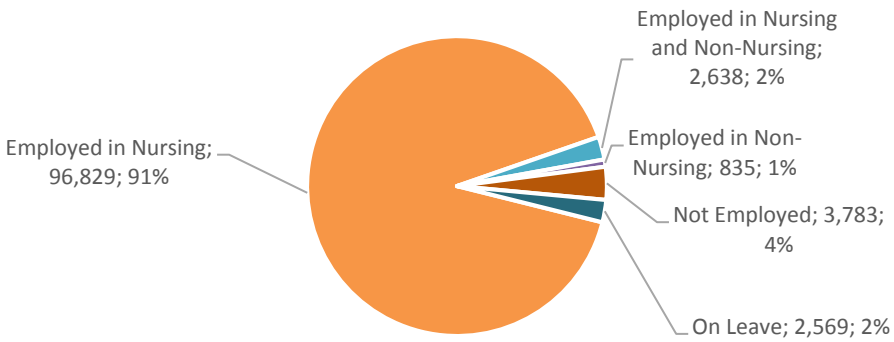
Table 4-1: Distribution of Nurses in Ontario by Place of Employment, 2015

Place of employment	**2015**
Acute care hospital	53%
Long-term care facility	8%
College or university	4%
Community care access centre (CCAC)	4%
Other community	4%
Public health unit/department	4%
Addiction and mental health centre/Psychiatric hospital	3%
Physician's office	2%
Nursing/Staffing agency	2%
Other	17%
Total	115,840*

*Includes full-time, part-time and casual workers. Source: CNO data query tool, College of Nurses of Ontario, 2015

In 2014, the overwhelming majority (91%) of nurses registered with the CNO were employed in nursing and 2% were employed both in nursing and non-nursing positions. The majority (83%) of nurses employed in nursing had one employer in 2014, while 17% reported having two or more employers – evidence that many nursing jobs are still part-time or casual positions (CNO, 2014). According to membership data from the CNO, two-thirds (66.3%) of RNs in the general class employed in nursing reported full-time employment, while 26.3% reported part-time employment and 7.4% reported casual employment (CNO, 2015). The full-time employment rate remains below the Registered Nurses Association of Ontario's (RNAO's) minimum target of 70% recommended to ensure a balanced retention rate (RNAO, 2005).

Figure 4-1: Employment Status[22] of Licensed Nurses in Ontario, 2014



Source: CNO membership data, 2014

Analysis of a custom tabulation of data from the 2011 National Household Survey (NHS) comparing occupational employment to field of study indicates that 68% of those who hold a university-level nursing degree in Ontario work as registered nurses, nurse practitioners or nursing supervisors. The remaining third are employed across a wide range of occupations concentrated in social services that do not require the RN or NP professional designation to practice. Top occupations outside nursing include nurse aides, orderlies, patient service associates, home support workers and housekeepers. Table 4-2 provides the distribution of occupations for those who had a university-level nursing degree in Ontario in 2011.

22 Includes employment outside Ontario.

Table 4-2: Occupations of Individuals with a Nursing Degree, Ontario, 2011

Occupation	% of Total
3012 Registered nurses and registered psychiatric nurses	63.5%
3124 Allied primary health practitioners	2.8%
0311 Managers in health care	2.8%
3011 Nursing co-ordinators and supervisors	2.2%
4021 College and other vocational instructors	2.0%
3413 Nurse aides, orderlies and patient service associates	1.9%
4412 Home support workers, housekeepers and related occupations	1.3%
3233 Licensed practical nurses	1.1%
4411 Home child care providers	1.1%
4032 Elementary school and kindergarten teachers	0.8%
4165 Health policy researchers, consultants and program officers	0.8%
6421 Retail salespersons	0.8%
1221 Administrative officers	0.8%
4011 University professors and lecturers	0.8%
6711 Food counter attendants, kitchen helpers and related support occupations	0.6%
1241 Administrative assistants	0.5%
1411 General office support workers	0.5%
6611 Cashiers	0.5%
4212 Social and community service workers	0.5%
4152 Social workers	0.4%
Other	12%

Gender

Nursing has been and continues to be a female-dominated profession. The share of men in nursing has risen only slightly over the past two decades, from 2% in 1994 to 6% in 2014.

Table 4-3: Gender Profile of Nurses in Ontario; 1994, 2004 and 2014

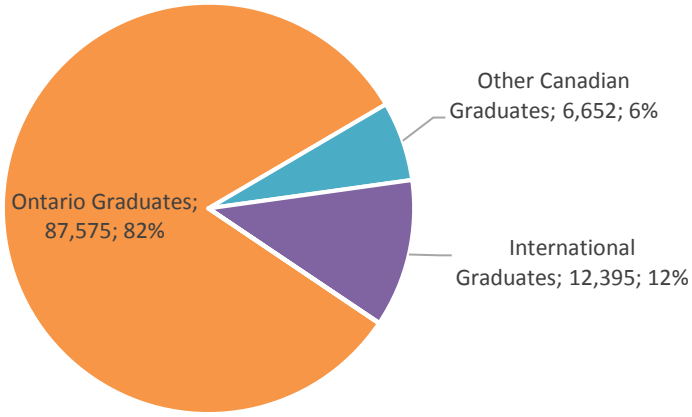
	1994	2004	2014
Total Members	**108,495**	**106,337**	**106,660**
Female	98%	96%	94%
Male	2%	4%	6%

Source: CNO data

Location of Nursing Education

CNO membership data indicate that the majority (82%) of nurses in Ontario are graduates from Ontario nursing programs. Just over 1 in 10 Ontario nurses are internationally educated, while nursing graduates from other provinces make up approximately 6% of Ontario's nursing workforce. Historical membership data reveal that these shares have been relatively stable over time.

Figure 4-2: Licensed Nurses in Ontario by Location of Nursing Education, 2014



Source: CNO

Regulation of the Nursing Profession in Ontario

The nursing profession has been self-regulated in Ontario since 1963. The College of Nurses of Ontario (CNO) is the regulatory body that issues licences to qualified individuals to practise nursing. It fulfils its role by establishing requirements for entry to practice; articulating and promoting practice standards; administering its quality assurance program; and enforcing standards of practice and conduct (CNO, 2012). The CNO also supports the regulation of nursing by participating in the legislative process and sharing statistical information about Ontario's nurses.

The College offers the following licences:

- Registered nurse (RN)
- Registered practical nurse (RPN)
- Nurse practitioner (NP)

While RPNs and RNs study from the same body of nursing knowledge, RNs study for a longer period of time at the university level, which allows for greater depth and breadth of foundational knowledge in the areas of clinical practice, decision-making, critical thinking, leadership, research utilization and resource management. RPNs study for a shorter period of time at the college level, which results in a more focused body of foundational knowledge (Registered Practical Nurses Association of Ontario, n.d.). Nurse practitioners (NPs) have a master's-level credential in nursing. RPNs are excluded from this study because the educational requirement for licensure is not a university degree. Instead, the focus of this study is on registered nurses (RNs) and nurse practitioners (NPs), and we refer to them collectively as "nurses" in the report.

Table 4-4: Minimum Education Requirement by Type of Nursing Applicant, Ontario

Type of applicant	Minimum education requirement
Registered nurse	An approved Canadian university baccalaureate degree in nursing
Registered practical nurse	An approved Ontario college diploma program in practical nursing
Nurse practitioner	An approved Ontario university master's degree in NP program in the preferred specialty

Source: CNO

The majority of nurses register with the CNO as registered nurses in the general class. To become nurse practitioners and register in the extended class, registered nurses must obtain additional education and clinical experience and pass the required examination. The extended class was introduced by the CNO following the passing of the Expanded Nursing Services for Patients Act, 1998, which expanded the scope of practice for NPs and gave them the authority to perform three additional controlled acts: communicate a diagnosis, prescribe a limited range of drugs, and order certain tests, such as x-rays and ultrasounds (Nurse Practitioners' Association of Ontario, n.d.).

Path to Licensure

After graduating from an accredited nursing program, candidates may apply to the CNO for registration. Internationally educated nurses must get their credentials assessed by the National Nursing Assessment Service (NNAS) before starting the registration process.

Prior to 2005, the CNO required a college diploma as the minimum education requirement for registered nurses. This requirement changed to a bachelor's degree in 2005, which led to a sharp rise in CNO registrations in 2003 and 2004 before the change came into effect. The following table provides current registration requirements for all registered nurses (RNs) and nurse practitioners (NPs) in Ontario. In

most cases, the practical component of the education requirement provides applicants with the required evidence of practice.

Table 4-5: Registration Requirements for Registered Nurses and Nurse Practitioners in Ontario

Registration Requirements	Registered Nurses	Nurse Practitioners
Minimum education Requirement	– Bachelor's degree in nursing from an approved Canadian university[23] (or equivalent)	– NP program from an approved Ontario university (or equivalent) in the chosen specialty (adult, pediatrics, primary health care at the master's or post-master's level)
Evidence of practice	– Recent experience practicing as a nurse (Most Ontario applicants meet this requirement by completing the education requirement)	– Evidence of practice in an advanced nursing role (Most applicants meet this requirement by completing the education requirement)
Examinations	– Registration examination (NCLEX-RN) – Jurisprudence examination	– Nurse practitioner examinations (separate exams for graduates from Ontario and from outside Ontario) – NP jurisprudence examination
Other	– Past offences and findings – Health and conduct	– Past offences and findings – Health and conduct – Applicants from other Canadian jurisdictions must provide a certificate/letter confirming their good standing as a nurse from the regulatory body in their home jurisdiction
Language requirements	– Proficiency in either English or French	– Proficiency in either English or French
Immigration status	– Citizenship, permanent residency, or authorization to practice nursing in Canada	– Citizenship, permanent residency, or authorization to practice nursing in Canada

23 Universities are the only institutions in Ontario authorized to issue bachelor's degrees in nursing, but colleges and universities work together to offer collaborative nursing programs.

In 2014, a new registration requirement (the declaration of practice) was introduced, restricting licence renewals in the general class to nurses who had:

- Practised nursing in Ontario within the past three years; or
- Become registered or reinstated within the past three years.

Members failing to meet these conditions can move to the non-practising class, resign their membership, or do nothing and have their membership revoked. In 2014, close to 9,200 licences were revoked or resigned, more than triple the number in the previous year. This change led to a drop of 7% in the number of registered nurses in 2014.

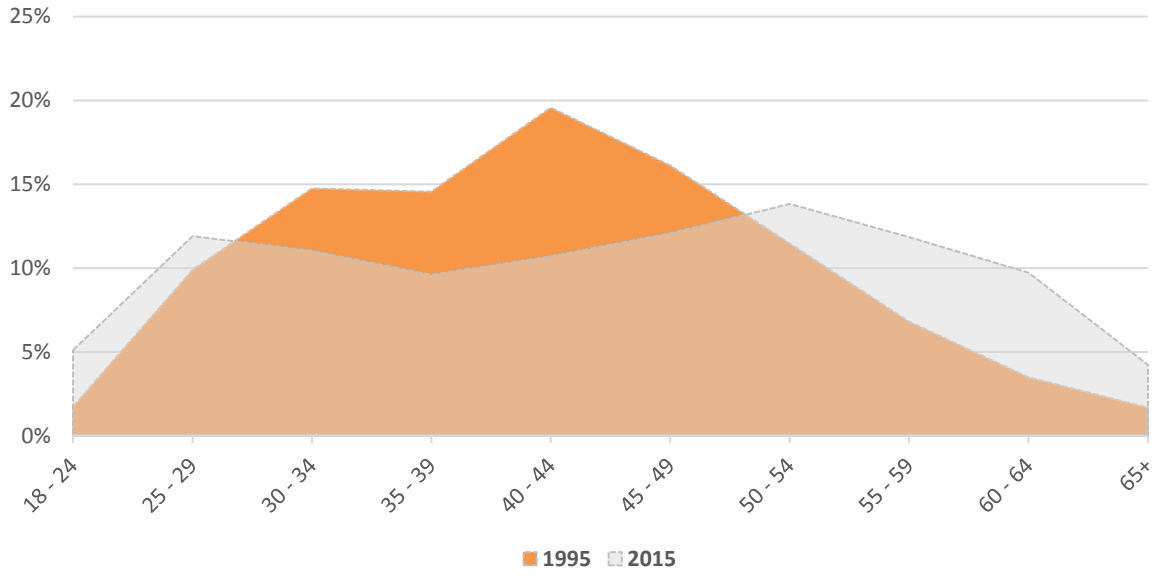
Labour Market Outcomes of New Nurses

Findings from the 2013 National Graduates Survey (NGS) suggest that recent Ontario nursing graduates enjoy favourable employment outcomes. The overwhelming majority (92%) of 2009-10 graduates obtained their licence to practice and were employed in their field of study three years after graduation (Statistics Canada, 2013). Findings from the same survey show that the majority of both Ontario and national graduates from nursing programs were satisfied with their employment and felt that their qualifications matched the demands of their job.

The Aging Nursing Workforce

The average age of the working cohort of nurses is increasing rapidly. In 2015, four out of 10 Ontario nurses were over 50 years of age, a significant increase compared to 1995, when three-quarters (75%) of nurses were between 25 and 50 years old.

Figure 4-3: Average Age of Nurses in Ontario, 1995 and 2015

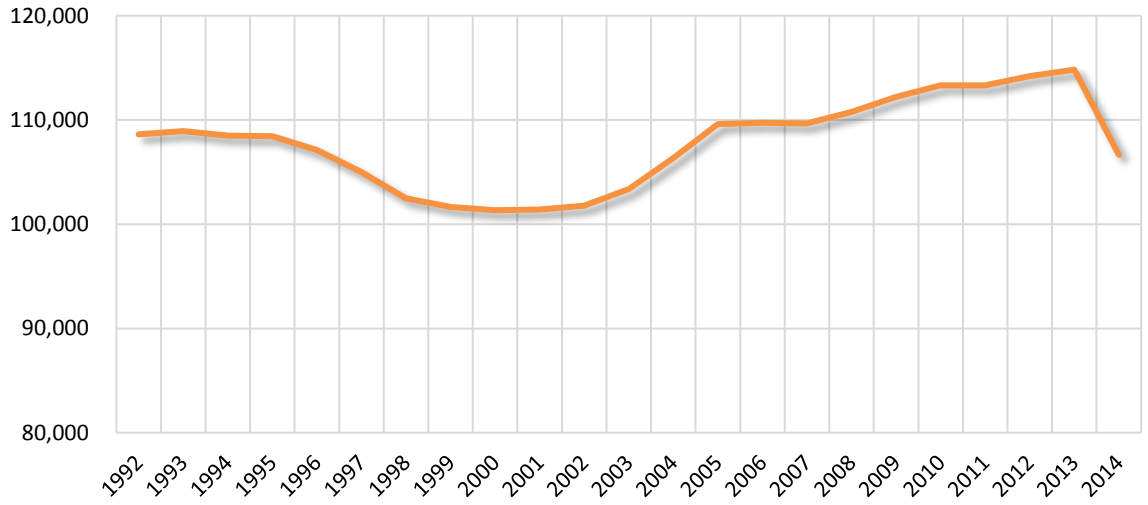


Source: CNO

Many of those nurses who are under age 50 today were just entering the labour force in the mid and late 1990s, a period characterized by deep cuts to the province's health care budget and major reforms to the system. According to the Registered Nurses Association of Ontario (RNAO), the restructuring and downsizing of the health care system in the 1990s "produced the largest displacement of nurses in Canadian history." Thousands of "layoffs and a massive move to part-time and casual work led to the loss of thousands of nurses and a marked decrease in continuity of nursing care" (JPNC Implementation Monitoring Subcommittee, 2003). The deteriorating work environment led to a withdrawal of nurses from the labour market, with many seeking employment in other provinces or outside of the country, or leaving the profession altogether. By 1999, more than 9% of the RNs who had graduated in Ontario in 1995 were practicing in the US (Daussault, 2001).

The statistics obtained from CNO verify this trend. In 1995, almost 6,000 licensed nurses were employed in non-nursing jobs. CNO membership losses rose 28% during that time, from below 4,800 in 1995 to more than 6,100 in 1998. The total number of nurses registered with CNO fell by 6.5% from 1995 to 2001. Poor labour market conditions also dissuaded students from enrolling in nursing programs, resulting in fewer graduates available to enter the nursing labour market in the late 1990s and early 2000s.

Figure 4-4: Total Number of Licensed Nurses, Ontario, 1992 to 2014



Source: CNO

The health care reforms of the 1990s had a lasting impact on the labour market for nurses in Ontario. Two decades later, Ontario nurses are disproportionately older and facing rising replacement demands.

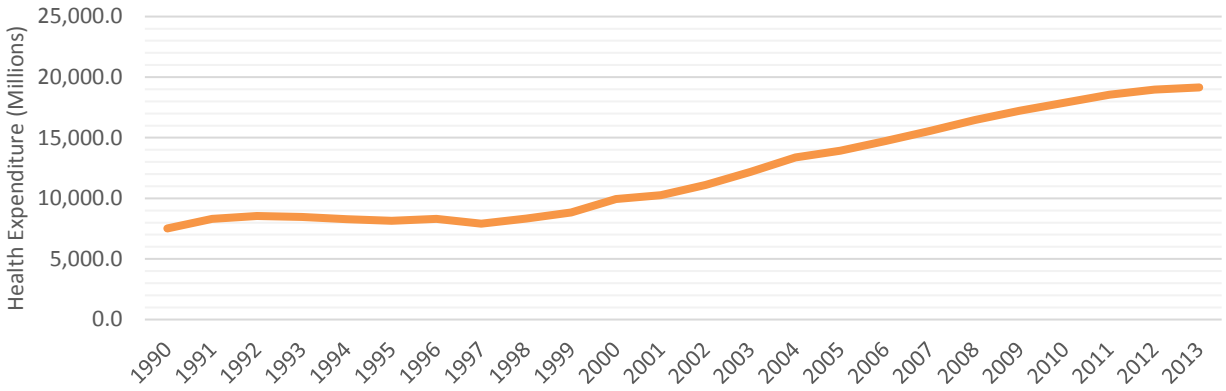
Labour Market Outlook for Nurses in Ontario

Demand

Hiring requirements for practising nurses are driven by expansion demand — requirements related to the rising health care needs of a growing and aging population — and replacement demand — the number required to replace nurses exiting the workforce due to death and retirement. Voluntary or natural withdrawal from the workforce is another driver of demand for nurses. Membership data suggest that a large number of nurses voluntarily leave the workforce each year for various reasons.

Expansion demand for nurses under the framework of Canada's public health-care system is determined by health care expenditures. Ontario government health expenditures on hospitals declined by 4.5% from 1992 to 1995. After years of cuts during the 1990s, the Ontario government began to invest heavily in new nursing positions in the early 2000s. The increased investment resulted in a spike in new hires in 2000, adding an estimated 4,000 nurses to the workforce and an additional 2,000 over the following two years.

Figure 4-5 Ontario Government Health Expenditure on Hospitals, 1990 to 2013



Source: Canadian Institute for Health Information (CIHI) (2016)

Table 4-6 Ontario Government Health Expenditure by Use of Funds, levels ($Million, Current Dollar) and Percentage Change from 1992 to 1995

	Hospitals	Other Institutions	Physicians	Other Professionals	Administration
1992 ($Million)	8,540.4	1,844.6	4,738.9	233.9	188.7
1995 ($Million)	8,159.5	1,687.7	4,510.7	221.6	171.8
%change 1992-1995	-4.5%	-8.5%	-4.8%	-5.3%	-8.9%

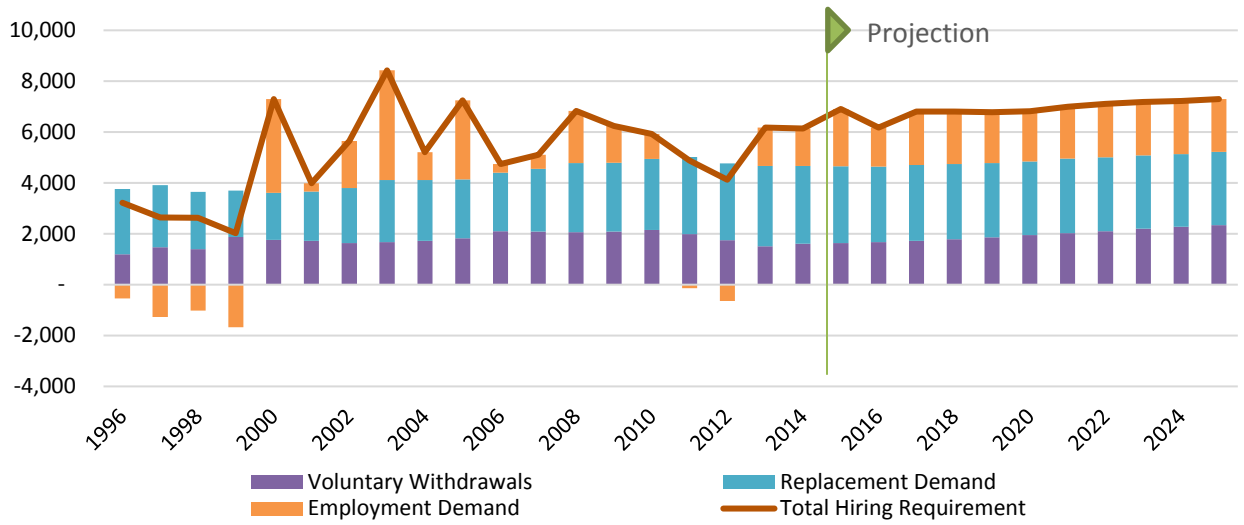
Source: CIHI (2016)

After coming into power in 2003, the McGuinty government made substantial efforts to bring transformational change to nursing. It provided multi-year funding to hospitals to create full-time nursing jobs (RNAO, 2004) and provided incentives to keep late-career nurses in the workforce longer (Office of the Premier, 2005). The sustained investment continued to create new jobs through the 2000s. An estimated 19,700 nursing jobs were added over the 11-year period between 2000 and 2010. In 2003 alone, an estimated 4,300 additional nursing positions were created.

At the same time, the number of full-time nursing positions also increased. According to the Registered Nurses Association of Ontario, full-time employment among nurses increased from a low of 50% in 1998 to almost 66% in 2010 (Registered Nurses Association of Ontario).

The figure below depicts components of total hiring requirements, including estimated annual demand for nurses as a result of new employment opportunities (employment demand), the demand to replace retiring nurses (replacement demand), and the number of nurses needed to replace those who leave the workforce voluntarily for reasons other than retirement or mortality (voluntary withdrawal).

Figure 4-6: Change in Annual Hiring Requirements for Ontario, 1996 to 2025



Source: Prism Economics and Analysis

Future demand for nurses is expected to continue to grow as an increasing proportion of the nursing workforce reaches retirement age and as Ontario's population continues to age and grow. It is projected that close to 2,700 nurses will exit the labour force annually through retirement over the next 10 years. In addition, given the aging population and the expected increase in demand for nursing services, between 1,500 and 2,200 new nurses will need to be hired annually to meet growing health care demand.

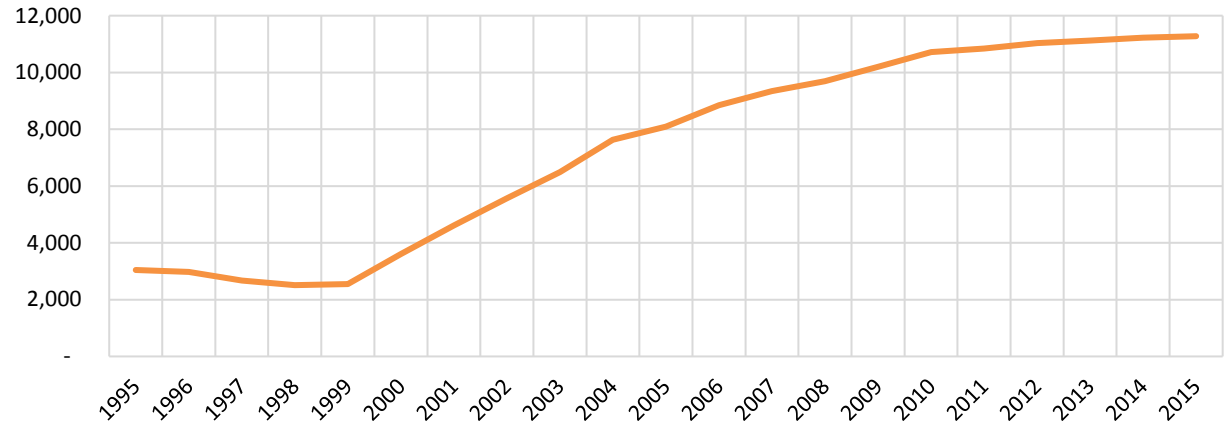
The high rate of voluntary exits among nurses adds to those demand requirements. Literature suggests a high inactivity rate among nurses due to excessive workload (Canadian Federation of Nurses Unions, 2015; RNAO, 2003). According to Statistics Canada, the absentee rate for full-time workers (excluding maternity leave) is more than two times higher among nurses (7.5%) compared to all occupations (3.7%) (Statistics Canada, Fact-sheet on work absences, 2005).

Based on the demographic characteristics of the nursing labour force and its voluntary exit rates, it is forecast that between 1,600 and 2,300 nurses leave the labour force annually for reasons other than retirement or mortality.

Supply

Enrolment in nursing programs more than doubled from 2000 to 2005, growing from 3,600 to more than 8,000. Enrolment has grown by another 40% since 2005, reaching more than 11,200 in 2014. Data obtained from the Ministry of Advanced Education and Skills Development indicate a 71% increase in the number of new nursing program enrolments over the same period.

Figure 4-7: Total Enrolment in Nursing Programs, Ontario

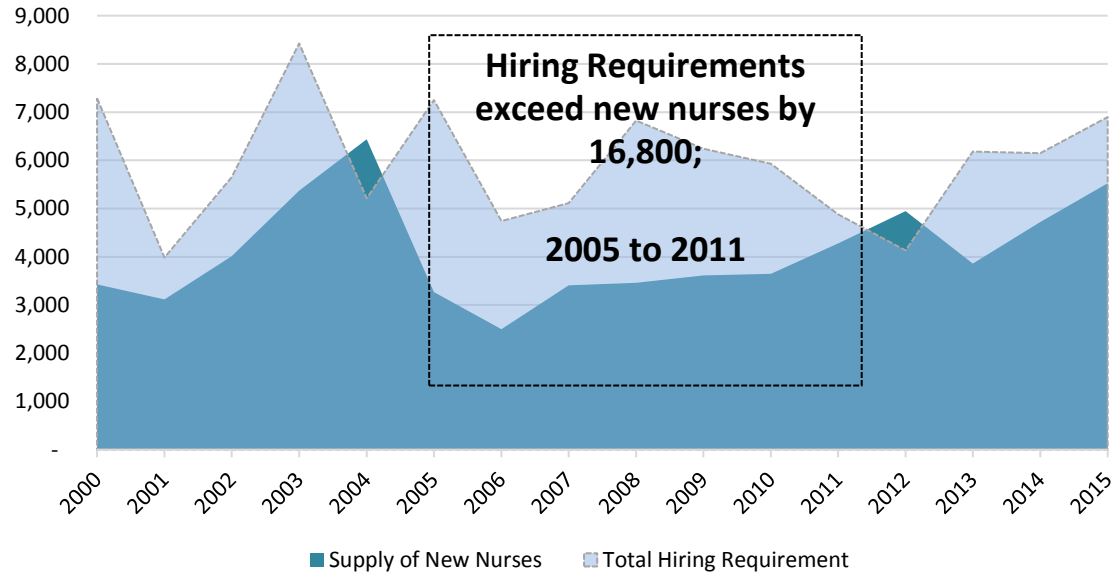


Source: Statistics Canada, Post-secondary Information System (PSIS)

An estimated 4,000 eligible nurses left the labour force between 1996 and 1999. As the nursing job market expanded in the early 2000s, more graduates from Ontario and other provinces registered with the CNO. The number of new licensed nurses more than doubled between 2001 and 2004, rising from 3,115 in 2001 to more than 6,430 in 2004. The surge in new registrations in 2003 and 2004 is partly attributed to individuals trying to register ahead of the change in the education requirement, which was implemented in 2005 (Consultation with CNO).

The policy change of 2005, requiring nurses to obtain a university degree instead of a college diploma, led to prolonged study duration for nurses and restrained the supply. The restrained flow of supply from recent graduates on the one hand and increasing demand for nursing services on the other deepened the already existing shortage in the nursing workforce. Hiring requirements exceeded the number of new nurses registering with the CNO by 16,800 from 2005 to 2011. This resulted in an increased workload for the existing workforce. The demand seems to have been met by the return of nurses who had left the province or the profession in previous years. Membership data show that the number of nurses working both in nursing and non-nursing positions declined significantly, from an annual average of about 7,400 in the years prior to 2003 to an annual average of 1,600 from 2003 to 2011, coinciding with an increase in the number of nurses employed only in nursing over the same period.

Figure 4-8: Annual Change in Supply and Demand for Ontario Nurses, 2000 to 2015

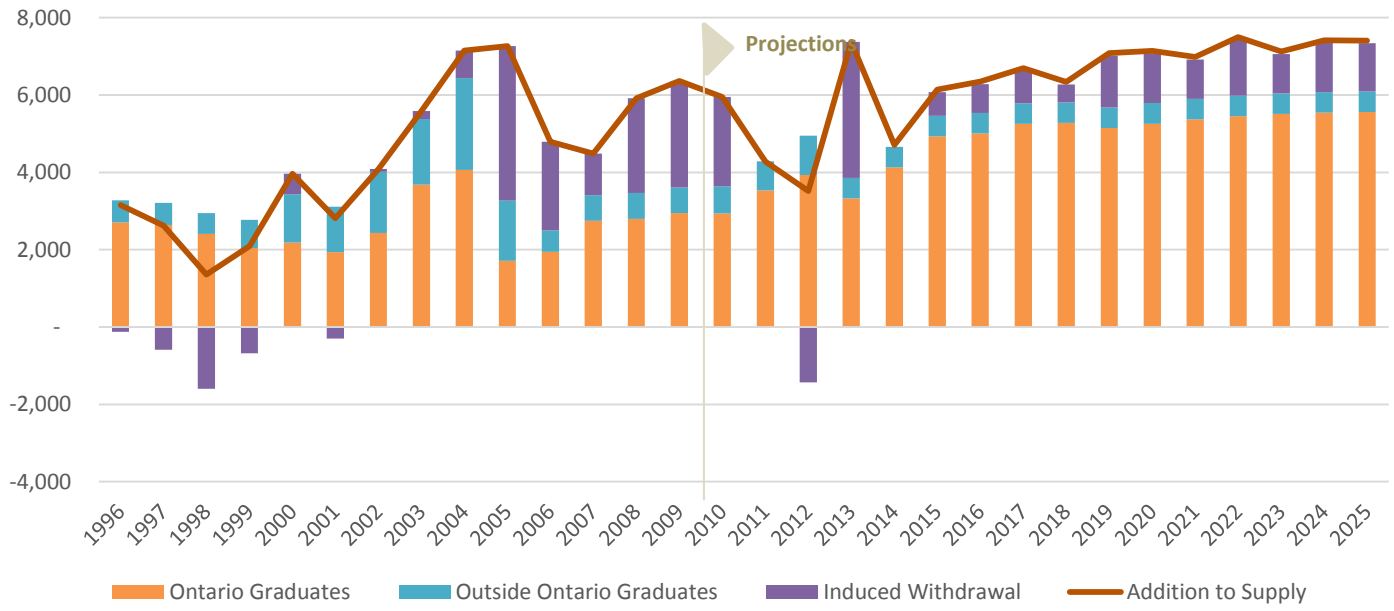


Source: Prism Economics and Analysis

A 2003 survey by the RNAO of nurses who were not working in nursing and did not renew their CNO membership estimated that there were more than 11,000 eligible nurses who could return to the profession if working conditions improved (JPNC Implementation Monitoring Subcommittee, 2003). In another study also conducted in 2003, the RNAO surveyed nurses who were working outside Ontario to understand the reasons they left the province during the 1990s and what would bring them back. The findings confirm that "the main reasons nurses left Ontario during the 1990s were related to job opportunities (70%), including downsizing and lack of full-time employment in Ontario. A substantial proportion (78%) responded that they would consider returning to Ontario to work. The two main factors that would entice them back were full-time jobs (65.5%) and relocation expenses (66.3%)" (JPNC Implementation Monitoring Subcommittee, 2003).

The induced withdrawal of nurses from the labour force in reaction to the cuts, and the drop in the number of nursing graduates in the late 1990s and early 2000s, as well as the increased number of graduates in the mid-2000s are illustrated in the following graph. Induced withdrawals represent withdrawals (if negative) or the return of eligible nurses (if positive) in reaction to changes in labour market conditions.

Figure 4-9: Annual Supply of New Nurses in Ontario, 1996 to 2025



Source: Prism Economics and Analysis

Looking Forward

It is estimated that more than 76,000 new nurses will be required over the next 10 years to meet anticipated expansion and replacement demand. The largest demand for nurses will come from the need to replace retiring nurses. Between 2015 and 2025, 32,200 nurses are expected to exit the labour force through retirement or death. A further 21,580 nurses will be needed to cover voluntary withdrawals over the same period. An additional 22,340 new nurses will be required to meet the projected growing demand for nursing services in Ontario's health care system.

Figure 4-10: Supply and Demand Requirements for Nurses in Ontario, Aggregate 2015 to 2025

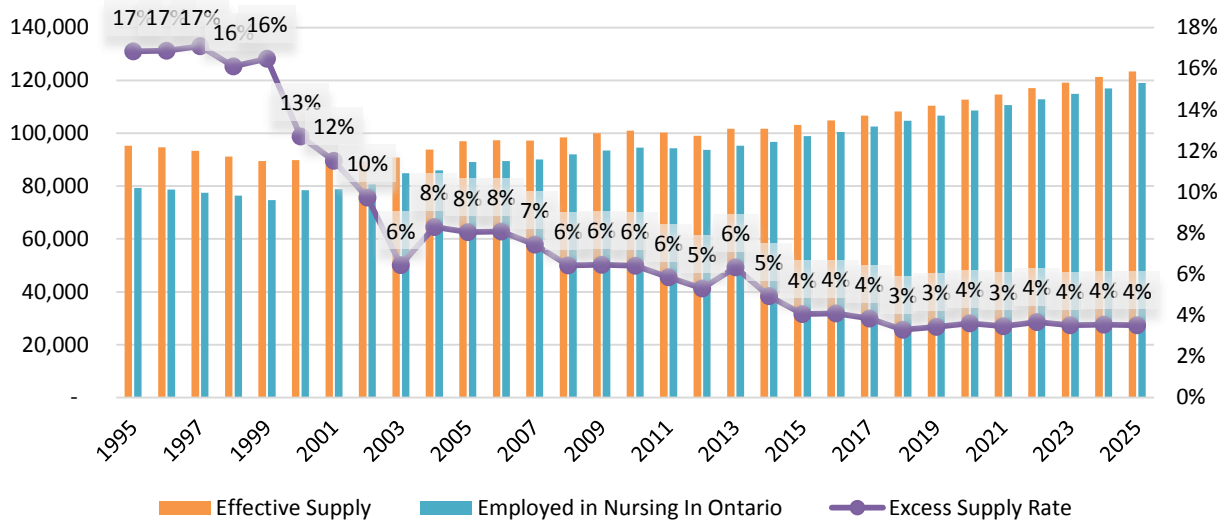
Source: Prism Economics and Analysis

Assuming that current enrolment trends hold, the projected 5,300 Ontario nurses on average graduating each year – aggregate total of over 58,000 graduates until 2025 - will meet 77% of the demand for nurses over the next 10 years. This leaves a gap of 17,000 nurses to be filled either by new nurses coming from outside Ontario or the return of nurses who left the profession or the province in previous years.

Figure 4-11 presents historical trends as well as projections of the total supply and demand of nurses in Ontario. The years before 2000 are marked by a high excess supply rate among nurses due to the downsizing and restructuring of the health care system. According to the CNO data, nursing employment dropped by 4.1%[24] from 1995 to 1999. With the new investments and job creation that occurred, the excess supply rate started on a downward path in the early 2000s and stabilized in the mid and late part of the decade. Given the growing need for nursing services, it is expected that the rate of increase in demand will remain at low levels of 3% to 4% over the coming years.

24 Includes CNO members employed in nursing in Ontario, in and outside Ontario, and outside Ontario.

Figure 4-11: Labour Supply and Employment Trends for Ontario Nurses, 1995 to 2025



Source: Prism Economics and Analysis

5 Architects

The labour market for architects is global and, as such, the employment outlook for Ontario architects is determined by both domestic and international demand, and by the share of the international market held by Ontario firms. Assuming no change in global market share, hiring requirements over the next decade are expected to total around 4,100. The total supply availability originating from Master of Architecture (MArch) programs in Ontario and international immigration is estimated at around 5,170 over the same period.

The likely outcome is that an increasing proportion of graduates will be obliged to pursue employment outside of Ontario; move into a broadly related field such as construction, property management, urban planning or design; or pursue other careers not directly related to their training. In the latter half of the forecast period, the proportion of MArch graduates who are unable to find employment in architecture commensurate with their qualifications will likely decline.

Overview of the Labour Market for Ontario Architects

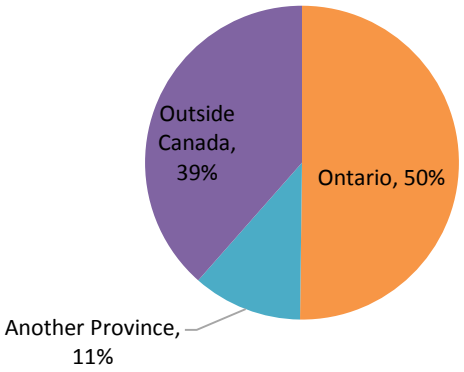
In 2011, the National Household Survey (NHS) estimated that there were 5,985 persons employed in Ontario as architects and 35 employed as architecture and science managers. This made up 39.2% of all persons employed as architects in Canada, with roughly one-quarter of architects (24.1%) being self-employed.

Approximately 80% of persons working as architects in Ontario in 2011 had a bachelor's degree or higher in architecture. Those working as architects who did not have a bachelor's degree or higher included technologists with a college certification; "junior architects" still completing their undergraduate degree; and persons who obtained their training in architecture from the Royal Architectural Institute of Canada (RAIC) Syllabus Program or from a technical institute, a polytechnic or another non-university institution.

The overwhelming majority of Ontario's architects (88.0%) are employed in architecture practices or other technical service companies. The construction industry employs around 2.4% of architects, while governments employ around 3.6%.

Data from the NHS underscore the importance of inter-provincial and especially of international migration in the Ontario architecture labour force. Figure 5-1 shows that about half of persons employed as architects in Ontario received their university degree in architecture outside of Ontario, with 39% of the total number of architects in Ontario representing internationally educated architects. While many of these individuals are immigrants to Canada, some non-Canadian degree holders are Canadians who earned their degree outside of Canada.

Figure 5-1: Location of Education for Architects Employed in Ontario, 2011



Source: 2011 National Household Survey (special tabulation), Statistics Canada
Note: Sample restricted to those with a bachelor's degree or higher

Fewer than half of those with a degree in architecture and employed in Ontario work as architects or as architectural managers. For persons with Canadian degrees, approximately one-third are employed in occupations that are unrelated to architecture, design or the construction industry. The proportion is higher for persons with non-Canadian degrees.

Table 5-1: Occupations of Individuals with a Bachelor's Degree or Higher in Architecture, Ontario, 2011

Occupations	Ontario degree	Degree from another province	Degree from outside Canada
Architects	38.4%	52.0%	27.8%
Architectural and engineering managers	0.6%	0.0%	0.2%
Landscape architects	0.3%	0.0%	0.0%
Technicians/Technologists	15.8%	9.1%	15.9%
Construction industry-related (other than trades)	11.0%	2.5%	5.1%
Urban and land use planners	0.8%	1.5%	0.5%
Education	3.4%	1.5%	4.1%
Unrelated occupations	29.6%	33.3%	46.4%
	100%	100%	100%

Source: 2011 National Household Survey (special tabulation), Statistics Canada

Technician and technologist jobs in architecture typically require college rather than university training. University graduates who were employed in these jobs may view them as "stepping stones" to other opportunities more commensurate with their qualifications. An undetermined proportion of persons in unrelated occupations are likely also employed in jobs that are not commensurate with their qualifications.

Regulation of the Profession

The Ontario Association of Architects (OAA) regulates the practice of architecture in Ontario. The Architects Act defines the scope of practice of architecture as:

(a) the preparation or provision of a design to govern the construction, enlargement or alteration of a building; or

(b) evaluating, advising on or reporting on the construction, enlargement or alteration of a building; or

(c) a general review of the construction, enlargement or alteration of a building.

To practise architecture within the scope of the Act, an individual must be licensed by the OAA or supervised by an OAA licence-holder. Only a licence-holder can offer architectural services to the public, with the exception of certain cases in which an architect is not required, such as work on a single-family residence or certain types of interior design. In addition to architects, only individuals with a Building Code Identification Number (BCIN) number from the Ministry of Municipal Affairs and Housing may do the exempted work. The Architects Act also identifies permitted areas of overlap with professional engineers. In 2014, there were 3,706 persons in Ontario with an OAA licence.

There are three requirements for licensure:

Education requirement: The basic education requirement is a professional degree that meets the requirements of the Canadian Educational Standard (CES). The CES is established by the Canadian Architectural Certification Board (CACB), which acts on behalf of the provincial regulatory bodies in the architectural profession. CACB accredits Canadian university architecture programs and also evaluates the degrees of all graduates against the CES. In Ontario, accredited professional degree programs are offered by Carleton University, Ryerson University, the University of Toronto and the University of Waterloo.

There are four routes to meeting the requirement for a certified professional degree.

(a) The first (and most common) route is to obtain a master's degree in architecture (MArch) from an accredited Canadian university. As a practical matter, all Canadian universities that currently offer MArch degrees are accredited, although a graduate must have completed specific training for his or her MArch to be considered a professional degree.

(b) The second (but uncommon) route is to complete the syllabus program of the Royal Architectural Institute of Canada.

(c) The third route is to obtain a professional architecture degree from a university accredited by one of the national parties to the Canberra Accord. CACB is party to the Canberra Accord, through which national regulatory bodies have agreed to extend mutual recognition to professional degrees accredited by the respective national regulators.[25]

(d) The fourth and final route is to apply to CACB to have an architecture degree from a non-accredited university evaluated against the CES. CACB will identify any deficiencies in the educational qualification, which the applicant may then address by taking additional courses.

Experience requirement: Applicants for licensure are required to have 3,720 hours of professional experience, at least 940 of which must be undertaken in Ontario. Experience must be logged in the Canadian Experience Record Book, which categorizes experience in relation to 10 projects in terms of design/construction documents (10 components), construction administration (three components) and management (two components). Experience must be confirmed by the applicant's employer. In general, it takes two to three years for an applicant to complete the required experience, although this may be longer if an applicant has limited exposure to certain types of necessary experience.

Examination requirements: Applicants for licensure in Ontario must complete two examinations. The Examination for Architects in Canada (ExAc) is used by all of the provincial regulatory bodies. ExAc is

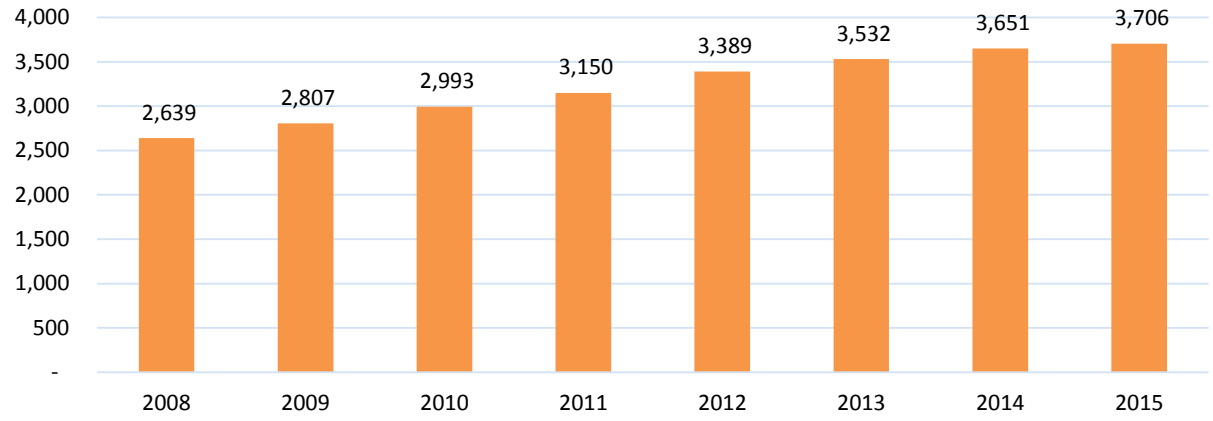
25 The national parties to the Canberra Accord are Australia, Canada, China, Korea, Mexico, the United States and the Commonwealth Association of Architects, which accredits programs in 34 Commonwealth countries.

administered once annually in four half-day sessions. It is a competency-based examination that deals with a range of themes relevant to the practice of architecture. Ontario applicants for licensure must also complete the OAA admission course, which focuses on legal aspects of the practice of architecture and the professional business environment.

Practising architects who immigrate to Canada have the option of applying for a broadly experienced foreign architect (BEFA) certification from CACB. In this case, CACB evaluates education and experience through interviews and a review of documentation. BEFA certification enables an individual to apply directly for licensure. In Ontario, an applicant may be required to complete the OAA admission course. In the last three years, only eight BEFA applicants have been licensed by OAA.

Figure 5-2 shows the recent trend in the number of fully licensed members of OAA. Not all of these individuals, however, are necessarily working in architecture. Since 2006, the average annual rate of growth in the number of fully licensed members of OAA has been 5%. This is substantially greater than the annual increase in the size of the Ontario labour force as a whole (0.65%).

Figure 5-2: Number of Licensed Members of OAA, 2008 to 2015



Source: Ontario Association of Architects, administrative data

Table 5-2 summarizes the number of OAA licences issued based on where applicants obtained their professional degree.

Table 5-2: OAA Licences Issued by Location of Professional Degree, 2010 to 2014

	2010	2011	2012	2013	2014	Total 2010-2014	Share of 2010-2014 Total
Ontario graduates (MArch)	79	77	102	85	90	433	36.2%
Graduates from other Canadian provinces/territories	51	43	64	44	51	253	36.2%
Graduates from the United States	51	58	59	54	38	260	21.8%
Other international graduates	37	49	67	45	56	254	21.3%
Unknown	1	0	0	0	1	2	0.2%
Total	212	227	292	228	236	1,195	100%

Source: Administrative data provided by Ontario Association of Architects to the Ontario Fairness Commissioner

These data can be compared to the trends in the number of MArch degrees awarded by Ontario universities (Table 5-3). There is a lag of three to seven years between graduation and licensure. Taking this lag into account, the rate of licensure of Ontario MArch graduates would appear to be around 40% or less.

Table 5-3: Comparison of OAA Licences Issued to Ontario Graduates and Ontario MArch Degrees Awarded, 2010 to 2014

	2010	2011	2012	2013	2014	Total 2010-2014
OAA licences granted to Ontario graduates	79	77	102	85	90	433
Ontario MArch graduates	122	214	235	212	210	993

Source: Common University Data Ontario (CUDA); Ontario Fairness Commissioner

It is important to stress, however, that many graduates work in the architecture industry without obtaining a professional licence. These individuals may work in areas of design that are exempt from the requirement for licensure or they may work under the supervision of a person who is licensed.

Those seeking to qualify for licensure must enter the Internship in Architecture Program (IAP) to have their experience credited. The IAP is common to and administered by the 11 regulatory bodies across Canada. In 2014, there were 1,476 persons registered in the OAA's internship program. Of these, 30.9% had earned their professional degree outside Canada. Table 5-4 shows recent trends in the registration of interns by the OAA. The number of registered interns has increased at an average annual rate of 3.3%. This is consistent with the growth in the number of licensed architects. Over the past five years, the ratio of licensed architects to interns as been approximately 2.3:1.

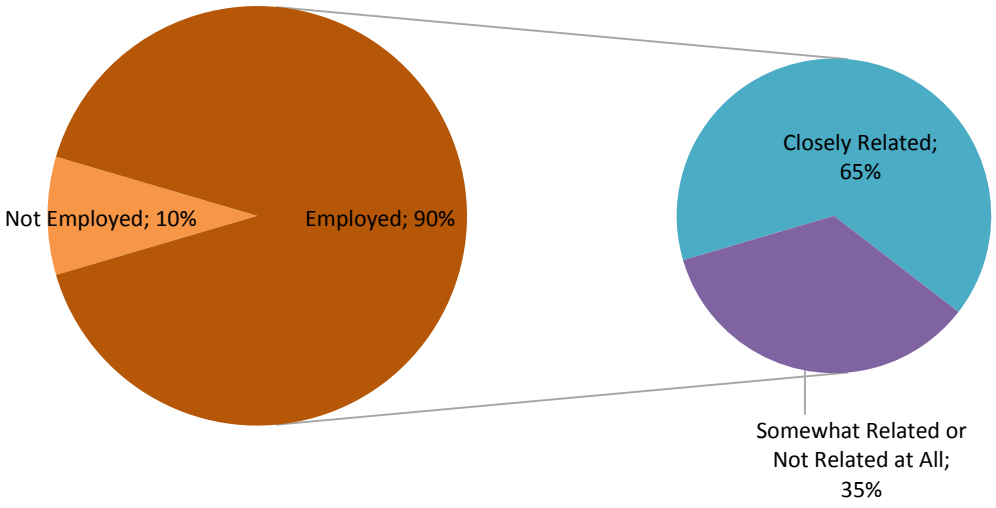
Table 5-4: Intern Architects Registered by OAA at Year End by Location of Degree, 2010 to 2014

	2010	2011	2012	2013	2014
Professional degree earned in Canada	882	893	923	994	1019
Professional degree earned outside Canada	412	417	488	437	457
Total	1,294	1,310	1,411	1,431	1,476

Source: OAA annual reports

Findings from the 2013 National Graduates Survey (NGS) indicate that among architecture graduates from the classes of 2009 and 2010 in Canada, 20% had obtained a licence to practice three years after graduation. The vast majority of Ontario respondents (90%) were employed. Among them, 65% were employed in a job closely related to their education, while more than one-third were working in a field somewhat related or not related to their degree at all. The results further indicate that the overwhelming majority of both Ontario (90%) and national graduates (85%) felt that their qualifications matched their job requirements.

Figure 5-3: Labour Force Status of Class of 2009-10 Architecture Graduates, Ontario, 2013



Source: 2013 National Graduates Survey, Statistics Canada

Based on the NGS, more than half of architecture graduates from the classes of 2009 and 2010 across Canada responded that a college diploma or certificate (29%) or a bachelor's degree (28%) was required to get their job. Only 18% identified a master's degree as the education requirement for employment. Furthermore, architectural technology/technician was identified by one-third (32%) of respondents as the prefered field of study by employers, followed by architecture (24%).

Labour Market Outlook for Architects in Ontario

Demand

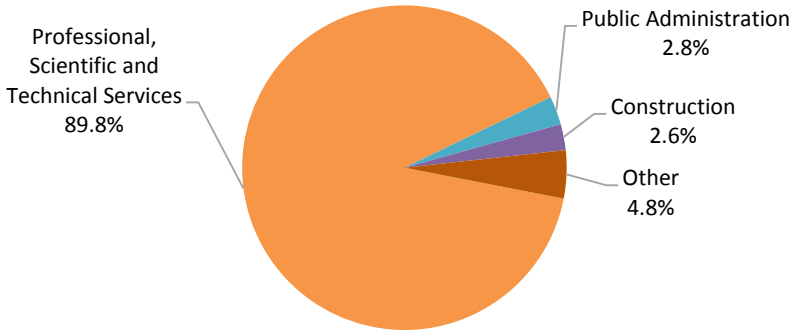
The demand projections are divided into economic demand and demographic demand. The change in projected employment for architects and architectural managers is an approximate measure of economic demand. Demographic demand comprises the sum of projected retirements, deaths and voluntary withdrawals from the architecture labour force.

Economic Demand: Change in Employment

While the overwhelming majority of architects (90%) are employed by firms classified as belonging to the Professional, Scientific and Technical Services industry, they mainly provide services to developers in the construction sector. As a result, new building construction is the main driver of demand for architects.

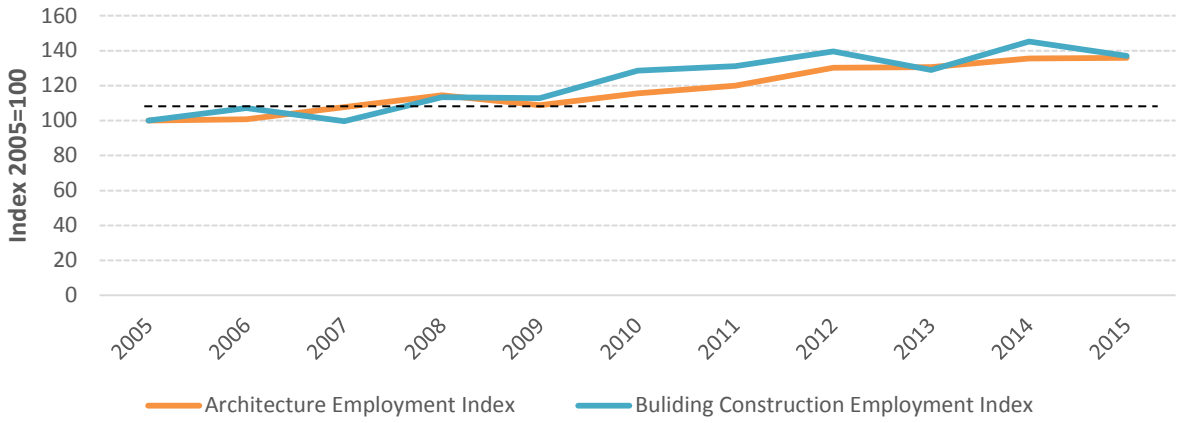
Historical employment trends for architects have closely followed building construction cycles. From 2005 to 2008, activity in building construction[26] grew by 13.4%. During the same period, architecture employment increased by 13.2%, adding a total of 650 new architect positions in Ontario. When the economy dipped in 2009, architect employment followed suit, with a loss of 280 architect positions. Employment among architects has been trending upward since 2010, growing at an average annual rate of 3.5% between 2010 and 2015 and increasing employment by 980 positions.

Figure 5-4: Share of Architecture Employment by Industry, Ontario, 2011



26 We use change in employment in building construction as an indicator of growth in activities.

Figure 5-5: Building Construction and Architecture Employment Index (2005=100), Ontario, 2005 to 2015



Source: Labour Force Survey (Statistics Canada, 2015); Prism Economics and Analysis

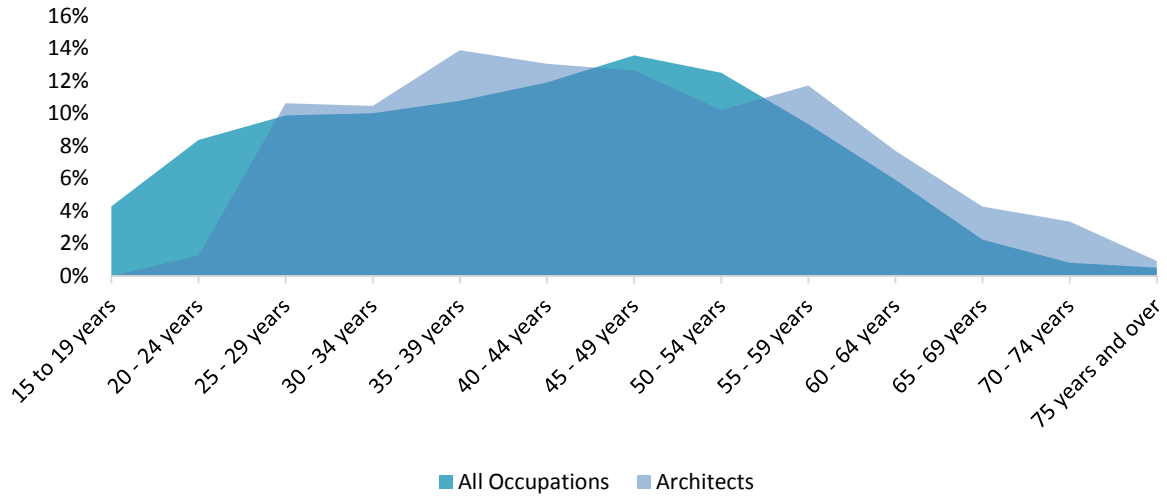
Employment growth for architects is expected to slow as construction and renovation activity recedes from peak levels. Construction industry GDP is expected to grow at an average annual rate of 0.8% over the next 10 years, a significant decline from an average of 3.1% from 2013 to 2016. The employment of architects and architectural managers is projected to rise at an average annual rate of 0.75%, adding on average 48 architect positions annually between 2016 and 2025.

Architecture is both a domestic and an international industry. Demand projections would therefore need to be adjusted based on the international performance of Canadian architectural practices.

Replacement Demand

Replacement demand, primarily stemming from retirements, will be the primary driver of hiring requirements for architects over the next decade. Architects remain in the workforce longer than workers in other occupations. More than 16% of architects work well through their 60s and 70s, compared to less than 10% in other occupations. Replacement requirements over the past decade are estimated at 1,360. As the current workforce ages, the retirement rate will rise. The total number of architects expected to leave the workforce over the next decade is estimated at 2,300.

Figure 5-6: Age Distribution, Architects vs. All Occupations, Ontario, 2011



Source: National Household Survey, 2011

Total Hiring Requirements

The total hiring requirement is the number of persons needed by the architecture labour force to meet both replacement demand and the change in economic demand. Over the next 10 years, total hiring requirements will total around 4,100 architect jobs.

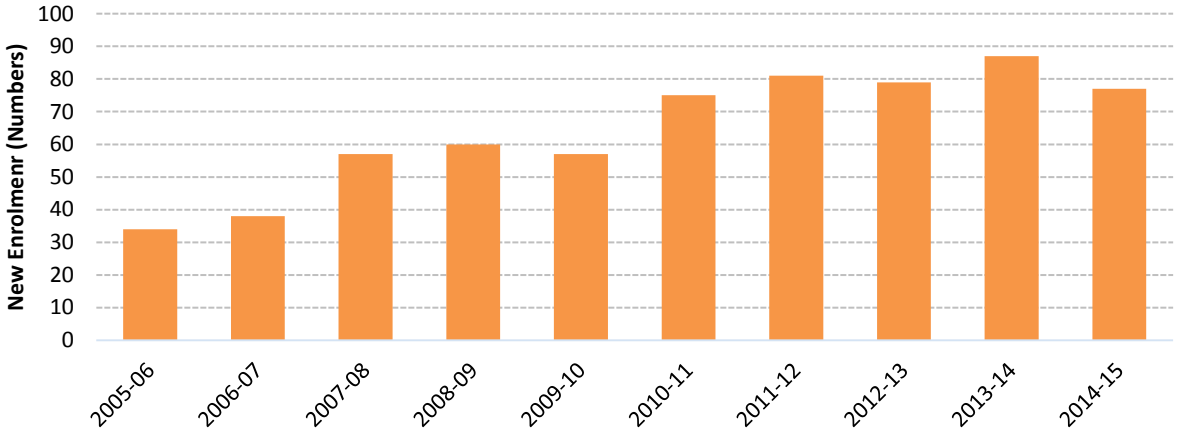
Supply

Supply projections are based on historical enrolment and graduation trends in Ontario architecture programs, historical data on international migration and an estimate of inter-provincial migration based on historical patterns.

Ontario Architecture Graduates

For several years, Ontario had only three accredited schools offering a Master's of Architecture: the University of Toronto, the University of Waterloo and Carleton University. In 2010, Ryerson's Master's of Architecture program became the first new professional architecture program accredited by the CACB in 35 years. This program contributed to a 2.5% rise in new Master's of Architecture enrolments in Ontario in 2010, with a 2.9% rise in 2011. The following graph presents the number of new students entering Master's of Architecture programs between the 2005-06 and 2014-15 academic years.

Figure 5-7: New Enrolment in Master's of Architecture, Ontario, 2005 to 2015



Source: MAESD (2015)

Currently, all accredited architecture programs operate near full capacity, and there are no indications that the number of program spaces will be expanded in the near future.

While licensure from the OAA is required to work as an architect in Ontario, BArch graduates working under the supervision of licensed architects augment the labour market requirements for architects. It is projected that 495 BArch graduates will enter the architecture labour force over the next 10 years, adding to the approximately 2,310 MArch graduates. These projections are based on historical trends and operate under the assumption that there will be no expansion of architecture programs in Ontario.

International and Net Inter-Provincial Immigration

Ontario's architecture firms operate within a national and international labour market. As a result, the national and international migration trends depend at least in part on the market share and strength of these practices.

International immigration projections are based on historical data with no allowance for growth. Hence, the immigration forecasts should be viewed as conservative. Over the next 10 years, immigration will add around 1,265 persons to the potential supply of architects in Ontario. International immigrants may not necessarily be licensed but include those who intend to work as architects in Ontario.

Net inter-provincial migration trends are strongly influenced by perceptions of employment opportunities. The estimate in the forecast is based on a model of past trends in the issuance of OAA licences. Within these assumptions, we project that inter-provincial migration will add another 1,100 architects to the supply in Ontario over the next decade.

Looking across all sources of supply, we see around 5,170 persons seeking employment in architecture over the next 10 years.

The supply and demand projections are summarized in Table 5-5.

Table 5-5: Projected Supply and Demand for Architects and Architectural Managers, Ontario, 2015 to 2025

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total employment	6,213	6,260	6,306	6,354	6,401	6,449	6,498	6,547	6,596	6,645	6,695
Demand											
Economic demand: Change in employment from prior year	46	47	47	47	48	48	48	49	49	49	50
Replacement demand											
Retirements	150	159	169	183	195	206	218	233	250	266	283
Deaths	33	31	30	29	28	28	27	27	27	27	27
Voluntary withdrawals from architecture labour force	85	86	86	87	87	87	87	86	85	84	83
Total hiring requirement	314	323	332	346	358	370	381	395	412	426	443
Supply											
Ontario MArch graduates	210	210	210	210	210	210	210	210	210	210	210
Ontario BArch graduates entering architecture labour force	45	45	45	45	45	45	45	45	45	45	45
International immigration (architect as intended occupation)	115	115	115	115	115	115	115	115	115	115	115
Net inter-provincial migration (BArch and MArch)	100	100	100	100	100	100	100	100	100	100	100
Total annual increase in supply	470	470	470	470	470	470	470	470	470	470	470
Ratio of supply increase to hiring requirements	1.50	1.46	1.41	1.36	1.31	1.27	1.23	1.19	1.14	1.10	1.06

Source: Prism Economics and Analysis

Looking Forward

Over the next 10 years, there will be approximately 2,310 graduates of MArch programs in Ontario, and another 495 graduates from bachelor of architecture programs who will enter the labour force. Over this same period, international immigration will add around 1,265 persons to the supply, and inter-provincial migration will add another 1,100. The total supply will therefore be around 5,170 persons seeking new employment opportunities in architecture.

During this same time, the demand for the hiring of new architects is only projected to reach 4,100 in Ontario. This imbalance between projected supply and demand is more evident in the next few years and reflects a continuation of recent trends. Over the next five years, about 30% to 40% of MArch graduates will likely be obliged to pursue employment outside of Ontario or in architecture jobs that typically require credentials below the university level (i.e., as technicians or technologists); move into a broadly related field in construction, property management, urban planning or design; or pursue other careers not directly related to their architectural training. In the latter half of the forecast period (2021-2025), the proportion of MArch graduates who are unable to find employment in architecture commensurate with their qualifications will decline to less than 15%. The increase in the proportion of MArch graduates who are able to find employment in the Ontario architecture labour force that is commensurate with their qualifications may also lead to an increase in the proportion of graduates who complete the experience requirements for licensure successfully.

6 Engineers

Engineering graduates pursue careers in many related fields where licensure is not required. There are as many engineering graduates employed in other occupations that normally require a university degree as there are in the engineering profession. These occupations include jobs in information technology, systems planning, technical sales, technical inspection and approval, as well as general management.

The proportion of engineering graduates who obtain licensure may increase somewhat as demographic factors and technology trends generate an increase in demand for engineers. For the moment, though, at least half of engineering graduates are likely to pursue careers that will draw on their training in applied science but do not involve performing engineering work. The question for universities and for education planners is whether engineering schools are providing graduates with the preparation they need. The suggestion that one-fifth of Canadian engineering graduates in Ontario may be under-employed makes this question especially relevant.

Overview of the Engineering Labour Market

Findings from the 2011 National Household Survey (NHS) estimate that there were 90,250 persons employed in Ontario as engineers or engineering managers at the time. Engineers and engineering

managers accounted for 1.4% of total employment in Ontario, compared to 1.3% in the rest of Canada, making Ontario's economy somewhat more engineering-intensive than that of other provinces.

Approximately 69% of persons working as engineers or engineering managers in Ontario in 2011 had a bachelor's degree or higher in engineering. The 27,890 persons working as engineers or engineering managers who did not have a bachelor's degree or higher in engineering included technologists with a college certification, some of whom may also have a non-engineering degree; "junior engineers" who were still working on their undergraduate degree; and persons who obtained their training in engineering from a technical institute, a polytechnic or other non-university institution.

Table 6-1: Occupations of Employed Engineers in Ontario, 2011

NOC	Occupation	Number	% of Total
2132	Mechanical engineers	19,025	21.1%
2133	Electrical and electronics engineers	17,660	19.6%
2131	Civil engineers	16,325	18.1%
2147	Computer engineers (except software engineers and designers)	12,110	13.4%
2141	Industrial and manufacturing engineers	7,380	8.2%
2134	Chemical engineers	3,920	4.3%
2146	Aerospace engineers	2,005	2.2%
2148	Other professional engineers	1,385	1.5%
2143	Mining engineers	1,025	1.1%
2142	Metallurgical and materials engineers	835	0.9%
2144	Geological engineers	505	0.6%
2145	Petroleum engineers	260	0.3%
0211	Engineering managers	7,815	8.7%
	Total	90,250	100.0%

Source: 2011 National Household Survey, Statistics Canada

The largest numbers of Ontario's employed engineers and engineering managers had jobs in the consulting industry (36.8%), manufacturing (28.5%), government (7.0%), and the wholesale or retail trade (6.6%)

sectors. Some worked in industries as wide ranging as finance and insurance, educational services, and health care and social assistance as well.[27]

Table 6-2: Distribution of Engineers by Industry in Ontario, 2011

Industry	Share of engineering employment (%)
Professional, scientific and technical services	36.8%
Manufacturing	28.5%
Public administration	7.0%
Wholesale trade and retail trade	6.6%
Utilities	5.0%
Information and cultural industries	3.9%
Construction	3.8%
Transportation and warehousing	1.9%
Mining, quarrying, oil and gas extraction	1.3%
Finance and insurance	1.2%
Administrative and support – waste management and remediation	0.9%
Educational services	0.8%
Health care and social assistance	0.8%
Other industries	1.4%
Total	100%

Source: 2011 National Household Survey, Statistics Canada

Data from the National Household Survey underscore the importance of inter-provincial and especially international migration in Ontario's engineering labour force. Table 6-3 shows that just under half (44.4%) of persons employed as engineers or engineering managers in Ontario received their engineering education outside of Ontario. Internationally educated engineers who immigrated to Canada account for slightly more than one-third (35.5%) of persons employed as engineers or engineering managers.

27 Persons working as engineers in government may be employed in information technology systems or in design, technical approval, contract management or asset management roles. Persons employed as engineers in wholesale or retail trade may be engaged in the management of IT systems, supply chains or in technical sales.

Table 6-3: Engineers Employed in Ontario by Location of Education, 2011

NOC	Occupation	Ontario	Elsewhere in Canada	Outside Canada	Total
2132	Mechanical engineers	55.1%	7.2%	37.7%	100%
2133	Electrical and electronics engineers	50.3%	10.1%	39.6%	100%
2131	Civil engineers	61.4%	7.5%	31.1%	100%
2147	Computer engineers (e.g., software engineers and designers)	47.0%	10.6%	42.4%	100%
2141	Industrial and manufacturing engineers	53.2%	9.5%	37.2%	99.9%
2134	Chemical engineers	64.7%	8.6%	26.7%	100%
2146	Aerospace engineers	60.4%	7.9%	31.7%	100%
2148	Other professional engineers	58.0%	14.6%	27.8%	100%
2143	Mining engineers	57.9%	18.1%	23.4%	99.4%
2142	Metallurgical and materials engineers	52.0%	11.4%	37.4%	100.8%
2144	Geological engineers	71.8%	9.0%	19.2%	100%
2145	Petroleum engineers	60.6%	0.0%	36.4%	97%
0211	Engineering managers	58.4%	9.9%	31.6%	100%
	All engineers	55.6%	8.9%	35.5%	100%

Source: 2011 National Household Survey (special tabulation), Statistics Canada
Note: Sample restricted to persons employed as engineers or engineering managers with a bachelor's degree or higher

The National Household Survey provides an alternative perspective to the National Graduates Survey for estimating the proportion of graduates who are employed in jobs closely related to their educational qualifications. The NGS is based on self-reported descriptions of jobs by respondents. There may also be selection bias in determining the graduates who participate in the NGS. Analysis based on the National Household Survey compares educational qualifications with reported occupation. The National Occupation Classification (NOC) system categorizes occupations in part by whether a university degree is a usual qualification requirement. Using data from the NHS, it is therefore possible to estimate the proportion of persons with a baccalaureate degree in engineering who are employed in occupations that do not normally require a university degree. The resulting measure is not necessarily precise in that it may not reflect current industry practice. However, the proportion of engineering graduates employed in occupations that do not usually require a university degree is an approximate indicator of under-employment.

Table 6-4 summarizes the percentage of individuals with a baccalaureate or higher degree in engineering and whether they were employed in an engineering occupation.

Setting aside occupation, in Ontario half (50.1%) of persons with a bachelor's degree or higher in engineering obtained their degree outside Canada. Most, though not all, of these individuals immigrated to Canada. A small proportion (for which there are no data) are Canadian citizens who obtained their degree abroad and subsequently returned to Ontario.

Table 6-4: Proportion of Persons with a Bachelor's Degree or Higher in Engineering Employed as Engineers or Engineering Managers or in Other Occupations Normally Requiring a University Degree

	Where engineering degree was obtained		Total
	Canada	Outside Canada	
Employed as an engineer or engineering manager	38.3%	21.2%	29.7%
Employed in an occupation normally requiring a university degree	40.5%	35.0%	37.0%
Employed in an occupation not normally requiring a university degree	21.2%	43.8%	33.3%
Total	100%	100%	100%

Source: 2011 National Household Survey (special tabulation), Statistics Canada. Data provided by the Ontario Society of Professional Engineers.

There are three important inferences that can be drawn from Table 6-4. First, there are marked differences between the employment patterns of graduates of Canadian engineering programs and persons who obtained their engineering degree outside Canada. Second, focusing on persons who earned their engineering degree in Canada, somewhat more than one-fifth (21.2%) appear to be employed in occupations that do not normally require a university degree. This suggests a significant level of under-employment. For persons who earned their engineering degree outside Canada, the apparent level of under-employment is 43.8%. Third, again focusing on persons who obtained their engineering degree in Canada, there appear to be more graduates employed in professional occupations *outside* engineering than there are employed as either engineers or engineering managers. Substantially fewer than half of persons who earned their engineering degree in Canada (38.3%) were employed in 2011 as engineers or engineering managers.

Regulation of the Engineering Profession in Ontario

Professional Engineers Ontario (PEO) regulates the practice of engineering. PEO was established by the Professional Engineers Act in 1922 with a mandate to register professional engineers, although at that time

registration was not a requirement to practise engineering. In 1937, the Act was amended to restrict the practice of engineering to licensed engineers. Licensed engineers are entitled to use the designation PEng.

The current Act defines the scope of practice of engineering as:

> "any act of planning, designing, composing, evaluating, advising, reporting, directing or supervising that requires the application of engineering principles and concerns the safeguarding of life, health, property, economic interests, the public welfare or the environment, or the managing of any such act."

However, the Act also includes an "industrial exemption" that waives the requirement for licensure when an individual is employed in the manufacturing sector and his or her duties are limited to non-structural machinery equipment used in production processes (Government of Ontario, 1990).[28] An individual may also practice engineering without a licence if his or her work is supervised by a professional engineer who takes responsibility for it.

In 2014, there were 64,901 persons with a PEng who were full fee-paying members of PEO (PEO, 2015).[29] There are three requirements for licensure:

- a bachelor's degree in engineering from a program accredited by the Canadian Engineering Accreditation Board (CEAB). CEAB is a committee of the Board of Engineers Canada, which is the national federation of provincial and territorial regulatory bodies in the Canadian engineering profession. Engineers Canada is party to the Washington Accord, through which national regulatory bodies have agreed to extend mutual recognition to bachelor's degrees accredited by the respective national regulators.[30] In the alternative, an individual with a bachelor's degree from a jurisdiction that is not party to the Washington Accord may apply to have their degree evaluated by PEO. PEO will identify any deficiencies in the educational qualification, which the applicant must then address by taking additional courses.

- four years of engineering employment experience, at least one year of which was completed in Canada. This ensures that applicants for licensure have had sufficient exposure to Canadian engineering codes, legislation, technical standards and regulations. Applicants with a postgraduate degree or other relevant second degree may be credited with up to 12 months of experience. In

28 Sec 12(3) of the Professional Engineers Act provides that the requirement for a licence does not apply to "prevent a person… from doing an act that is within the practice of professional engineering in relation to machinery or equipment, other than equipment of a structural nature, for use in the facilities of the person's employer in the production of products by the person's employer."

29 In addition to the full fee-paying members, there were also 13,756 persons who paid partial fees. Most of these persons (88%) were retired. These individuals are not included in the labour market analysis.

30 The national parties to the Washington Accord include Australia, Canada, Chinese Taipei, Hong Kong China, India, Ireland, Japan, Korea, Malaysia, New Zealand, Russia, Singapore, South Africa, Sri Lanka, Turkey, the United Kingdom and the United States.

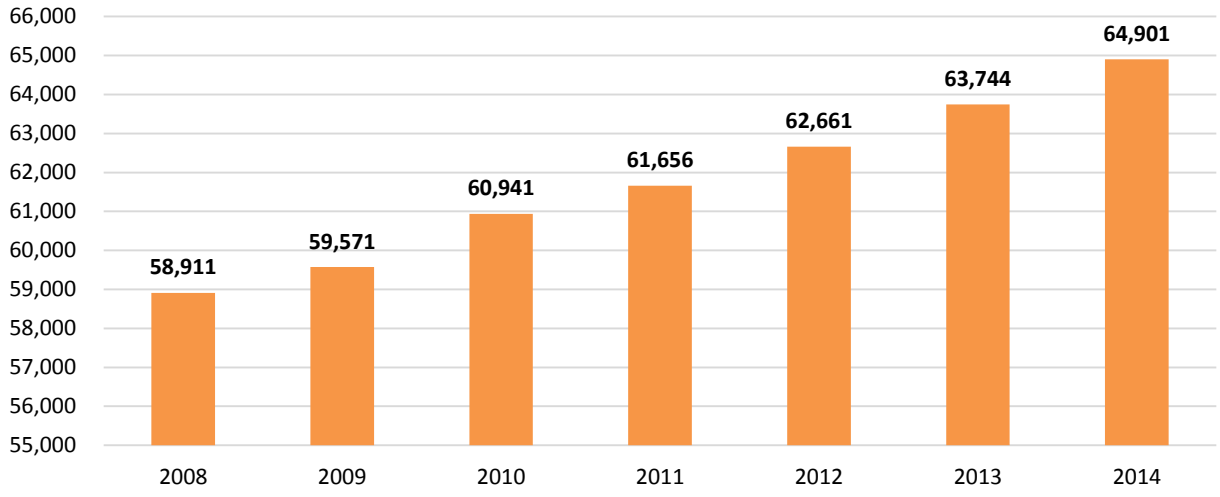
some cases, pre-graduation work experience of up to 12 months may also be credited. PEO evaluates each applicant's engineering experience against five criteria:

  - application of theory
  - practical experience
  - management of engineering
  - communication skills

- awareness of the social implications of engineering successful completion of the professional practice examination (PPE), which is a three-hour, closed-book examination on ethics, professional practice, engineering law and professional liability. Applicants may write this examination at any time. Examination sittings are held in April, August and December in major centres across Ontario.

Figure 6-2 shows the recent trend in the number of full fee-paying members of PEO. This is an approximate indicator of the number of active, licensed professional engineers in Ontario. Not all of these individuals, however, are necessarily working in engineering occupations or performing tasks that are within the scope of practice of the Professional Engineers Act.

Figure 6-2: Number of Full Fee-Paying Members of Professional Engineers Ontario, 2008 to 2014



Source: Professional Engineers Ontario, administrative data

Since 2008, the average annual growth rate in the number of full fee-paying members of PEO has been 1.65%. This compares with an annual growth rate of 0.65% in the Ontario labour force as a whole. We can conclude that full fee-paying membership in PEO (and by inference the number of actively employed

professional engineers) is growing at more than double the rate of overall employment in the Ontario economy.

Table 6-5: Number of Licenses Issued by PEO by Location of Education, 2010 to 2014

Location	2010	2011	2012	2013	2014	Total 2010-2014	Share of 2010-2014 Total
Ontario graduates	1,358	1,156	1,380	1,234	1,541	6,669	54.9%
Graduates from other Canadian provinces/territories	148	395	114	92	357	1,106	9.1%
Graduates from United States	37	74	40	32	94	277	2.3%
Other international graduates	965	773	761	663	911	4,073	33.5%
Unknown	-	11	-	-	7	18	0.1%
Total	2,508	2,409	2,295	2,021	2,910	12,143	100.0%

Source: Administrative data provided by Professional Engineers Ontario to the Ontario Fairness Commissioner

The licensure data provided above can be compared with trends in engineering degrees awarded by Ontario universities, as is presented below.

Table 6-6: Bachelor's Degrees Awarded in Engineering, 2010 to 2014

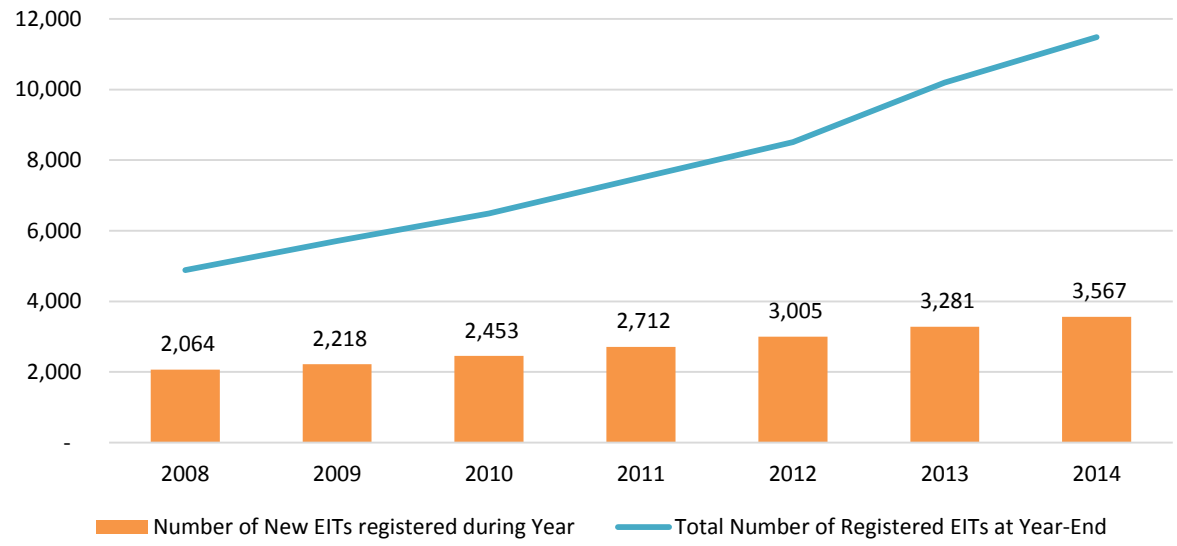
Location	2010	2011	2012	2013	2014	Total 2010-2014	Share of 2010-2014 Total
Canada	11,536	11,761	12,382	13,363	13,876	62,918	
Ontario	5,101	5,075	5,508	5,927	5,996	27,607	
Ontario share	44.2%	43.2%	44.5%	44.4%	43.2%	43.9%	
Canadian students	4,693	4,664	4,931	5,342	5,356	24,986	90.5%
Visa students	408	411	577	585	640	2,621	9.5%
Total	5,101	5,075	5,508	5,927	5,996	27,607	100%

Source: Engineers Canada, Canadian Engineers for Tomorrow: Trends in Engineering Enrolment and Degrees Awarded, 2010-2014

The first conclusion we can draw from Table 6-6 is that between 2010 and 2014, Ontario's share of Canada's engineering graduates (43.9%) somewhat exceeded Ontario's share of Canada's engineering employment (40.8%). In broad terms, around 27% of graduates of Ontario university engineering programs become licensed professional engineers in Ontario. This figure, however, underestimates the incidence of licensure since some graduates of Ontario universities move to other provinces or outside of Canada following their graduation and pursue licensure in those jurisdictions.

Persons who are seeking to qualify for licensure are encouraged to enter PEO's internship program. Individuals who enter this program are designated as "Engineers in Training" (EITs). In 2014, there were 11,482 persons registered in PEO's internship program.

Figure 6-3: Number of Registered Engineers-in-Training at Year End and Number of New EITs Registered during the Year, 2008 to 2014



Source: Professional Engineers Ontario, administrative data

In 2014, 3,567 persons entered PEO's Engineer-in-Training program. This number included internationally educated graduates who immigrated to Canada, as well as Canadian graduates. That same year, there were 5,996 bachelor's degrees in engineering awarded by Ontario universities. Of these, 640 were granted to visa students. Some of the Canadian graduates were undoubtedly residents of other provinces who returned home or otherwise left Ontario following graduation. There were also graduates who entered graduate programs. Taking these factors into account, PEO likely registers in its internship program around 60% to 65% of graduates who are entering the Ontario labour force subsequent to the completion of their bachelor's degree.

Since 2008, the number of EITs newly registered with PEO has increased at an average annual rate of 9.5%. The total number of EITs has increased at an average annual rate of 15.3%. These growth rates appear to reflect successful outreach efforts on PEO's part to increase the proportion of graduating students who registered in the EIT program. It is unlikely, however, that these growth rates can be sustained for more than a few years.

Administrative data suggest that approximately 40% of individuals who enter the EIT program (including internationally educated professionals) complete the program and obtain their professional licence. Even though engineers are encouraged to become professionally licensed, there are circumstances where they are not required to have a licence to act as a professional engineer. These exemptions open up employment opportunities for engineering graduates without obligating them to acquire their professional designation. Nevertheless, the stock of PEng licence holders in Ontario has been trending upward since 2008.

Career Intentions of Final-Year Engineering Students

In contrast with a number of other professions, the bachelor of engineering is typically a first degree. Career intentions may not have been fully formulated when individuals began their undergraduate training or may have changed afterward. Engineers Canada's annual survey of final-year students shows that in 2015, 71% of final-year students planned to enter the labour force following graduation.

Table 6-7: Intentions of Final-Year Engineering Students after Graduation, Ontario, 2015

	2015	Range 2008 to 2015
Enter the labour force	71%	60-75%
Pursue further education	21%	20-26%
Don't know/Unsure/Declined to answer	7%	4-7%
Total	99%	

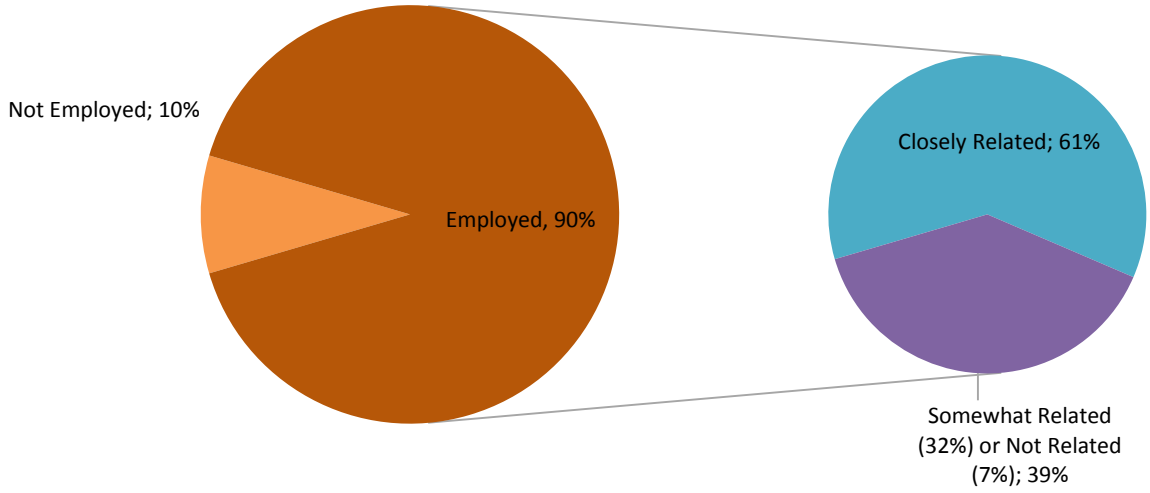
Source: Engineers Canada Final-Year Engineering Student Survey, 2015. Ontario sample n=968

More than half (55%) of the 2015 survey respondents indicated that they definitely intended to pursue an engineering career, while a further 34% indicated that they would probably pursue an engineering career. The 2015 survey results were close to the average survey results between 2008 and 2015. Of those indicating that they definitely or probably would pursue an engineering career, 80% reported their intention to seek professional licensure. Findings from the 2013 National Graduates Survey suggest that only 13% of engineering graduates from the class of 2009-10 in Ontario obtained a licence to practice three years after graduation. At the national level, this was 29%.

While 90% of engineering graduates were employed three years after graduation – most often in a permanent position (93%) – a substantial portion (39%) were employed in a field not closely related to their

education. The findings further indicate that 17% of graduates believed they were overqualified for their jobs.

Figure 6-4: Labour Force Status of Class of 2009-10 Engineering Graduates, Ontario, 2013



Source: 2013 National Graduates Survey, Statistics Canada

About one-quarter (25%) of engineering graduates from the class of 2009-10 had moved to Ontario to study engineering. The majority (84%) of graduates from this class did not have to move outside the province to find or begin their jobs.

Labour Market Outlook for Engineers in Ontario

Demand

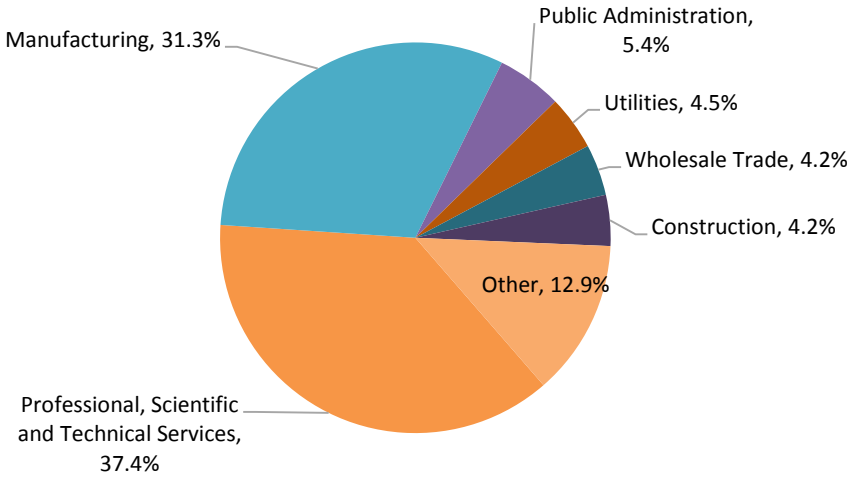
Demand projections are divided into economic demand and demographic demand. The change in projected employment of engineers and engineering managers is an approximate measure of economic demand. Demographic demand includes the sum of projected retirements, deaths and voluntary withdrawals from the engineering labour force.

Economic Demand: Change in Employment

The change in the employment of engineers and engineering managers is derived from the Provincial Occupational Modelling System (POMS). POMS is a proprietary forecasting model maintained by Stokes Economic Consulting. The macroeconomic forecast that underlies POMS employment projections is derived from the quarterly forecasts produced by the Centre for Spatial Economics (C4SE).

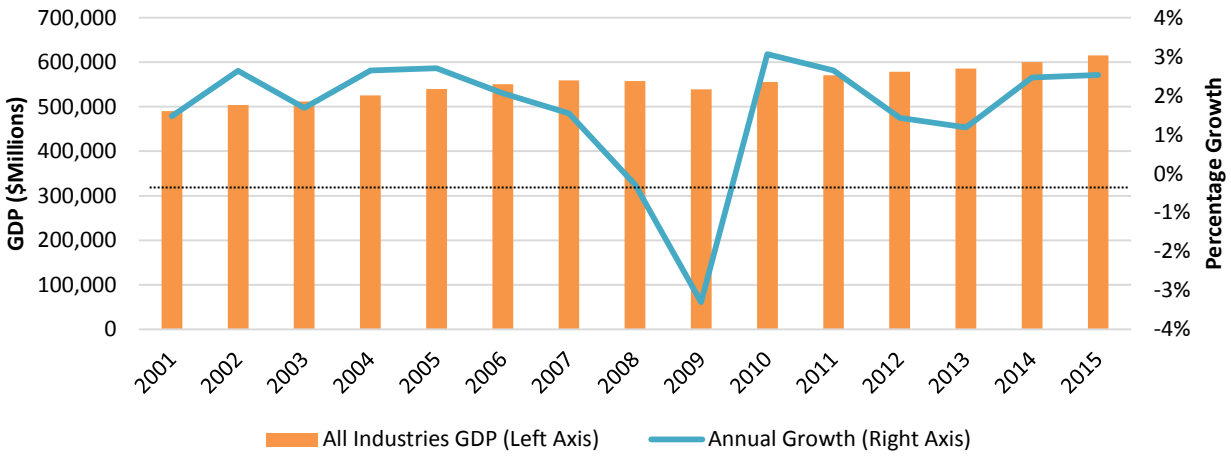
More than 60% of engineers are employed in either manufacturing or professional services industries. Many industries experienced a significant decline in GDP in 2008 and 2009. Among them, the manufacturing, oil and gas extraction and support activities for mining witnessed the greatest declines — 17%, 20%, and 34%respectively. In 2009, more than 9,400 engineering jobs were lost in Ontario. Those losses were recovered between 2010 and 2015; during this period engineering employment increased by 21,500.

Figure 6-5: Share of Engineering Employment by Industry, Ontario, 2011



Source: NHS 2011, Prism Economics and Analysis

Figure 6-6: All Industries GDP levels and Annual Growth Rate, Ontario, 2001 to 2015



Source: Statistics Canada, CANSIM Table 379-0030, 2016

Replacement Demand

An estimated 31,500 engineers are expected to leave the labour force due to death or retirement over the next ten years (2015 and 2025). This represents a significant increase in replacement demand compared to the approximately 17,500 age-related exits from the labour force over the preceding decade. Replacement demand projections are based on demographic models and labour force participation rates.

Total Hiring Requirements

It is projected that, in total, approximately 48,500 new engineers will be required to meet economic and replacement demand requirements in the engineering workforce over the next 10 years.

Supply

The supply projections are based on historical enrolment and graduation trends in Ontario engineering programs, historical data on international migration and an estimate of inter-provincial migration based on historical patterns.

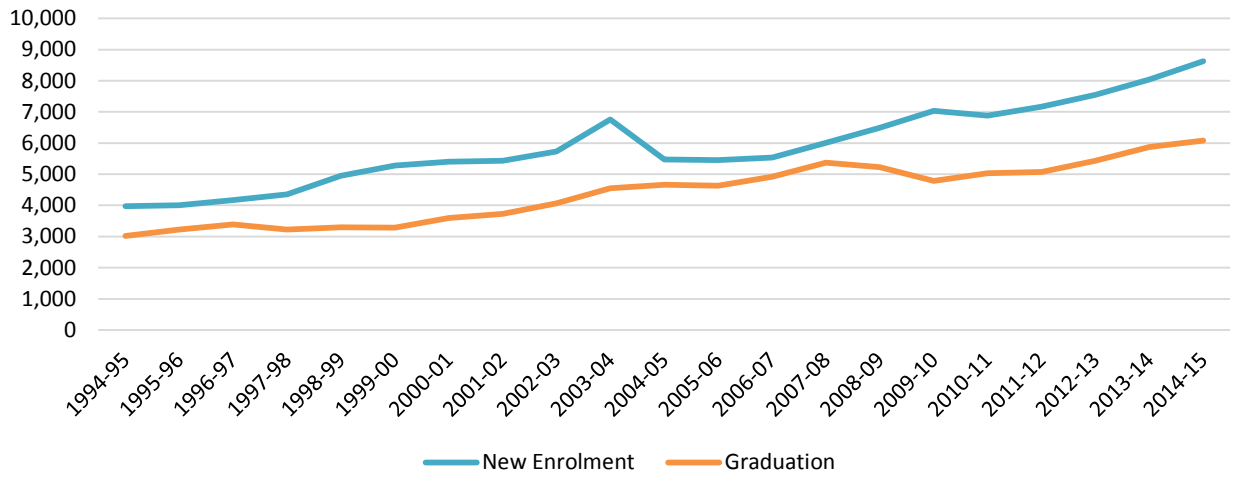
Ontario Engineering Graduates

The projected number of Ontario engineering graduates is based on historical enrolment and graduation data. The forecast does not reflect recently announced approvals to expand engineering programs at some Ontario universities. This omission adds a measure of conservatism to the graduation forecasts. The graduation data include both visa students and out-of-province students.

Enrolment in engineering programs has generally been on the rise since the mid-1990s. The number of students across all engineering disciplines grew by 69% over the nine-year period from 1995 to 2003. Slower economic growth and fewer employment opportunities contributed to a decline in engineering enrolment in the mid-2000s. This trend reversed in the latter half of the decade. Growth in engineering program enrolment accelerated sharply between 2011 and 2015, rising by nearly one-quarter (24%).

The following graph provides historical trends in engineering enrolments and graduation from 1994-1995 to 2014-2015. Graduation trends follow the trends in new enrolments, with a four-year lag due to program duration. Given the significant rise in enrolment in recent years, it is expected that the number of engineering graduates will rise significantly over the next four years.

Figure 6-7: New Enrolment and Graduation, Undergraduate Engineering Programs, Ontario



Source: MAESD, 2015

Visa Graduates Returning Home

Data on undergraduate enrolments published by Engineers Canada indicate that 10% to11% of undergraduates are visa students. The Final-Year Engineering Students Survey asked foreign students if they intend to work in Canada. Approximately 50% did. We rely on this ratio to estimate the proportion of visa graduates who will enter the Ontario engineering workforce.

Out-of-Province Graduates Returning Home

It is estimated that approximately 5% of graduates are from out-of-province and will return home. They do not enter the Ontario engineering labour force following graduation.

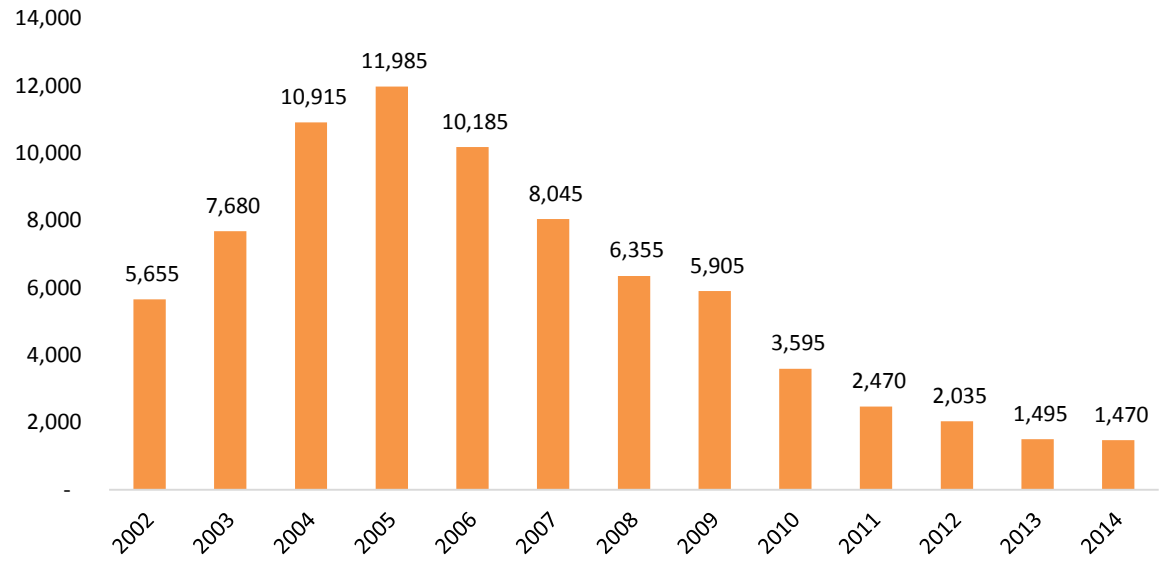
International Immigration

Projections are based on historical data, with a 2% growth rate. The number of engineers immigrating to Canada is cyclical. It is affected by perceived employment prospects in Canada, which usually lag actual employment conditions. The immigration of engineers is also affected by the design and management of the Federal Skilled Worker Program and provincial nominee programs. Recent changes in federal immigration policy seek to strengthen the role of employability criteria and employers' hiring requirements in selecting candidates for immigration. It is unclear how these changes will affect immigration trends for engineers. However, it is more likely that they will support an increase in immigration by engineers than a reduction. Hence, the immigration forecasts should be viewed as conservative.

A growing number of immigrants who intended to work as engineers were admitted to Ontario in the middle part of the last decade. Based on data by Immigration, Refugees and Citizenship Canada, between

2003 and 2007, more than 48,800 immigrant engineers arrived in Ontario. Following the recession of 2009, the intake of internationally trained engineers through immigration dropped from almost 6,000 in 2009 to just under 1,470 in 2014.

Figure 6-8: International Immigrants Intended to Work as Engineers in Ontario, 2002 to 2014



Source: Immigration, Refugees and Citizenship Canada, 2015

Temporary Foreign Workers

Prior to recent changes in policy, the number of engineers immigrating to Canada under the Temporary Foreign Worker program was approximately equal to the number of persons admitted under the Federal Skilled Worker program and declaring engineering to be their intended occupation. The projection used in this forecast holds the average over the last four years of admissions figures constant.

Net Inter-Provincial Migration

Net inter-provincial migration trends are strongly influenced by the oil price cycle and conditions in western Canada. Data from the 2011 NHS indicate that approximately 9% of Ontario engineering jobs were filled by Canadian engineering graduates who obtained their engineering degree in another province. This proportion has been applied to the estimate of total hiring requirements to derive a projection for net inter-provincial migration.

Structural Factors

No effort has been made to model the impact on engineering hiring requirements of technology trends, the

outward migration of manufacturing capacity, or trends in the substitution of technologists for engineers. It can be plausibly conjectured that technology trends may increase engineering hiring requirements. However, this effect could be partially or wholly offset by the movement of manufacturing facilities to low-wage jurisdictions and the trend to hire college-trained technologists for roles that were previously performed by engineers.

The supply and demand projections are summarized in Table 6-8.

Table 6-8: Projected Supply and Demand of Engineers and Engineering Managers in Ontario, 2015 to 2025

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Demand											
Economic demand: Change in employment from prior year	703	1,342	1,674	1,488	1,751	1,394	1,556	1,323	1,328	1,477	1,543
Replacement demand											
Retirements	2,077	2,170	2,336	2,455	2,564	2,669	2,772	2,914	3,029	3,167	3,316
Deaths	177	179	181	184	187	189	191	194	197	199	201
Voluntary withdrawals from engineering labour force	644	527	447	393	372	388	412	450	481	505	523
Total hiring requirements	3,601	4,217	4,639	4,520	4,874	4,640	4,932	4,881	5,034	5,348	5,583
Supply											
Ontario engineering graduates (including visa students)	6,335	6,716	7,085	7,608	7,439	6,968	7,006	7,048	7,075	7,077	7,052
Visa graduates returning home	-320	-339	-358	-384	-376	-352	-354	-356	-357	-357	-356
Out-of-province graduates returning home	-317	-336	-354	-380	-372	-348	-350	-352	-354	-354	-353
International immigration (by intended occupation)	1,868	1,905	1,943	1,982	2,021	2,062	2,103	2,145	2,188	2,232	2,276
Temporary foreign workers	224	224	224	224	224	224	224	224	224	224	224
Net inter-provincial migration	324	380	417	407	439	418	444	439	453	481	502
Total annual increase in supply	8,114	8,549	8,957	9,456	9,376	8,971	9,072	9,148	9,229	9,302	9,346
Ratio of supply increase to hiring requirements	2.25	2.03	1.93	2.09	1.92	1.93	1.84	1.87	1.83	1.74	1.67

Source: PRISM Economic Analysis

Looking Forward

Netting out returning visa students and out-of-province students, there will be approximately 69,600 Ontario engineering graduates over the forecast period. Inter-provincial and international migration will add an additional 29,900 engineering graduates to Ontario's labour force. Total supply will therefore be around 99,500. Hiring requirements in engineering and engineering management are likely to be around 52,300. As a result, close to half of the increase in supply (47,200) will need to take employment in non-engineering jobs.

This forecast is consistent with analysis of the 2011 NHS, which indicates that there are as many engineering graduates employed in other occupations that normally require a university degree as there are employed in engineering occupations. Many of these occupations are careers in which an undergraduate degree in applied science is an advantageous qualification. Among others, these occupations include jobs in information technology, systems planning, technical sales, technical inspection and approval, as well as general management.

The evidence from the labour market is that an engineering degree is a valued qualification that can open doors to many different professional careers that are not covered by the Professional Engineers Act. At the same time, 2011 NHS data also suggest that around one-fifth of graduates from Canadian engineering programs are employed in occupations that do not normally require a university degree. Among persons who earned their engineering degree outside Canada, the apparent level of under-employment is more than 40%. Some of this employment may be "stepping stone" employment. Some may reflect personal preference. It is difficult to believe, however, that these factors fully account for the under-employment of one-fifth of Canadian engineering graduates. The data therefore suggest a significant level of under-employment among graduates of Canadian engineering programs.

The challenge for universities and for education planners is how to better understand the role of an engineering degree as preparation for a career. An Ontario engineering degree is a professional degree. As such, it qualifies a graduate for admission into the regulated engineering profession. Around 35% to 45% of graduates will follow this path. On the whole, these graduates appear to be well prepared for these careers. At the same time, at least half of engineering graduates are likely to pursue career paths that will draw on their training in applied science but that do not involve performing engineering work as it is defined in the Professional Engineers Act. Most of these graduates will not complete and may not even enter the licensure stream. The question for universities is whether engineering schools are also providing these graduates with the preparation they need. The suggestion that one-fifth of Canadian engineering graduates in Ontario may be under-employed makes this question especially relevant.

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