



Apprentice Demand in Red Seal Trades: A 2020 National Labour Market Information Report



Contents

About the Canadian Apprenticeship Forum	5
About the Author	5
Intellectual Copyright	6
1.0 Executive Summary	7
2.0 Introduction	10
3.0 National Trends in Apprenticeship	11
3.1 Economic and Population Outlook	11
3.2 Population Growth	14
3.3 Trends in Apprenticeship	17
3.4 Provincial Trends	18
3.5 Trade Trends	20
3.6 Outcome Trends	21
4.0 Certification Requirements and Completions: A National Outlook	30
4.1 Workforce Certification Requirements	31
4.2 Future Supply of New Journeypersons	34
5.0 Conclusion	40
Appendix A: List of Red Seal Trades	42
Endnotes	43

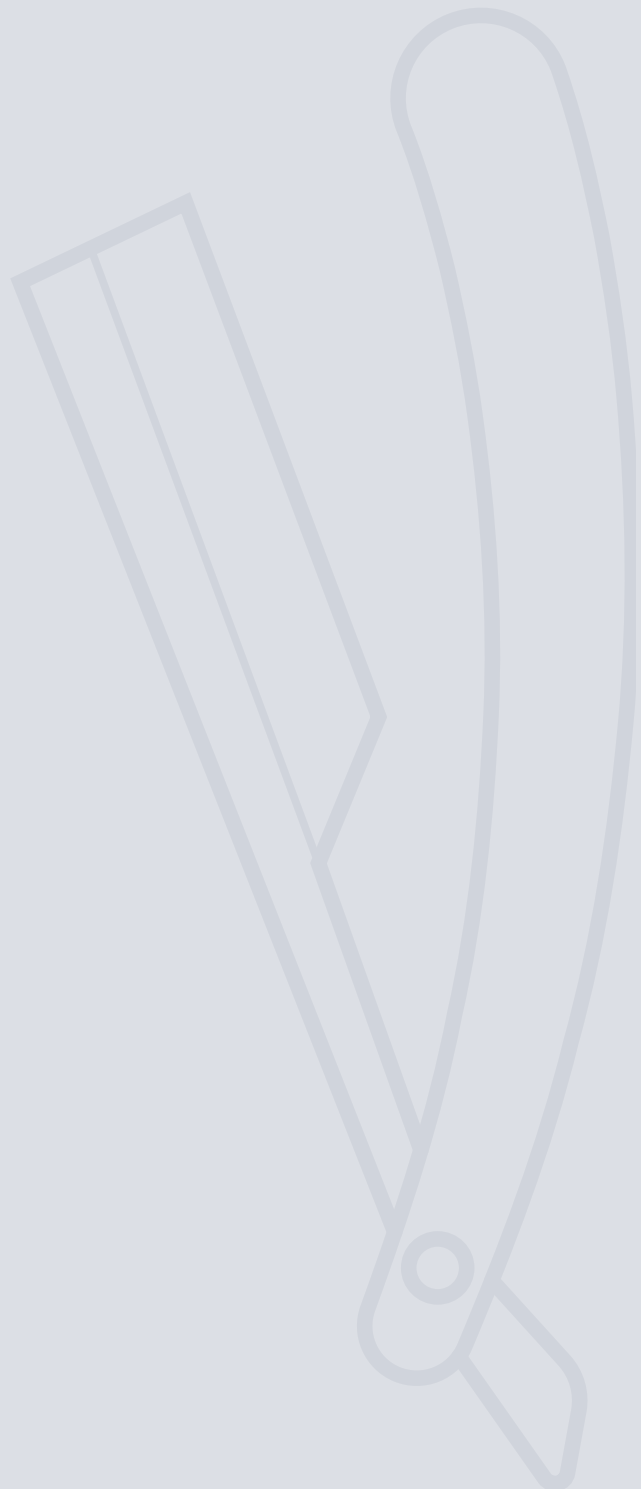
List of Figures

Figure 1- Real GDP Growth (%) Canada, 2014 to 2024	12	Figure 16- Highest Certificate, Diploma or Degree among Individuals in Red Seal Trades, Canada	27
Figure 2- Average Annual Real GDP Growth, by Province, 2019 to 2024	12	Figure 17- Highest Certificate, Diploma or Degree among Individuals in Red Seal Trades, Canada	28
Figure 3- Employment Change (%) by Sector, 2019 & 2020 to 2024	13	Figure 18- Highest Level of Education Attainment, by National Occupational Classification [NOC] 2016	29
Figure 4- Components of Population Growth (%), Canada, 2000 to 2029	15	Figure 19- Highest Level of Education Attainment, by Province, 15 Top Red Seal Trades	29
Figure 5- Share of the Population aged 65 and over by Province, 2020 and 2030	16	Figure 20- Trends in Apprenticeship Program Registrations and Completions, Total Red Seal Trades, 2004 to 2024 Canada (Excluding Territories)	30
Figure 6- New Registrations, Completions and Employment in Top 15 Red Seal Trades, Canada, 2004 to 2024	17	Figure 21- Principal Certification Requirements for Red Seal Trades by Province, 2020 to 2024, Canada (Excluding Territories)	32
Figure 7- Distribution of Total Registrations by Province, Total Red Seal Trades, 2018, Canada (Excluding Territories) . .	18	Figure 22- Total Certification Requirements for Red Seal Trades by Province, 2020 to 2024, Canada (Excluding Territories)	32
Figure 8- Change (%) in New Registrations by Province, Total Red Seal Trades, 2014 to 2018, Canada (Excluding Territories)	18	Figure 23- Average Annual New Registrations in Red Seal Trades, Historic (2015 to 2019) and Projected (2020 to 2024), by Province	34
Figure 9- Distribution (%) of New Registrations by Province, Total Red Seal Trades, 2014 to 2018, Canada (Excluding Territories)	19	Figure 24- Average Annual New Registrations in Red Seal Trades, Historic (2015 to 2019) and Projected (2020 to 2024), Canada (Excluding Territories)	35
Figure 10- Trends in New Registrations and Completions, Total Red Seal Trades, 2004 to 2024, Canada (Excluding Territories)	21	Figure 25- Average Annual Certification Demand by Province, Total Red Seal Trades, Historic (2015 to 2019) and Projected (2020 to 2024)	36
Figure 11- Distribution of Red Seal Completions by Province, 2018, Canada (Excluding Territories)	22	Figure 26- Average Annual Certification Demand by Red Seal Trade, Historic (2015 to 2019) and Projected (2020 to 2024), Canada (Excluding Territories)	37
Figure 12- Change (%) in Red Seal Completions, 2014 to 2018, Canada (Excluding Territories)	22	Figure 27- Average Annual New Registrations (Projected) and Target Registrations Required, Red Seal Trades, 2020 to 2024, Canada (Excluding Territories)	38
Figure 13- Percent Change (%) in Red Seal Program Completions, 2014 to 2018, Canada (Excluding Territories) . .	23		
Figure 14- Average Completion Rates (%) of Red Seal Trades, 2014 and 2018	24		
Figure 15- Average Completion Rates (%) of Red Seal Trades by Province, 2014 and 2018	25		



List of Tables

Table 1- Summary of Target Registrations and Certification Requirements for Total Red Seal Trades by Province, 2020 to 2024	8
Table 2- Summary of Projected Completions, Target Registrations and Certification Requirements Top 15 Red Seal Trades, 2020 to 2024, Canada (Excluding Territories)	9
Table 3- Top 15 Red Seal Programs	10
Table 4- New Apprenticeship Registrations by Trade, 2014 to 2018, Canada (Excluding Territories)	20
Table 5- Median Employment Income (\$) at Certification and 2 years Before Certification, 2010 to 2016*	25
Table 6- Median Employment Income (\$) at Certification and 2 years Before Certification by Gender, 2010 to 2016*	26
Table 7- Total Certification Requirements for Red Seal Trades, 2020 to 2024, Canada (Excluding Territories)	33
Table 8- Projected Registrations, Projected Completions, Certifications Required and Target Registrations by Province, 2020 to 2024	39
Table 9- Projected Registrations, Projected Completions, Certifications Required and Target Registrations by Red Seal Trade, 2020 to 2024, Canada (Excluding Territories)	39
Table 10- Summary of Projected Supply and Demand Conditions, by Province, Top 15 Red Seal Trades, 2020 to 2024	41



About the Canadian Apprenticeship Forum

The Canadian Apprenticeship Forum – Forum canadien sur l'apprentissage (CAF-FCA) is a national, not-for-profit organization working with stakeholders in all regions of Canada. We influence pan-Canadian apprenticeship strategies through research, discussion and collaboration. We share insights across trades, across sectors and across the country. We do this in order to promote apprenticeship as an effective model for training and education.

Our Board of Directors is comprised of representatives from business, labour, the jurisdictional apprenticeship authorities, education and equity-seeking groups. Through our work, CAF-FCA has shed light on a number of key issues affecting apprenticeship, such as the perceived barriers to accessing and completing apprenticeship, and the business case for apprenticeship training. For more information, visit the CAF-FCA website at www.caf-fca.org.

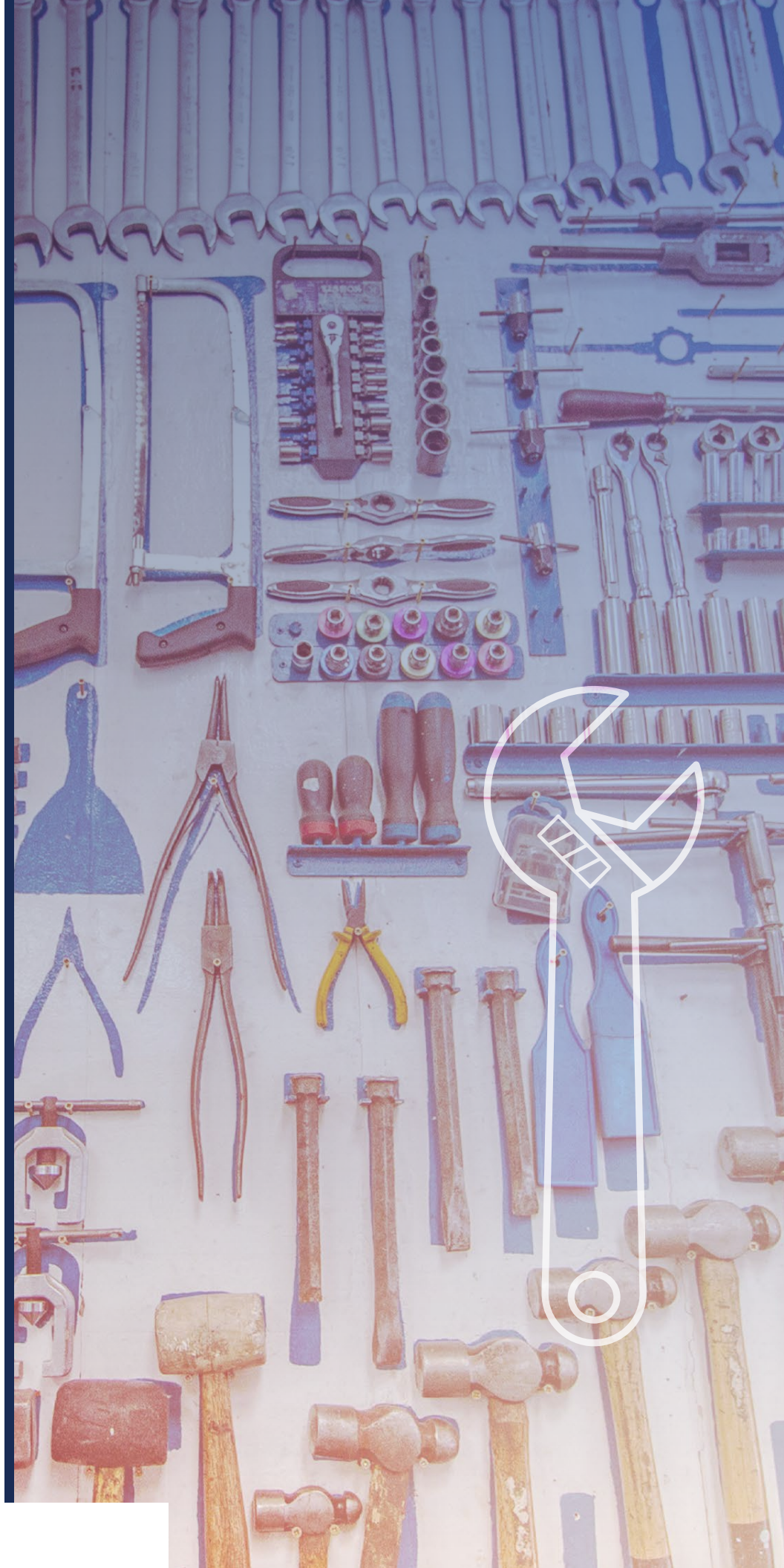


About the Author

Prism Economics and Analysis (Prism) is an established labour market economics consultancy firm specializing in the analysis of labour markets and human resource planning issues. Prism works with employers, governments, post-secondary institutions, trade unions and professional associations to deliver credible research that provides practical human resource solutions.

Working with such stakeholders enables Prism to develop its in-depth knowledge of labour market structures, apprenticeship and training systems, sources, people, institutions, regulations and policies. Prism understands the different interests and perspectives of stakeholder groups and carefully balances its analysis and reporting to respect and reconcile these interests.

Prism developed the Canadian System for Tracking Apprenticeship Qualifications (CANTRAQ) to track demand requirements and supply of trade certifications. CAF-FCA supported the development of the methodology and continues to work in collaboration with Prism to better understand apprentice supply and demand.



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The opinions and interpretations in this publication are those of the author and do not necessarily reflect those of the Government of Canada.

Canada 

Executive Summary

Canada will likely need more than 155,000 new certified journeypersons over the next five years to keep pace with economic growth and rising retirements. This will require attracting close to 351,000 new apprentices in more than 50 Red Seal trades. The boom and bust of the commodity super-cycle experienced over the last decade has contributed to large swings in apprenticeship registrations across many province and trades. Although the overall number of program registrations is beginning to recover, an assessment of certification requirements suggests that the long-term sustainable supply of journeypersons for some trades may be at risk.

This report draws together apprenticeship trends data and projections from the *Canadian System for Tracking Apprenticeship Qualifications (CANTRAQ)* to provide a forward-looking assessment of demand and supply for trade certification for Red Seal trades in Canada. National, provincial and trade-specific assessments of demand and supply projections for the 15 largest Red Seal trades are also provided.

From 2020 to 2024, an estimated 155,338 new journeypersons will be required to sustain workforce certification levels across Red Seal trades in Canada, two-thirds (67%) of which will be concentrated in the top 15 Red Seal trades. Although the pace of employment growth in many skilled trades is expected to slow compared to the rapid expansion over the last decade, workforce retirements and overall hiring and training requirements will continue to rise. Keeping pace with the demand for skills and workforce certification over the long-term will require attracting nearly 350,740 new apprentices over the next five years.

An anticipated shift in demand between regions and sectors will require a re-distribution of training certification requirements and, therefore a sharing of training resources among trades and provinces. The anticipated slowdown in the pace of construction employment is likely to result in decreased demand from current levels for some trades, such as construction electricians and plumbers, and increased requirements for others, such as cooks, welders, and automotive service technicians.

Another challenge is the risk of skilled trades shortages over the long-term due to a decline in new apprentices since 2014, and the potential erosion of training capacity. Annual new registrations in the 15 largest Red Seal trades contracted by 12% between 2014 and 2018, resulting in 6,088 fewer new registrants. This decline can be directly attributed to the collapse in oil and resource prices in 2014 and subsequent declines in investments in the resource sector.

The impact of declines in resource sector investment related to apprenticeship was felt strongest in Newfoundland and Labrador, where new registrations dropped by 45%, followed by Alberta, where it dropped by 42%, and Saskatchewan, where it dropped by 39%. Looking ahead, new registrations are forecast to rise steadily in the near-term; however, they are not projected to surpass previous peak levels.

Based on the CANTRAQ analysis, Table 1 provides a summary of the number of new journeypersons required and the targets for the total number of new apprentices likely needed to meet these requirements, by province, over the period 2020 to 2024. Table 2 compares projected program completions, target registrations and certification requirements for the 15 largest Red Seal programs over the same period, 2020 to 2024.

Table 1- Summary of Target Registrations and Certification Requirements for Total Red Seal Trades by Province, 2020 to 2024

PROVINCE	CERTIFICATIONS REQUIRED	TARGET REGISTRATIONS
British Columbia	23,243	70,468
Alberta	29,282	77,140
Saskatchewan	6,116	8,476
Manitoba	1,531	8,011
Ontario	48,772	100,903
Quebec	36,102	63,332
Atlantic Canada	10,293	22,407
Total	155,338	350,737

Source: Statistics Canada (RAIS), 2018; CANTRAQ Prism Economics (2020)

Table 2- Summary of Projected Completions, Target Registrations and Certification Requirements, Top 15 Red Seal Trades, 2020 to 2024, Canada (Excluding Territories)

RANK	TRADE	PROJECTED COMPLETIONS	CERTIFICATIONS REQUIRED	TARGET REGISTRATION
○	Boilermaker	966	1,201	1,421
○	Bricklayer	1,290	1,971	4,877
○	Welder	7,264	10,447	22,862
○	Automotive Service Technician	11,445	10,383	23,542
○	Carpenter	16,181	14,945	39,864
○	Cook	7,402	7,261	20,285
○	Hairstylist	11,103	8,399	20,667
○	Heavy Duty Equipment Technician	6,353	5,142	9,511
○	Mobile Crane Operator	1,249	1,191	1,945
○	Refrigeration and Air Conditioning Mechanic	5,052	4,473	7,331
○	Sheet Metal Worker	4,498	3,480	6,738
○	Construction Electrician	30,263	21,000	30,037
○	Industrial Mechanic (Millwright)	7,833	5,541	7,061
○	Plumber	10,189	6,147	19,414
○	Steamfitter/Pipefitter	5,497	2,940	5,310
	Total	126,582	104,522	220,866

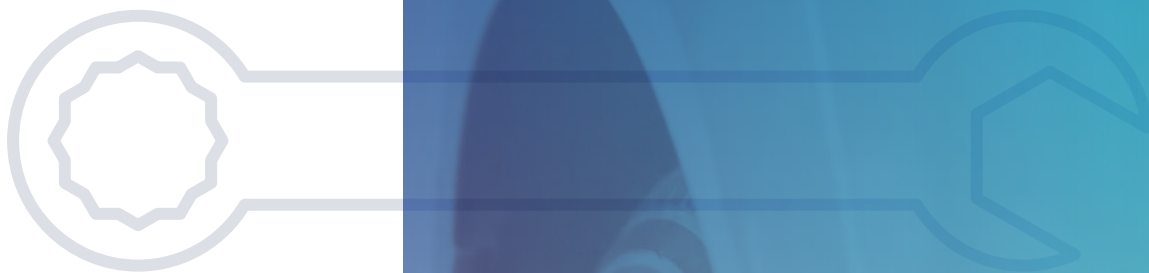
○ **At Risk** Certifications Required Exceed Projected Completions

○ **Balanced Conditions** Certifications Required In-Line with Projected Completions

○ **Ample Supply** Projected Completions Exceed Certifications Required

Source: Statistics Canada (RAIS), 2018; CANTRAQ Prism Economics (2020)

It is important to note that this analysis considers only anticipated annual changes in demand and supply of new journeypersons, and therefore does not take into account the labour market conditions at the 2020 starting point or the impacts of the global COVID19 pandemic. In many markets currently experiencing shortages for skilled trades, trades characterised as having an “ample supply” can be interpreted as essentially catching-up to demand.



Introduction

The objective of this report is to provide apprenticeship stakeholders with an analysis of apprenticeship trends and projections of training requirements for Red Seal trades across Canada. This report focuses primarily on the 15 largest Red Seal trades in Canada.

The first section of the report provides an analysis of national and provincial trends in apprenticeship registrations and completion rates based on the latest available data (2018) from Statistics Canada's Registered Apprenticeship Information System (RAIS). The section also provides a summary of the economic and population growth outlook as well as other factors which are likely to have an impact on the demand and supply for trade certification and apprenticeship training in Canada.

RAIS compiles data from the provinces and territories based on the number of individuals registered in apprenticeship programs and those who obtain certification. CAF-FCA's report provides statistics and analysis of the trends in new registrations and completions for the 15 largest Red Seal apprenticeable programs across Canada, excluding the Territories.

The second section of this report provides a forward-looking assessment of apprenticeship program registrations, completions and workforce certification requirements for the five-year period 2020 to 2024. An in-depth analysis of trade-specific training and certification requirements, and supply of new journeypersons is provided for individual provinces in section three of this report.

The projections and analysis are informed by recent provincial economic forecasts and sectoral labour market studies, including the 2020 BuildForce Canada Construction and Maintenance Looking Forward outlook, and provincial macroeconomic and occupational hiring projections produced by the Centre for Spatial Economics (C4SE). The detailed qualification-based analysis for individual trade programs is based on Prism Economics' CANTRAQ system.

Table 3- Top 15 Red Seal Programs

	RED SEAL TRADE	NOC 4
1.	Automotive Service Technician	7321
2.	Boilermaker	7234
3.	Bricklayer	7281
4.	Carpenter	7271
5.	Construction Electrician	7241
6.	Cook	6322
7.	Hairstylist	6341
8.	Heavy Duty Equipment Technician	7312
9.	Industrial Mechanic (Millwright)	7311
10.	Mobile Crane Operator	7371
11.	Plumber	7251
12.	Refrigeration and Air Conditioning Mechanic	7313
13.	Sheet Metal Worker	7233
14.	Steamfitter/Pipefitter	7252
15.	Welder	7237

National Trends in Apprenticeship

3.1 Economic and Population Outlook

This section describes economic and population trends and other factors likely to impact the demand and supply for trade certification and apprenticeship training in Canada. Economic conditions and fluctuations in employment are among the chief determinants of apprenticeship program registrations and completions.¹ Since employment is a precondition of an apprenticeship, this form of post-secondary education is distinct from college or university and is, typically, extremely sensitive to the ebb and flow of economic cycles. The correlation is positive with rising employment translating into higher program registrations and increased completions. Periods of rapid expansion in employment requirements however, can result in a decrease of available resources to take on and mentor apprentices. Tighter labour market conditions can lower employers' qualification requirements. This can dissuade workers from seeking a formal apprenticeship due to lost income while attending technical training. During these periods of economic growth, employers will tend to hire from the pool of available (unemployed) skilled and experienced workers first, rather than take on less-experienced new entrants.

Economic cycles tend to result in significant fluctuations in annual program registrations. These fluctuations and the long duration of four to five years for most apprenticeship programs has contributed to cyclical mismatches between the demand for skilled workers and the number of qualified certified workers available. This dynamic is evidenced by recent peaks in demand for skilled trades and the emergence of skilled trades shortages, driven by the highs of the resource cycle, followed by a period of rising rates of unemployment and significant declines in new apprentice registrations in many provinces. The anticipated slower growth outlook for Canada's economy, combined with an aging workforce, introduces a potential risk to the future capacity of Canada's skilled workforce.

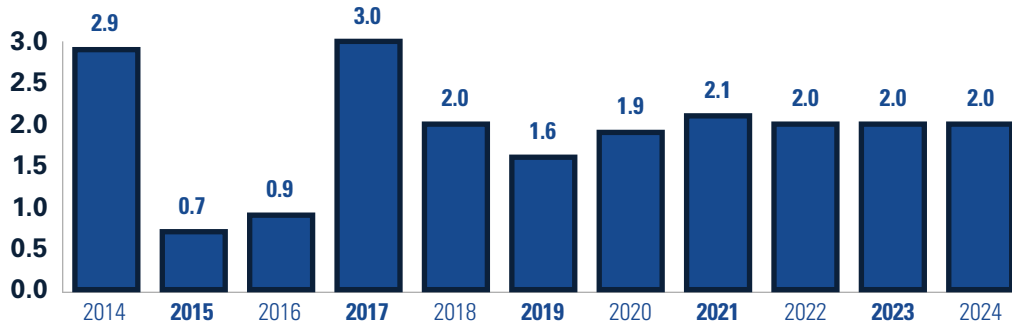
Modest Increases in Economic Growth on the Horizon

Nationally, the pace of economic expansion receded to 1.6% in 2019, with growth held back by global trade conflicts and related declines in key exports. Economic growth is expected to strengthen in 2020 and 2021, driven by record levels of immigration, increased levels of public and private sector investment, and stronger growth in exports. Continued uncertainty surrounding the full impacts of the COVID19 pandemic, oil and commodity prices and the pace of global growth, presents significant potential risks for Canada’s near-term outlook, especially for Alberta, Saskatchewan and Newfoundland and Labrador. Over the longer-term, the pace of growth is expected to slow below 2% per year due to higher interest rates, slowing rates of population growth and slowing rates of economic growth south of the border.

British Columbia, Quebec and Ontario are expected to lead growth between 2020 and 2021, propelled by steady immigration-driven population growth, recovering manufacturing, major infrastructure and energy sector investments. Weaker growth is expected to persist in Saskatchewan and Manitoba due to declines in resource and utility sector investments. A modest recovery is expected to take hold in Alberta, driven in part by younger population demographics.

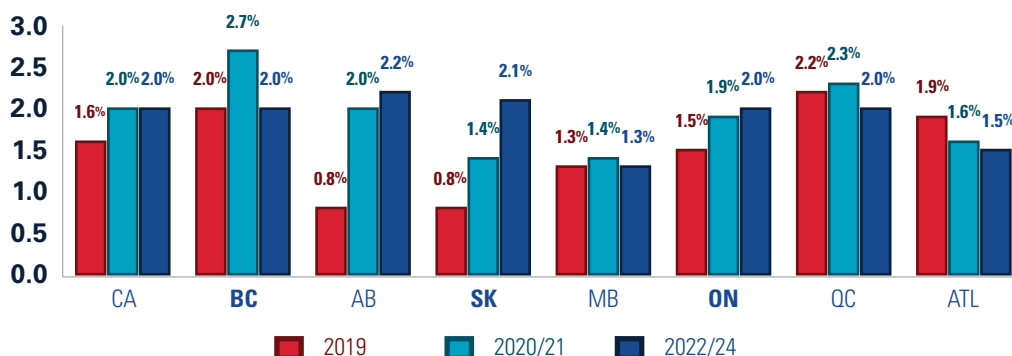
The regional divergence in the growth outlook is likely to contribute to labour market challenges in some provinces as well as opportunities for mobility. Rising near-term demand in British Columbia, related to major energy and infrastructure demand, is expected to exacerbate current labour market challenges for a large number of trades. Figure 2 shows annual average real GDP growth between 2019 and 2024 by province.

Figure 1- Real GDP Growth (%) Canada, 2014 to 2024



Source: Statistics Canada, BuildForce Canada 2020 Outlook

Figure 2- Average Annual Real GDP Growth, by Province, 2019 to 2024



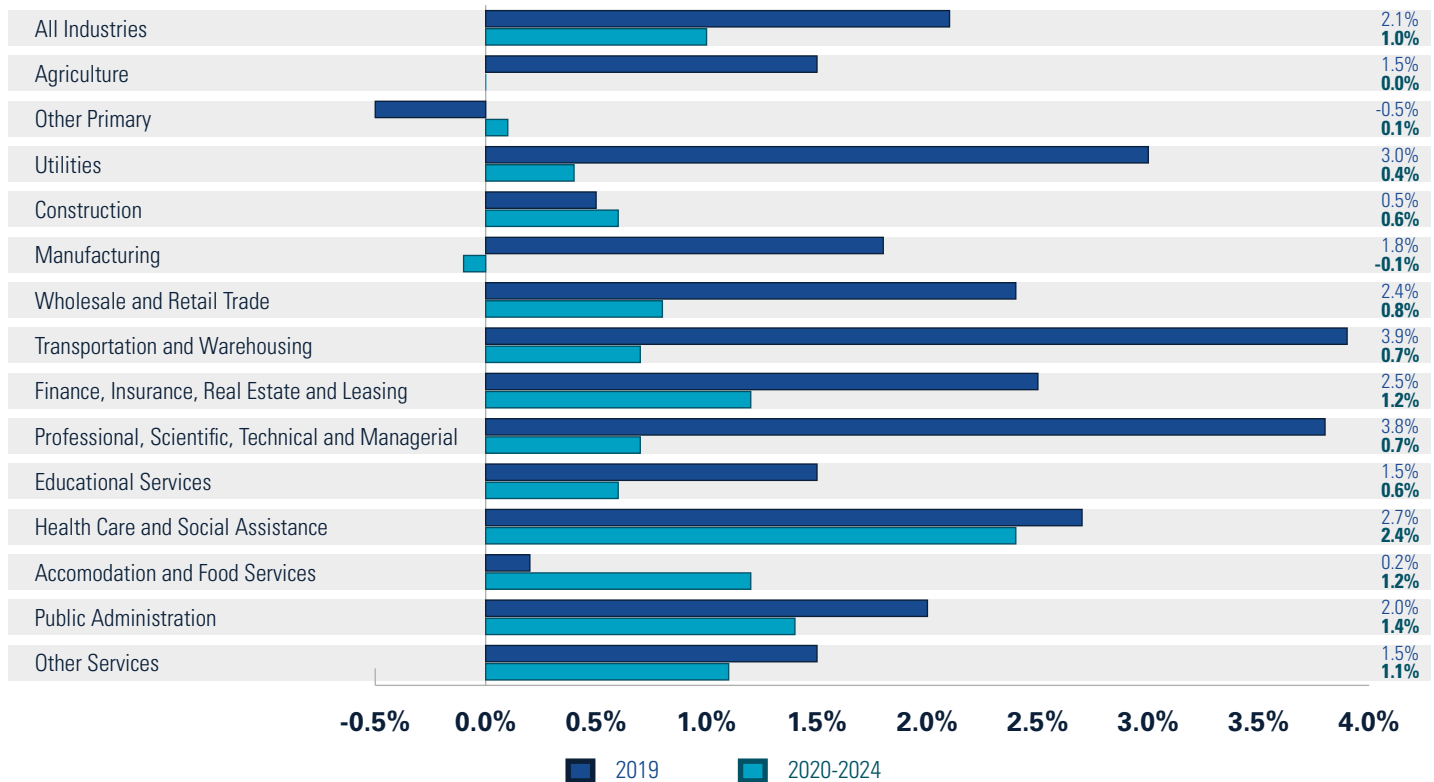
Source: Statistics Canada, BuildForce Canada 2020 Outlook

Shifts in Sectoral Employment

Employment growth in Canada is expected to average around 1% annually between 2020 and 2024, representing a gain of just over 900,000 jobs over the next 5 years. Weaker resource sector investment in addition to strong levels of immigration and ageing population demographics, accelerate the shift from goods producing to service sector employment over the coming decade. Over the same period, sectors expected to experience stronger average annual growth include Health care and social assistance (2.4%/yr), Public administration (1.4%/yr) and Finance, insurance, real estate and leasing (1.2%/yr). Health services-related employment continues to lead job growth in Canada, especially in provinces with older populations. The same age demographics are expected to slow education sector employment. Flat or modest declines in employment are expected in agriculture, oil and gas and manufacturing where demand is expected to be constrained by the slowing pace of global growth.

In the construction sector the average annual growth outlook suggests employment growth will likely average approximately 0.6% per year between 2020 to 2024. Although this is relatively slower compared to much of the last decade, there are distinct differences in the outlooks for individual provinces. According to the 2020 BuildForce Canada Construction and Maintenance Looking Forward outlook, Canada's construction employment is poised to intensify in 2020, "propelled by major public transportation and infrastructure, utility, liquefied natural gas (LNG), pipeline, and health services projects." The strongest period of growth is expected between 2020 and 2021 and concentrated in British Columbia, Ontario and Quebec.

Figure 3- Employment Change (%) by Sector, 2019 & 2020 to 2024



Source: Statistics Canada, BuildForce Canada 2020 Outlook

A recovery in new major construction projects, both residential (mostly apartments) and non-residential, is expected to sustain labour market challenges in multiple markets across Canada between 2020 and 2021:

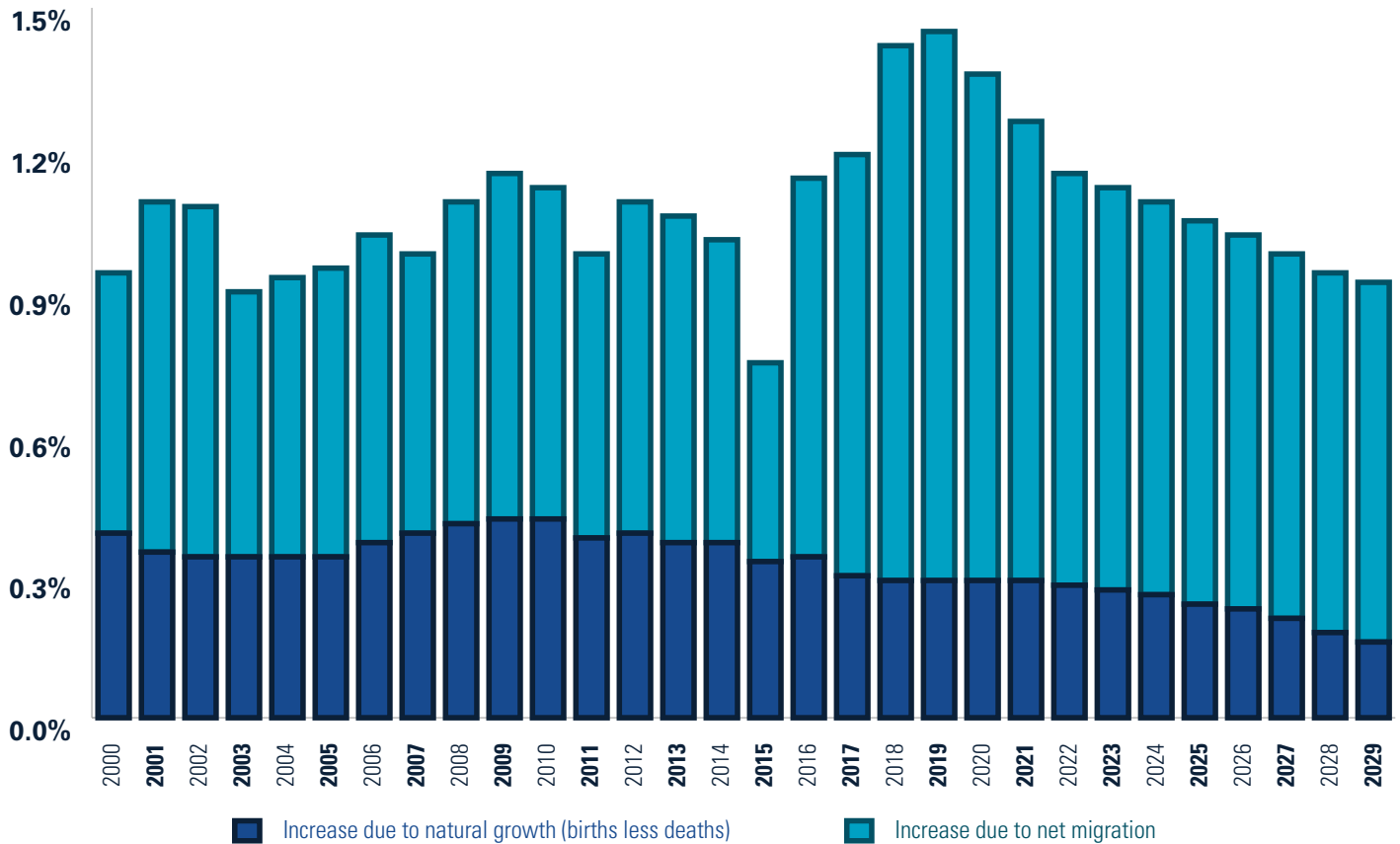
- ▣ British Columbia will remain the fastest-growing construction market in 2020 and 2021, driven by the start of several public transportation projects, pipelines, work on the LNG Canada project and related pipeline infrastructure.
- ▣ Ontario is expected to reach a near-term peak in 2020, driven by increased major project requirements in the Greater Toronto Area (GTA) and Southwestern Ontario due to major public transportation projects, including multiple light rail transit (LRT) projects, overlapping demands from two major nuclear refurbishment projects and other infrastructure-related demands. Construction employment continues to build to a peak in 2026, driven by ongoing and proposed new projects through this period.
- ▣ Prince Edward Island continues to grapple with its growth pains driven by expansions in housing and institutional requirements, while Nova Scotia braces for increased demands driven by several health care projects expected to get under way over the next few years.
- ▣ Quebec's infrastructure investments in roads, highways, bridges, health care, education and public transit are expected to accelerate in 2020 and 2021, building on a fourth consecutive year of growth in 2019.

According to BuildForce Canada, "meeting the anticipated peak employment demands in British Columbia and Ontario will likely require significant levels of interprovincial mobility, which may be a challenge."²

3.2 Population Growth

Population growth in Canada surpassed 1.4% in 2018 and 2019, the highest of all G7 countries. The largest contributor to growth has been record levels of immigration and significant increases in the number of foreign students attending Canadian universities and colleges. In 2019, immigration accounted for 80% of population growth. A moderate decline in immigration from current record levels and aging demographics are projected to limit the pace of population growth in Canada over the next decade, but workforce hiring requirements are expected to continue to rise, driven by the need to replace retirements and deaths from the workforce. The rate of population growth is expected to fall from 1.4% in 2019 to below 1% by 2027, as natural population growth (births-deaths) slows and population growth is increasingly dependent on immigration. Figure 4 illustrates the historical and projected contributions of net-migration and natural growth (births-deaths) to Canada's population growth between 2000 and 2029.

Figure 4- Components of Population Growth (%), Canada, 2000 to 2029



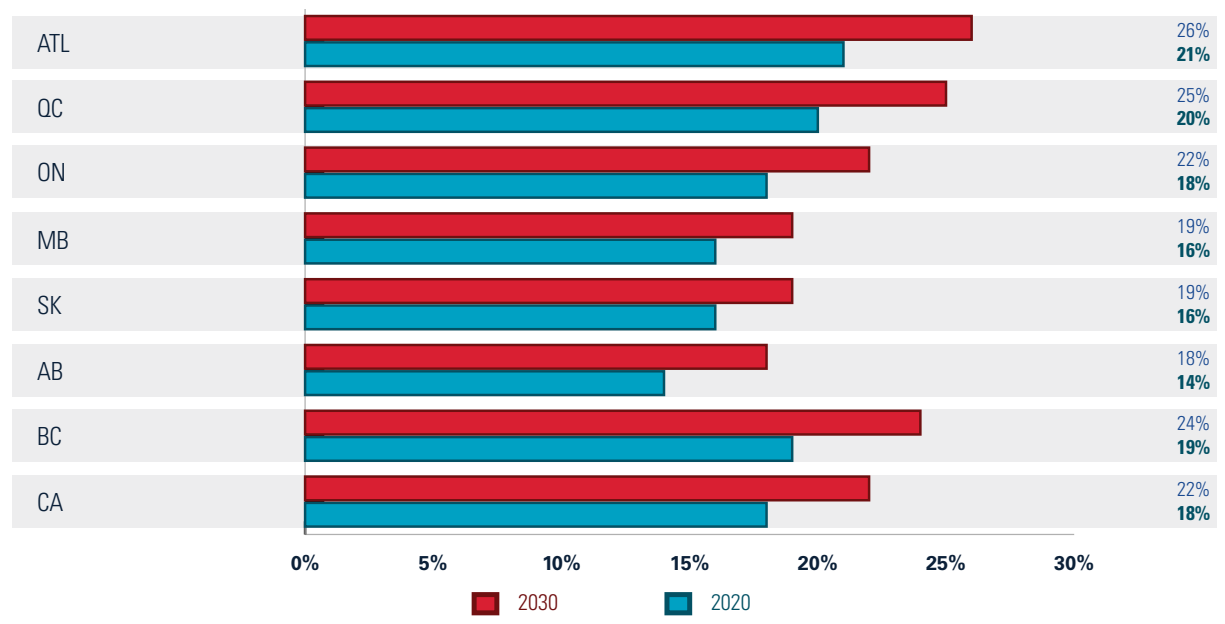
Source: Statistics Canada, BuildForce Canada 2020 Outlook

Retirements will be the primary driver of hiring and training requirements in Canada

From 2020 to 2030, the share of Canada’s population aged 65 and over is expected to increase from 18% to 22%, increasing the rate of workforce retirements. Atlantic Canada has the oldest population in the country with 21% of the population already aged 65 and over. By 2030, the share is expected to rise to 26%. Alberta, remains the province with the youngest population



Figure 5- Share of the Population aged 65 and over by Province, 2020 and 2030



Source: Statistics Canada, BuildForce Canada 2020 Outlook



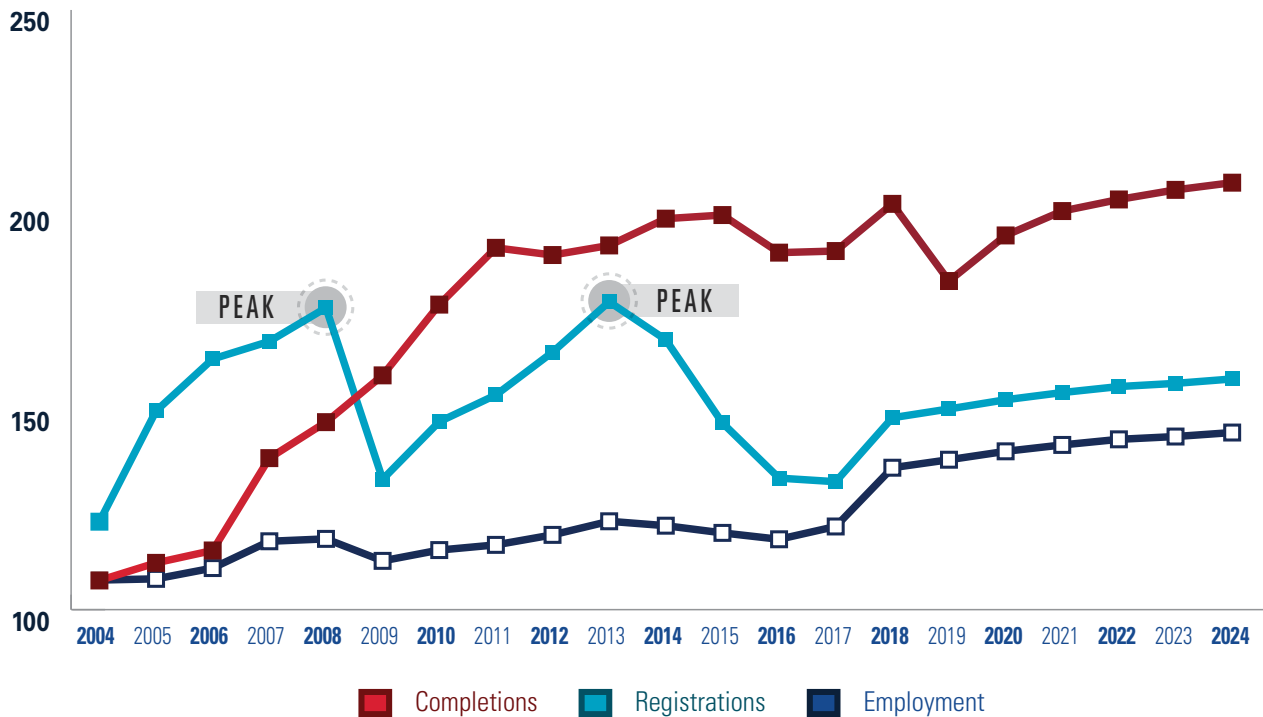
3.3 Trends in Apprenticeship

The number of apprentices swelled across Canada during the mid-to late-2000s, driven by a prolonged period of growth in natural resource sectors. The number of registered apprentices in the 15 largest Red Seal trades increased by 48% over 6 years from 144,822 in 2004 to 214,633 in 2009. From 2010 to 2015, the overall number of apprentices continued to increase steadily, reaching a peak of 226,857 in 2015. Since then, registrations have been trending downwards despite employment levels remaining relatively flat over the same period. Registrations in many trades in resource-dependant provinces such as Alberta have fallen by nearly half. New registrations rose modestly in 2018 and remain at 2010 levels. New registrations are projected to continue to rise only modestly over the next five years, in-line with employment but remaining well below levels reached over the last decade.

Between 2014 and 2018, annual new registrations for the 15 largest Red Seal trades contracted by 12%, resulting in 6,088 fewer new registrants. This decline can be directly attributed to the collapse in oil and other commodity prices in 2014 which resulted in weakening resource sector investments.

The 2008-2009 recession had a similar negative impact on new registrations resulting in a 24% drop in new registrations in 2009. This decline was followed by a relatively quick recovery, driven by a rebound in oil and commodity prices, significant infrastructure investment and an increase in new housing construction. New registrations rose steadily from 2009, nearly recovering to 2008 levels by 2014. Unlike the quick rebound in registrations following 2009, registrations have been slow to recover following the 2014 decline. Figure 6 shows an index of historic and projected trends in new registrations, completions and trades employment (2000=100).

Figure 6- New Registrations, Completions and Employment in Top 15 Red Seal Trades, Canada, 2004 to 2024

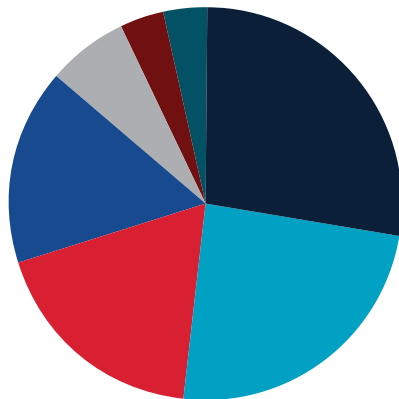


Source: Statistics Canada, RAIS, Custom Aggregation, Top 15 Red Seal Trades; LFS
 Note: 2019 to 2024 are estimates

3.4 Provincial Trends

Based on 2018 RAIS data, Ontario accounts for the largest number of apprentices registered in a Red Seal trade in Canada (77,178), followed by Alberta with 67,824 registered apprentices. Combined, Alberta and Ontario account for more than half (52%) of Red Seal apprentices in Canada. British Columbia follows with 18%, and Quebec with 16%. The share of registrations in the 15 largest Red Seal programs follows a similar distribution trend.

Figure 7- Distribution of Total Registrations by Province, Total Red Seal Trades, 2018, Canada (Excluding Territories)

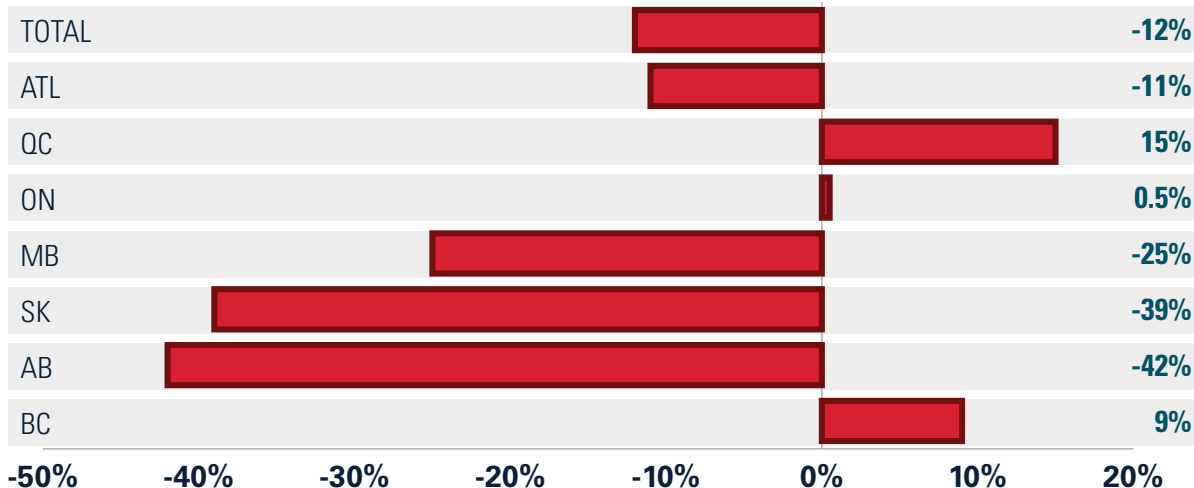


PROVINCE	TOTAL REGISTRATIONS %
Ontario	28%
Alberta	24%
British Columbia	18%
Quebec	16%
Atlantic Canada	7%
Manitoba	4%
Saskatchewan	3%

Source: Statistics Canada (RAIS), 2018

The impact of declines in resource sector investments were felt strongest in Newfoundland and Labrador, Alberta, and Saskatchewan, where new registrations dropped by 45%, 42% and 39% respectively between the five-year period of 2014 to 2018. While Newfoundland and Labrador experienced a significant decline in registrations, the rest of Atlantic Canada remained largely unaffected. In addition, Quebec, Ontario and British Columbia were also notable exceptions to the effects of the 2014 decline.

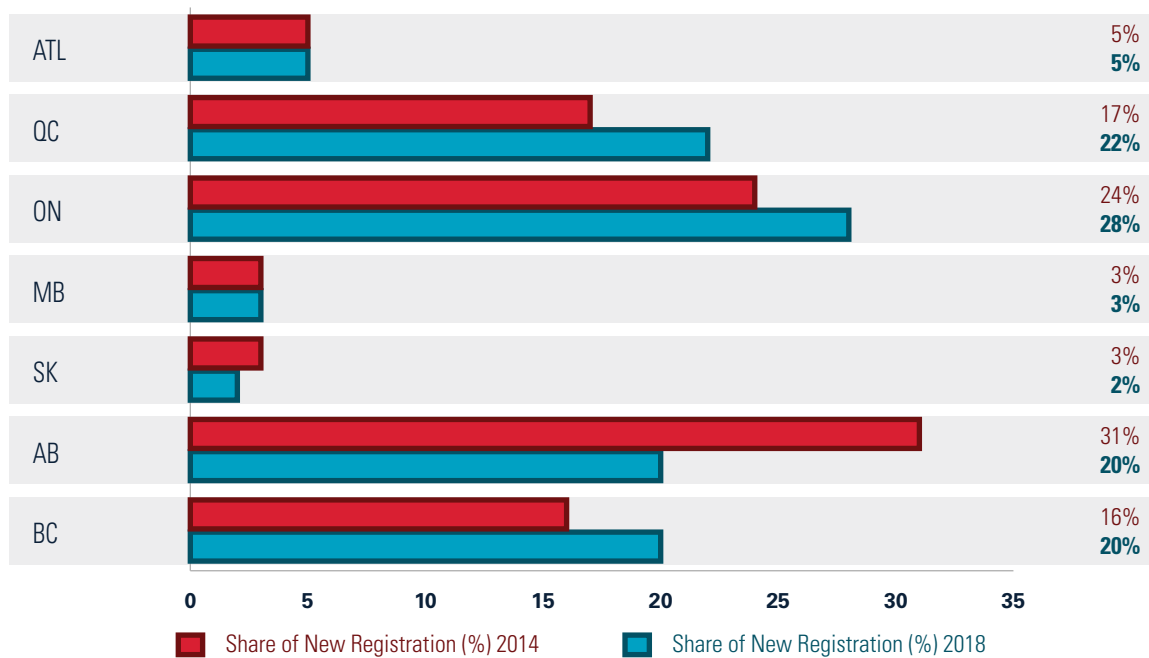
Figure 8- Change (%) in New Registrations by Province, Total Red Seal Trades, 2014 to 2018, Canada (Excluding Territories)



Source: Statistics Canada (RAIS), 2018

Figure 9 illustrates the change in the share of new registrations by province over the period of 2014 to 2018. Alberta's share of new registrations fell from 31% in 2014 to 20% in 2018. During the same time period, Quebec's share rose from 17% to 22%, and Ontario's rose from 24% to 28%.

Figure 9- Distribution (%) of New Registrations by Province, Total Red Seal Trades, 2014 to 2018, Canada (Excluding Territories)



Source: Statistics Canada (RAIS), 2018

3.5 Trade Trends

New Registrations

Between 2014 and 2018, new registrations fell for the majority of Red Seal trades, following a significant expansion period from 2011 to 2014. Trade programs with the most pronounced decline include: mobile crane operator (-47%), steamfitter/pipefitter (-45%), and welder (-33%). Employment in these trades is highly concentrated in the engineering, construction, industrial, and oil and gas sectors.

While new registrations fell for every Red Seal trade between the period of 2014 and 2017, new registrations for multiple trades began to rise in 2018, surpassing 2014 registration levels. The following trades experienced the most pronounced increase from 2014 to 2018: boilermaker (+20%), carpenter (+16%), and refrigeration and air conditioning mechanic (+16%).

Table 4- New Apprenticeship Registrations by Trade, 2014 to 2018, Canada (Excluding Territories)

RED SEAL TRADE	2014	2015	2016	2017	2018	% CHANGE (2014-2018)
Automotive Service Technician	4,848	4,565	4,174	4,363	4,597	-5%
Boilermaker	275	274	373	216	329	20%
Bricklayer	635	586	642	598	612	-4%
Carpenter	7,400	7,509	7,086	7,226	8,605	16%
Construction Electrician	11,466	9,764	8,585	8,404	8,643	-25%
Cook	3,257	3,117	3,227	2,941	3,623	11%
Hairstylist	3,853	3,437	3,227	3,212	3,291	-15%
Heavy Duty Equipment Technician	2,783	1,759	1,352	1,707	2,206	-21%
Industrial Mechanic (Millwright)	2,061	1,879	1,547	1,810	2,133	3%
Mobile Crane Operator	780	608	473	441	417	-47%
Plumber	4,033	3,652	3,420	3,191	3,504	-13%
Refrigeration and Air Conditioning Mechanic	1,470	1,396	1,486	1,437	1,707	16%
Sheet Metal Worker	1,517	1,402	1,345	1,378	1,707	13%
Steamfitter/Pipefitter	3,598	2,622	2,174	1,840	1,977	-45%
Welder	4,452	3,338	2,501	2,551	2,989	-33%
Other Red Seal Trades	19,802	17,321	15,093	15,482	17,458	-12%
Total	72,230	63,229	56,705	56,797	63,799	-12%

Source: Statistics Canada (RAIS), 2018

3.6 Outcome Trends

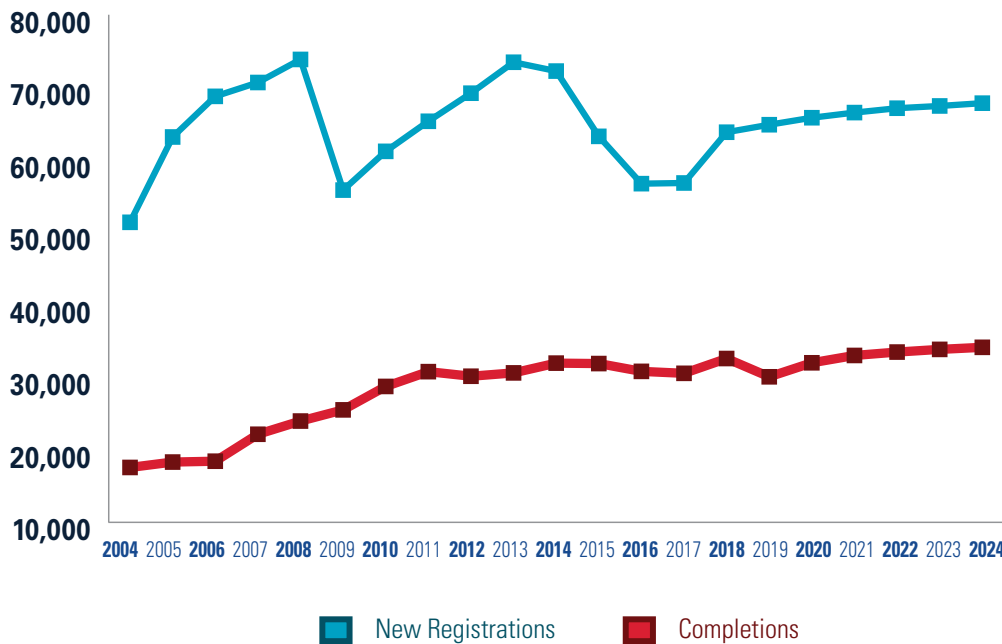
This section provides an overview of trends in apprentice completions, completion rates and earnings.

Program Completions

The number of apprentices completing programs and awarded a Certificate of Qualification (CofQ) tends to be much less volatile compared to new registrations. The proportion of apprentices going on to complete their respective programs remains generally stable. But the time taken to complete, and the completion rates can be impacted by overall labour market conditions. For example, it may take longer to complete an apprenticeship program if an apprentice experiences layoff during an economic downturn.

As Figure 10 illustrates, in the ten year period between 2005 to 2014, the number of apprentices completing their apprenticeship programs and obtaining a CofQ nearly doubled from 18,312 to a record high of 31,955. This 2014 high reflects both the peak in registrations in 2008 and also the surge in recorded completions (primarily carpenters and plumbers) in Ontario³. The downward trend in program completions since 2014 reflects weakening economic conditions that resulted in fewer hours, longer times to complete programs and an increase in discontinuations. In the near-term, new registrations are forecast to rise in line with strong economic expansion in British Columbia, Ontario, Atlantic Canada and Quebec, resulting in higher levels of program completions at the national level.

Figure 10- Trends in New Registrations and Completions, Total Red Seal Trades, 2004 to 2024, Canada (Excluding Territories)

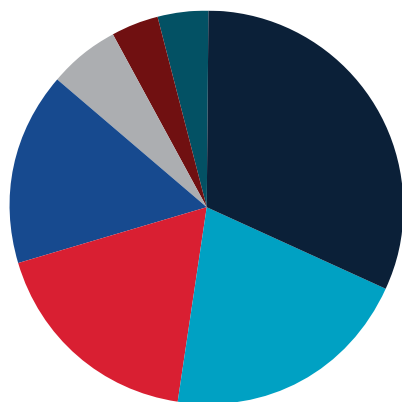


Source: Statistics Canada, RAIS (2018), CANTRAQ Prism Economics (2020)

In 2018, Ontario accounted for the largest number of newly certified journeypersons (10,410) within Red Seal trades in Canada, followed by Alberta with 6,880 journeypersons. Taken together, Alberta and Ontario account for more than half (53%) of the 32,590 newly certified journeypersons in Canada, excluding the Territories (Figure 11). British Columbia and Manitoba are the only provinces that have experienced an increase in program completions since 2014 (Figure 12).

Whereas other provinces such as Ontario and Quebec have experienced an increase in completions in recent years, program completions have not surpassed the certification levels recorded in 2014.

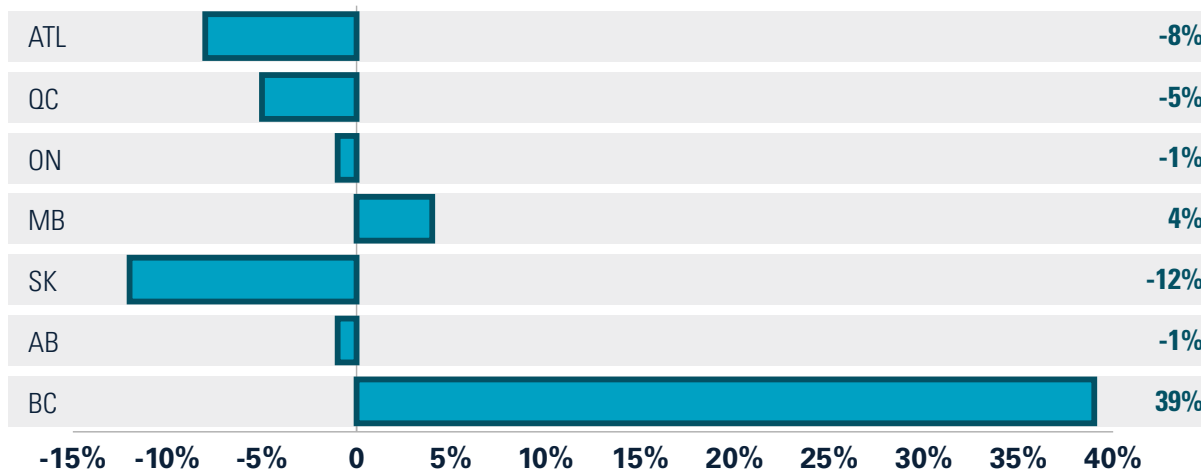
Figure 11- *Distribution of Red Seal Completions by Province, 2018, Canada (Excluding Territories)*



PROVINCE	TOTAL REGISTRATIONS	%
Ontario	10,410	32%
Alberta	6,880	21%
Quebec	5,800	18%
British Columbia	5,200	16%
Atlantic Canada	1,950	6%
Manitoba	1,300	4%
Saskatchewan	1,300	4%

Source: Statistics Canada (RAIS), 2018

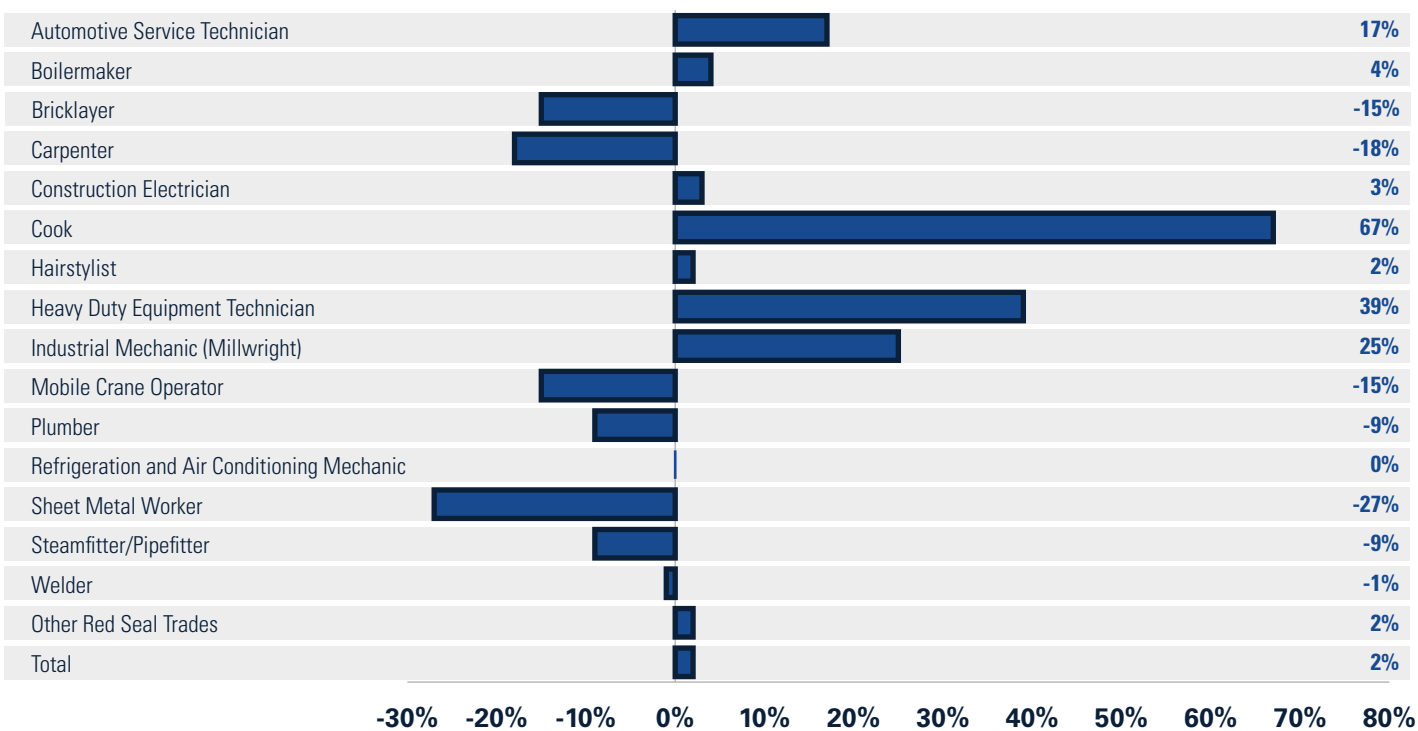
Figure 12- *Change (%) in Red Seal Completions, 2014 to 2018, Canada (Excluding Territories)*



Source: Statistics Canada (RAIS), 2018

The following trades experienced notable increases in program completions between 2014 and 2018: cook (+660, 67%), heavy duty equipment technician (+345, 39%), industrial mechanic (+265, 25%), and automotive service technician (+333, 17%). Over the same period, multiple trade programs experienced a decline in program completions, with sheet metal worker (-239, 27%) the most notable. Figure 13 illustrates the change in completions between 2014 and 2018 by Red Seal trade.

Figure 13- Percent Change (%) in Red Seal Program Completions, 2014 to 2018, Canada (Excluding Territories)



Source: Statistics Canada (RAIS), 2018

Completion Rates

The completion rate represents the percentage of apprentices that successfully complete their apprenticeship programs and receive a Certificate of Qualification (CofQ). Calculating completion rates is useful for tracking outcomes for apprentices. The role that apprenticeship and trade certification plays in the labour market depends on many factors, including regulations and market conditions.

Historically, completion rates have been remained near 50% in Canada, but these vary by trade and by region.⁴ Several factors impact completion rates:

▣ **Compulsory Certification:** In order to work in a compulsory trade, a worker must be a registered apprentice who is progressing towards certification in the trade or a certified journeyman.

▣ **Income:** According to the National Apprenticeship Survey, completion is associated with higher pay after certification.⁵

▣ **Employer Requirements:** Industrial sector employers tend to demand a CofQ.

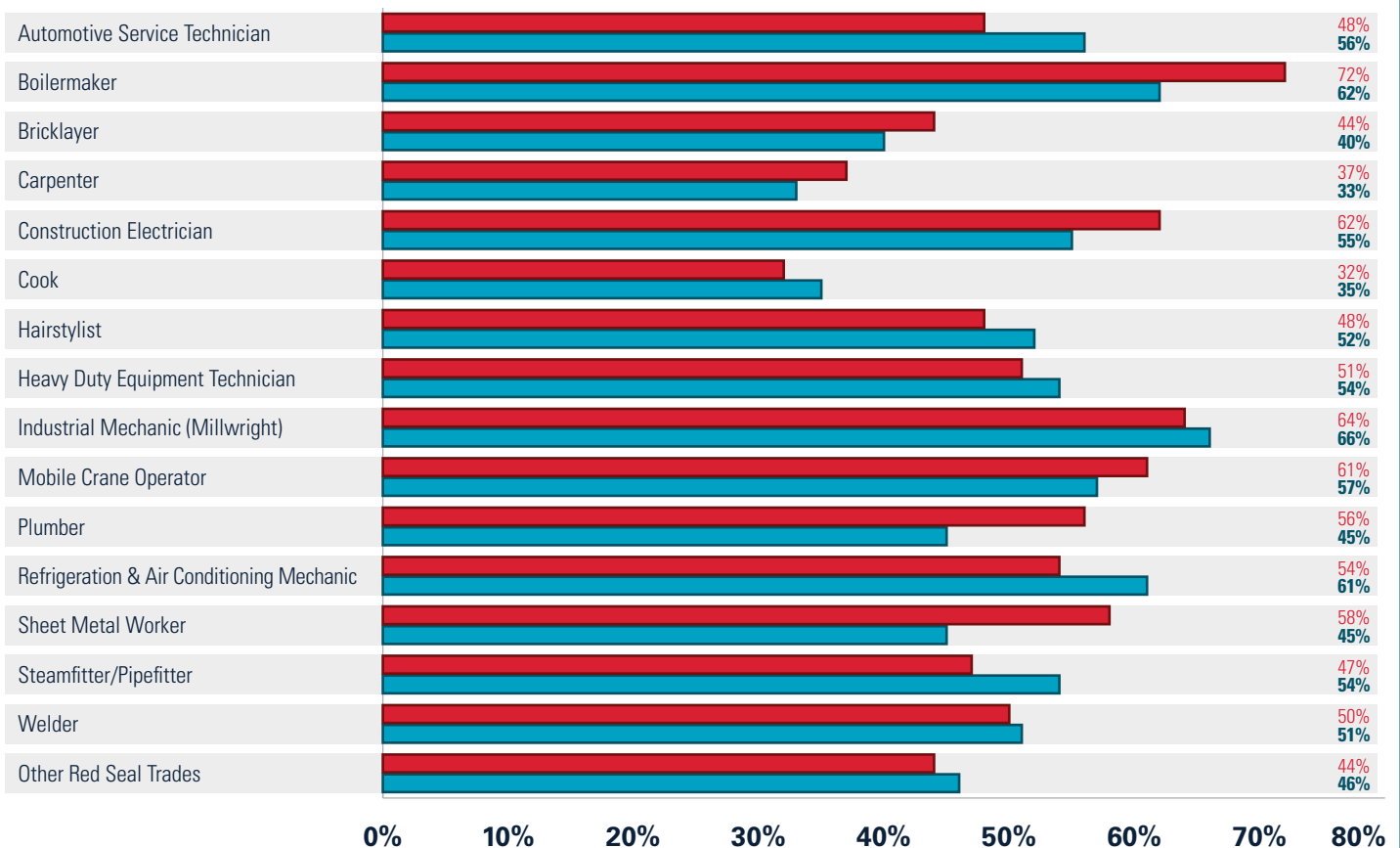
▣ **Sectoral Differences:** Individuals in service sector trades may use entry into an apprenticeship to gain knowledge and “get a foot in the door.” There tends to be less incentive to complete, however, because the employer is satisfied with a Level 2 apprentice.

▣ **Economic Conditions:** Economic conditions impact an apprentice’s ability to progress. If laid off, it is difficult for them to earn hours towards their apprenticeship. In tight labour markets, employers may not want to release their apprentices to go to technical training.

▣ **Technical Training:** Some apprentices feel they cannot afford to go back to technical training where they would receive Employment Insurance instead of their full wages. These apprentices stay at their current level and do not progress in their apprenticeship.

The CANTRAQ model calculates the completion rate based on program duration, while considering the additional time often necessary to complete training and obtain a CofQ. Figure 14 outlines the change (%) in completion rates for Red Seal trades in the 5-year period from 2014 to 2018. In 2018, completion rates ranged from a high of 66% for industrial mechanic (millwright) to a low of 33% for carpenters. Sheet metal workers experienced the largest decline (-13%) in the rate of completion from 2014 to 2018, followed closely by plumber (-11%). Conversely, automotive service technician (+8%) and refrigeration and air conditioning mechanic (+7%) experienced modest increases in the rate of completion over the same period.

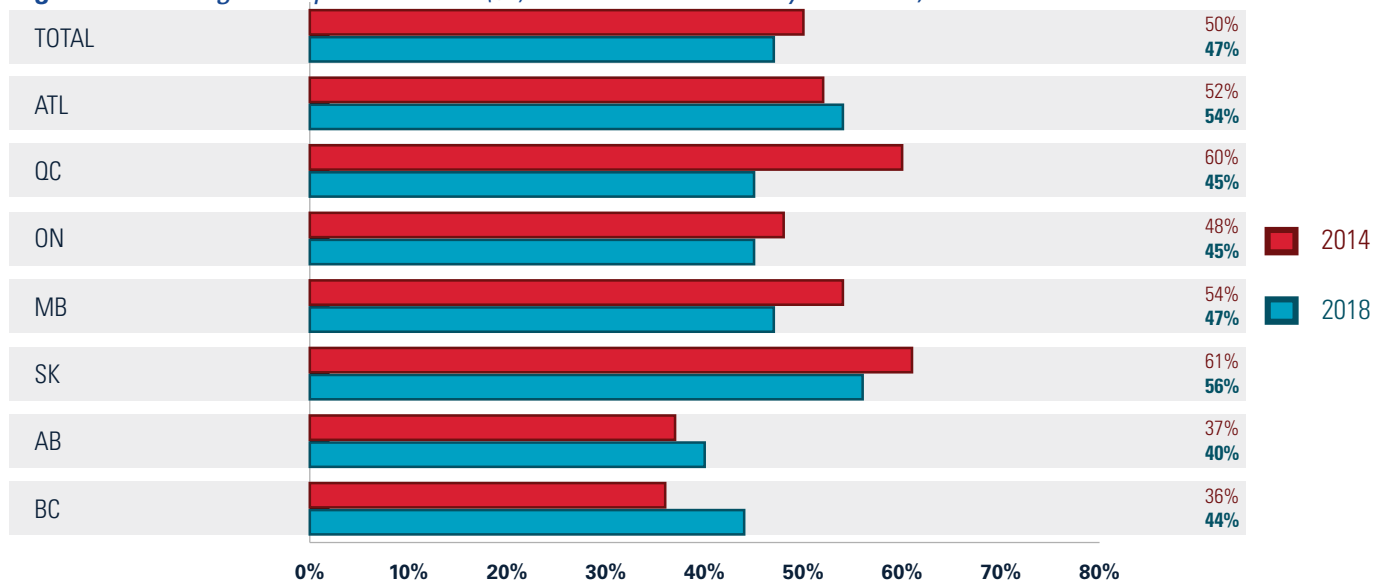
Figure 14- Average Completion Rates (%) of Red Seal Trades, 2014 and 2018



Source: Statistics Canada, RAIS (2018), CANTRAQ Prism Economics (2020)

Figure 15 illustrates the change (%) in the completion rate for Red Seal trades by province during the five-year period from 2014 to 2018. In 2018, completion rates at the provincial level ranged from a high of 56% in Saskatchewan to a low of 40% in Alberta. Several provinces underwent a decline in the rate of completion since 2014, with Quebec (-15%) and Manitoba (-7%) experiencing the largest decline. Over the same period, Alberta (+3%) and Atlantic Canada (+1%) saw marginal increases, while British Columbia had a more notable increase of 7%.

Figure 15- Average Completion Rates (%) of Red Seal Trades by Province, 2014 and 2018



Source: Statistics Canada, RAIS (2018), CANTRAQ Prism Economics (2020)

Trends in Earnings

Statistics Canada recently began tracking earnings of apprentices by linking RAIS data to tax files, resulting in better tracking of apprentice labour market outcomes. Table 5 highlights the significant rise in employment income reported at the year of certification compared to that two years prior to certification. Apprentices earn on average 27% higher at the year of certification compared to two years before certification. The rate of increase was highest in 2012, during a period of peak employment in Canada following the recession in 2009, where employees worked a higher number of hours and earned increased wages. Those who completed their program following this peak are experiencing more modest increases in income relative to their salary two years prior.

Table 5- Median Employment Income (\$) at Certification and 2 years Before Certification, 2010 to 2016*

COMPLETION YEAR	2 YEARS BEFORE CERTIFICATION	YEAR OF CERTIFICATION	% CHANGE
2010	\$44,389	\$54,579	23.0%
2011	\$41,253	\$54,787	32.8%
2012	\$42,568	\$58,229	36.8%
2013	\$43,873	\$58,985	34.4%
2014	\$46,371	\$59,579	28.5%
2015	\$47,130	\$57,106	21.2%
2016	\$46,832	\$53,457	14.1%
Average	\$44,631	\$56,675	27.0%

*Top 15 Red Seal trades, excluding boilermaker Source: Statistics Canada (RAIS), 2018, Table 37-10-0017-01

There is a significant disparity in income between male and female apprentices. On average, female apprentices experience a larger increase in income two years before certification compared to the year of certification, with the exception of 2016. Despite this increase, male apprentices earn higher wages than female apprentices both two years prior to certification and at the year of certification. This trend may differ when examining income on a trade specific level; however, income data for female apprentices was largely suppressed at this level to meet the confidentiality requirements of the *Statistics Act*.

Table 6- Median Employment Income (\$) at Certification and 2 years Before Certification by Gender, 2010 to 2016*

COMPLETION YEAR	2 YEARS BEFORE CERTIFICATION		YEAR OF CERTIFICATION		CHANGE % (FEMALE)	CHANGE % (MALE)
	Female	Male	Female	Male		
2010	\$28,991	\$46,308	\$37,448	\$56,655	29%	22%
2011	\$25,112	\$43,310	\$33,887	\$57,475	35%	33%
2012	\$26,376	\$44,850	\$36,822	\$61,183	40%	36%
2013	\$28,026	\$46,359	\$40,344	\$62,011	44%	34%
2014	\$31,126	\$48,816	\$40,091	\$62,680	29%	28%
2015	\$33,206	\$49,570	\$40,347	\$59,999	22%	21%
2016	\$32,229	\$48,664	\$35,230	\$55,668	9%	14%

*Top 15 Red Seal trades, excluding boilermaker Source: Statistics Canada (RAIS), 2018, Table 37-10-0017-01

Trends in Rates of Certification

Obscured Trade Certification Rates

Estimates of the number and the share of the workforce with a trade certification are obscured due to the hierarchical nature in which education attainment data are collected and reported by Statistics Canada. The 2016 Census asked about the highest level of education that a person has successfully completed, and just under one-quarter (24%) of individuals working in a Red Seal trade⁶ reported a Certificate of Apprenticeship (CofA) or Certificate of Qualification (CofQ) as their highest level of education attainment.

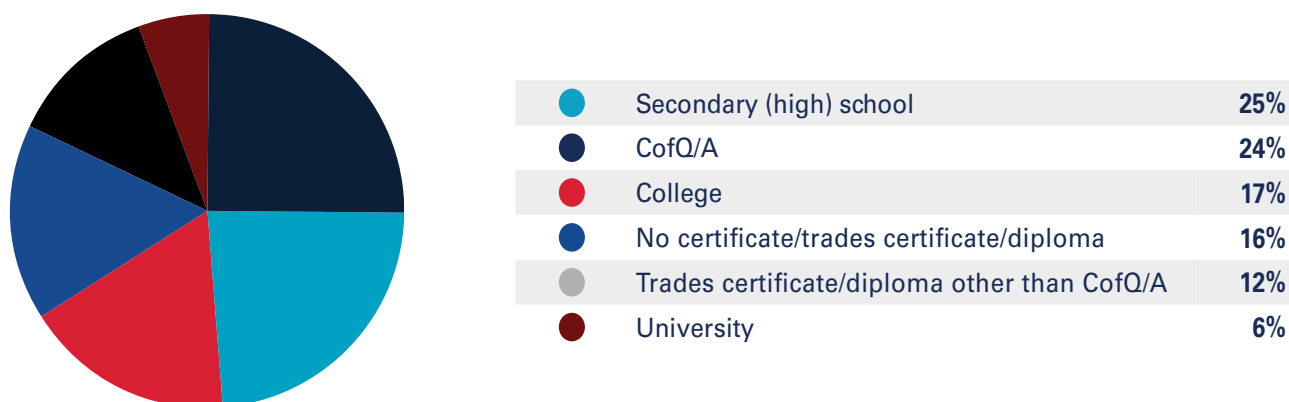
This should be interpreted, however, as only the minimum number – as the ‘certification floor’ – because any individuals that successfully completed a college or university level certificate, degree or diploma in addition to earning a trade certificate, would not be captured.

The problem with this hierarchical approach to measuring education attainment is that it makes it impossible to know the exact number or share of the labour force with a CofQ, or to identify the occupations and industries in which they work. This presents a challenge to accurately measure the demand for trade certification. It also hinders any measurements of the impacts that trade certification may have on social and labour market outcomes in conjunction with other forms of education attainment.

According to the 2016 Census, the share of individuals working in a Red Seal trade with a certificate, degree or diploma above a trade certificate or diploma (including CofQ or CofA) was close to half (47%), essentially double the share of those with a CofA or CofQ as their highest level of education (24%).

Two factors are at play here. First, the average age of apprentices is increasing. Second, the prevalence of post-secondary education continues to rise. When combined, these factors suggest that the number of certified journeypersons who either complete a college or university degree before or after earning a CofQ may, in fact, be increasing. Figure 16 shows the highest level of education attainment among individuals working in Red Seal Trades.

Figure 16- Highest Certificate, Diploma or Degree among Individuals in Red Seal Trades, Canada

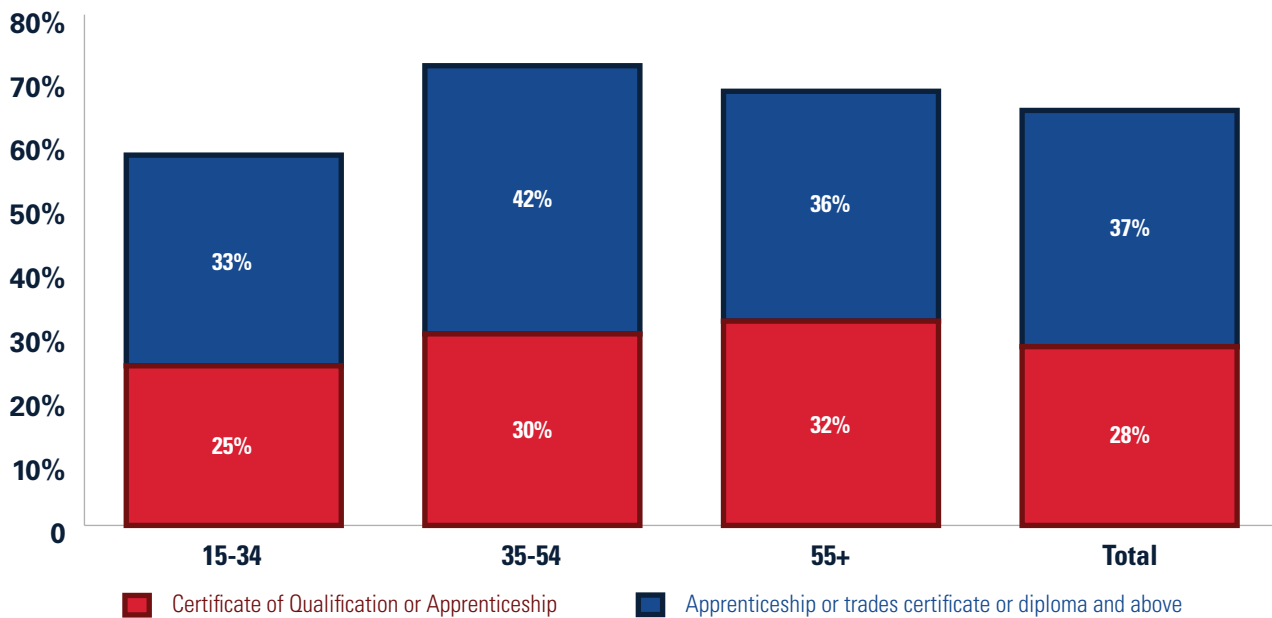


Source: Statistics Canada, 2016 Census

Older Workers More Likely to be Certified – A Big Loss of Journeypersons as Retirements Accelerate

The largest share of individuals with a CofQ as their highest level of education attainment are over the age of 55. This is no surprise given they have had more time to become certified and come from a generation with lower overall rates of college and university enrollments. According to the 2016 Census, nearly one-third (32%) of individuals aged 55 years and older working in the top 15 Red Seal trades have a CofQ or CofA as the highest level of education attainment. As the retirements in this cohort accelerate, a disproportionately higher number of certified journeypersons will leave the labour force.

Figure 17- Highest Certificate, Diploma or Degree among Individuals in Red Seal Trades, Canada

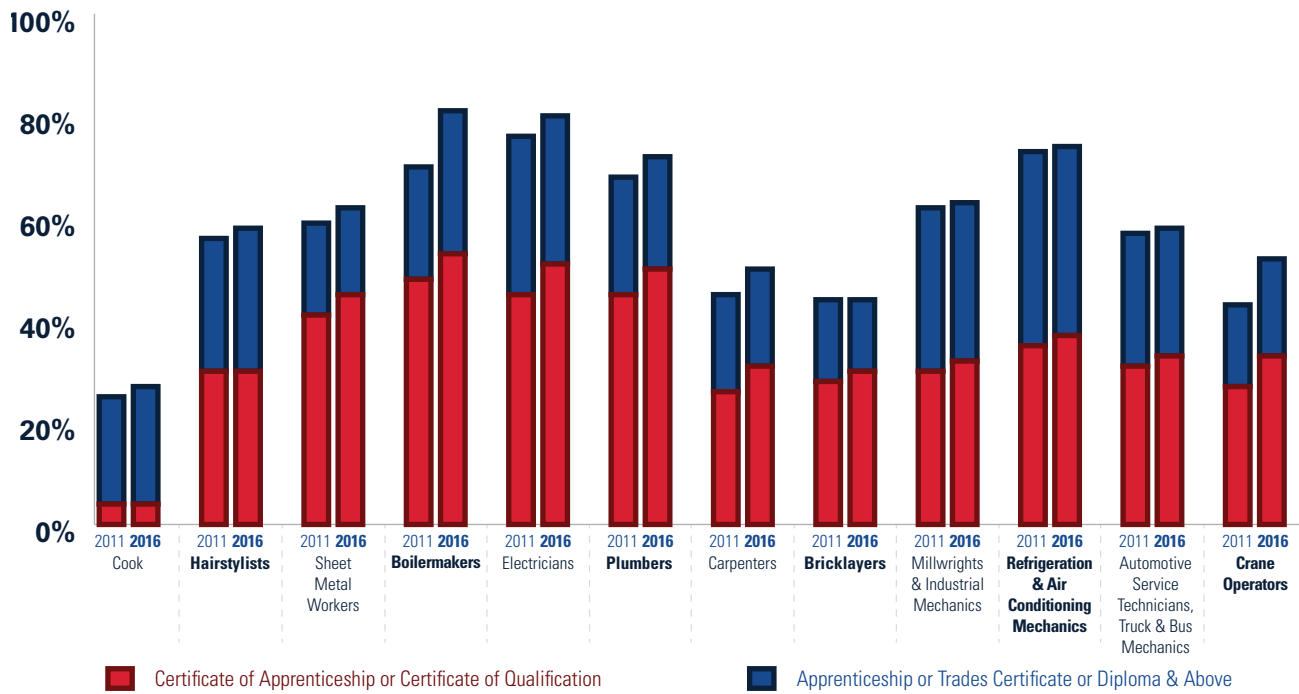


Source: Statistics Canada, 2016 Census

Workforce Trade Certification Rates Have Risen

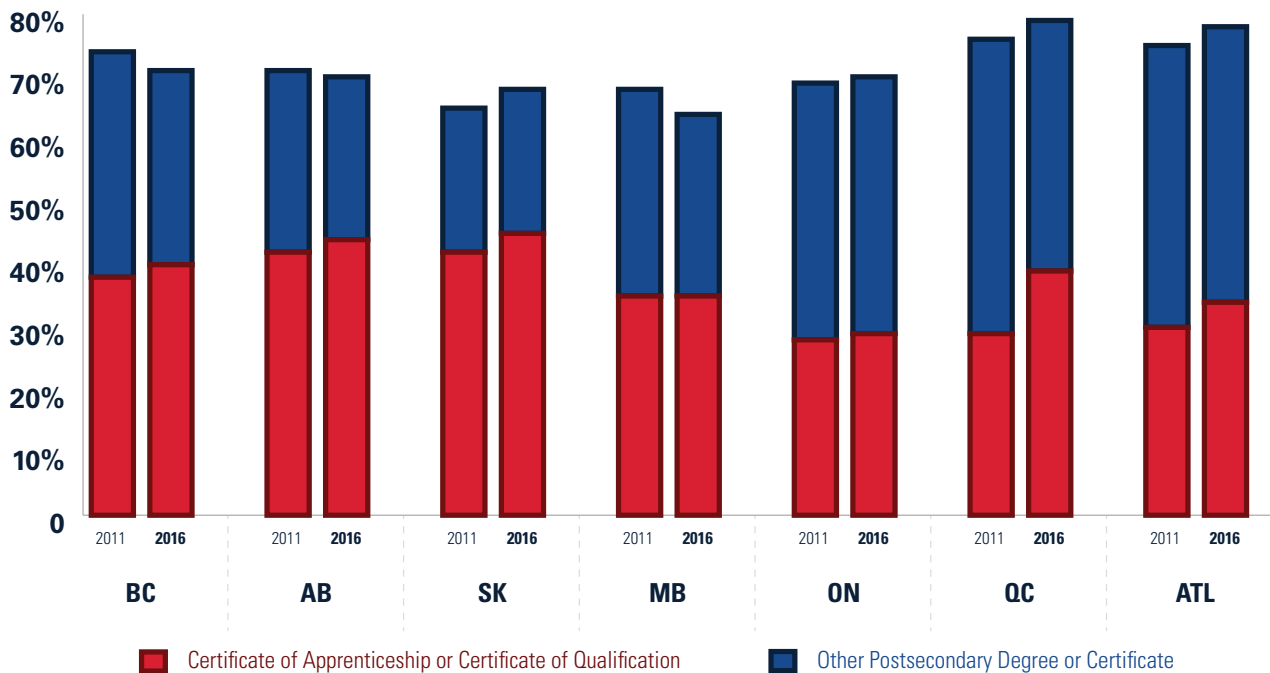
The average share of individuals working Red Seal trades with a CofQ or CofA increased to 60% in 2015, up from 56% (trade average) in 2010. Trades with the largest increases included boilermakers, crane operators and carpenters. Figure 18 shows the change in potential certification rates for individual trades nationally. Figure 19 shows changes in potential certification rates by province. As illustrated, increases have occurred in Quebec, Ontario and Saskatchewan, while modest declines have been observed in British Columbia and Manitoba.

Figure 18- Highest Level of Education Attainment, by National Occupational Classification [NOC] 2016



Source: Statistics Canada, 2016 Census

Figure 19- Highest Level of Education Attainment, by Province, 15 Top Red Seal Trades



Source: Statistics Canada, 2016 Census

Certification Requirements and Completions: A National Outlook

This section provides a forward-looking assessment of apprenticeship program registrations, completions and workforce certification requirements for the five-year period from 2020 to 2024. A more in-depth provincial analysis of trade-specific training and certification requirements and supply of new journeypersons is provided in separate provincial and regional reports.

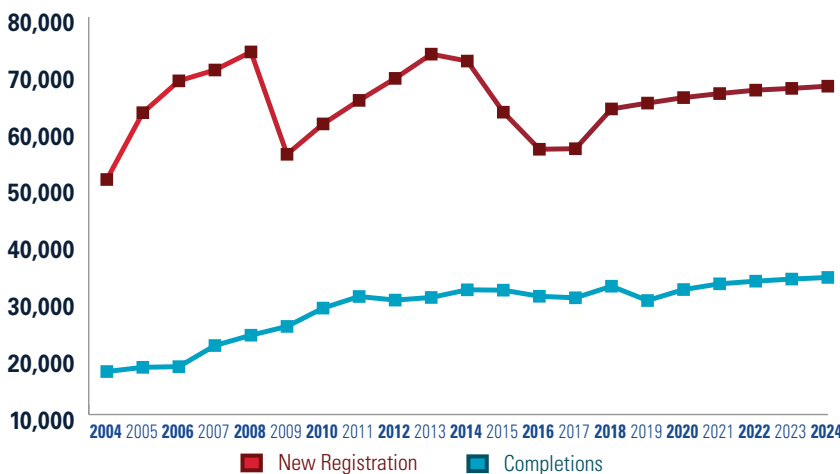
Certification requirements for skilled trades and estimates of the required number of new journeypersons are determined by many inter-related factors. The supply of new certified workers is met by either apprenticeship completers or trade qualifiers. Completers are those individuals who complete an apprenticeship program and who are awarded a CofQ. Trade qualifiers are those workers who have significant work experience and who, if they pass the CofQ exam, are awarded certification. Although trade qualifiers contribute positively to the supply of certified workers, a significant proportion hold multiple tickets or are existing skilled workers who move between provinces or countries.

Consequently, these workers do not represent an addition of skills in the workforce or an increase in demand for apprenticeship training. The analysis in this report focuses solely on apprenticeship completers, therefore, the estimates of new journeypersons are based on projections of new registrations and completions.

Figure 20 outlines projections of registrations based on anticipated changes in employment, age demographics and completions, assuming that recent trends in completion rates for individual trades and provinces remain consistent.

The economic and employment growth outlook suggests that between 2020 and 2024, new registrations in Red Seal programs will continue to increase, rising from 65,800 to 67,800. Completions are expected to increase modestly over the same period from 32,000 to 34,135.

Figure 20- Trends in Apprenticeship Program Registrations and Completions, Total Red Seal Trades, 2004 to 2024 Canada (Excluding Territories)



Source: Statistics Canada (RAIS), 2018; CANTRAQ Prism Economics (2020)



4.1 Workforce Certification Requirements

The skilled trades workforce is composed of certified and non-certified workers. The proportion varies across trades, sectors and provinces due, in part, to differences in regulations and industry requirements. The central question posed in the assessment of workforce certification requirements is this: How many newly certified journeypersons are required to maintain the current share of certified workers for a skilled trade in the workforce? Since a CofQ is held by individuals as they move between jobs and progress in their careers, the analysis must also consider certification rates of related trades and occupations. A related trade or occupation is an occupation that requires or benefits from the skills and qualifications as represented by a CofQ, but does not have an apprenticeship program attached to it. Most often, these related occupations are managerial or supervisory positions. The total trade certification and training requirement is the sum of journeypersons required to maintain stable certification rates in both the principal and related trades and occupations. Future requirements are driven by the following variables:

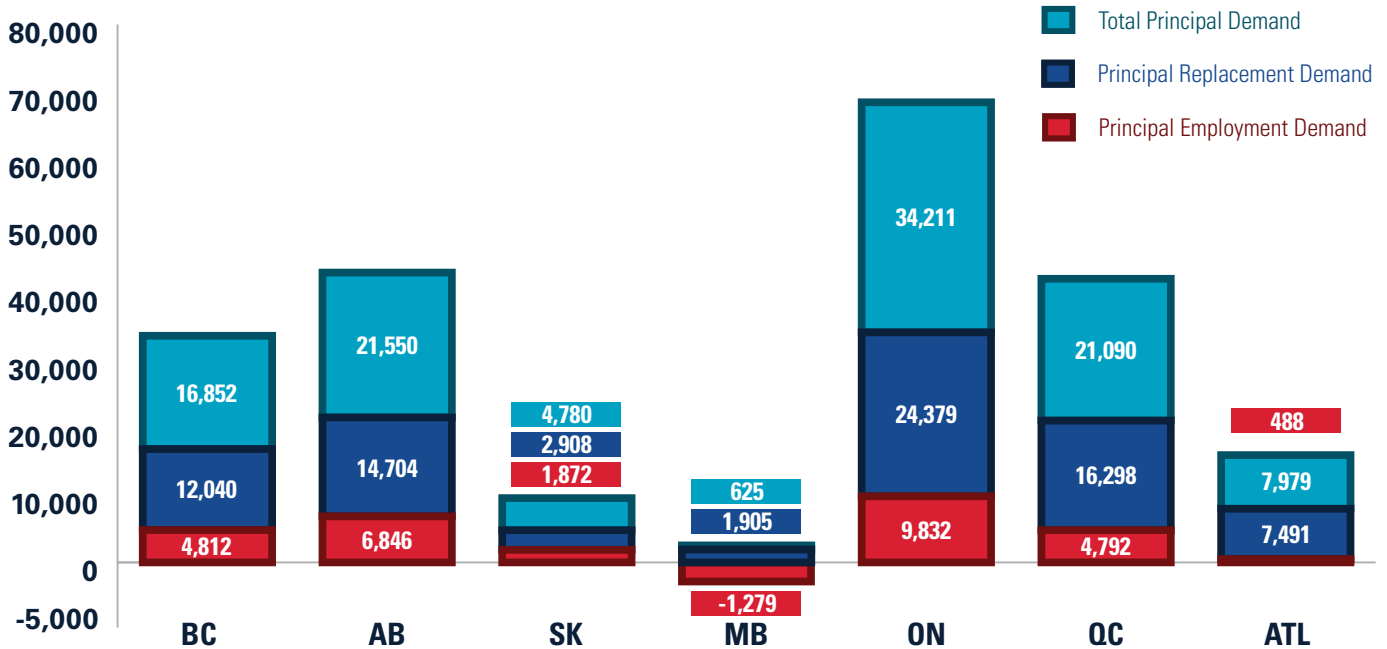
- ▣ **Principal Employment Demand:** Changes in employment for the apprenticeable (or principal) trade;
- ▣ **Principal Replacement Demand:** Labour force retirements and deaths of individuals employed in the apprenticeable (or principal) trade;
- ▣ **Related Employment Demand:** Changes in employment for related trades and occupations;
- ▣ **Related Replacement Demand:** Retirements of certified workers in related trades and occupations.

In the next five years, an estimated 155,340 newly certified journeypersons will be required to maintain certification requirements for skilled workers in all the Red Seal trades. Of that total, 104,520 are required to sustain current certification rates in the 15 largest trades. More than three-quarters (79%) of this total certification requirement is attributed to the expected age-related exits of 122,210 certified workers from the workforce through retirement or death.



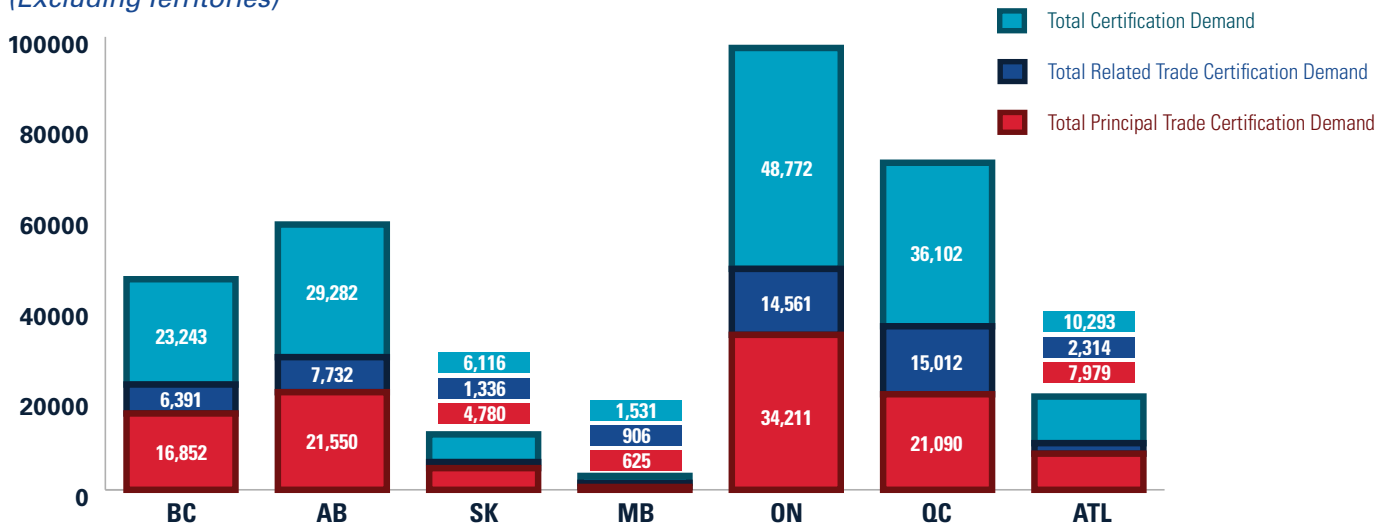
Figure 21 outlines the provincial certification requirements for principal apprenticeable trades. Ontario is projected to lead demand for journeypersons over the next five years, requiring an estimated 34,210 newly certified journeypersons working directly in a Red Seal trade. Alberta and Quebec follow, requiring an estimated 21,550 and 21,090 new journeypersons respectively. Certification requirements in Manitoba will be driven primarily by the need to replace retiring workers, resulting from a wind down of projects and downward trend of new-housing construction. Despite continued growth in Prince Edward Island and Nova Scotia, demand requirements for Atlantic Canada overall are partially constrained due to employment decline in Newfoundland and Labrador.

Figure 21- Principal Certification Requirements for Red Seal Trades by Province, 2020 to 2024, Canada (Excluding Territories)



Source: Statistics Canada (RAIS), 2018; CANTRAQ Prism Economics (2020)

Figure 22- Total Certification Requirements for Red Seal Trades by Province, 2020 to 2024, Canada (Excluding Territories)



Source: Statistics Canada (RAIS), 2018; CANTRAQ Prism Economics (2020)

Table 7 provides a breakdown of national certification requirements by Red Seal trade, including principal employment and replacement demand (retirements and deaths), and related certification demand. It is worth noting that a larger proportion of certification requirements for sheet metal worker and boilermaker trades are driven by demand in the related trades and occupations.

Table 7- Total Certification Requirements for Red Seal Trades, 2020 to 2024, Canada (Excluding Territories)

TRADE	EMPLOYMENT CERTIFICATION DEMAND (PRINCIPAL TRADE)	REPLACEMENT CERTIFICATION DEMAND (PRINCIPAL TRADE)	RELATED CERTIFICATION DEMAND	TOTAL CERTIFICATION DEMAND
Automotive Service Technician	1,861	5,476	3,046	10,383
Boilermaker	327	366	509	1,201
Bricklayer	402	1,175	395	1,971
Carpenter	2,191	9,248	3,507	14,945
Construction Electrician	5,046	8,624	7,329	21,000
Cook	1,671	3,281	2,308	7,261
Hairstylist	2,339	3,952	2,109	8,399
Heavy Duty Equipment Technician	562	2,530	2,050	5,142
Industrial Mechanic (Millwright)	844	3,888	808	5,541
Mobile Crane Operator	64	830	297	1,191
Plumber	2,336	3,068	743	6,147
Refrigeration and Air Conditioning Mechanic	1,181	2,221	1,071	4,473
Sheet Metal Worker	519	1,263	1,698	3,480
Steamfitter/Pipefitter	760	1,629	551	2,940
Welder	1,274	6,211	2,962	10,447
Other Red Seal Trades	5,986	25,962	18,869	50,816
Total	27,363	79,724	48,251	155,338

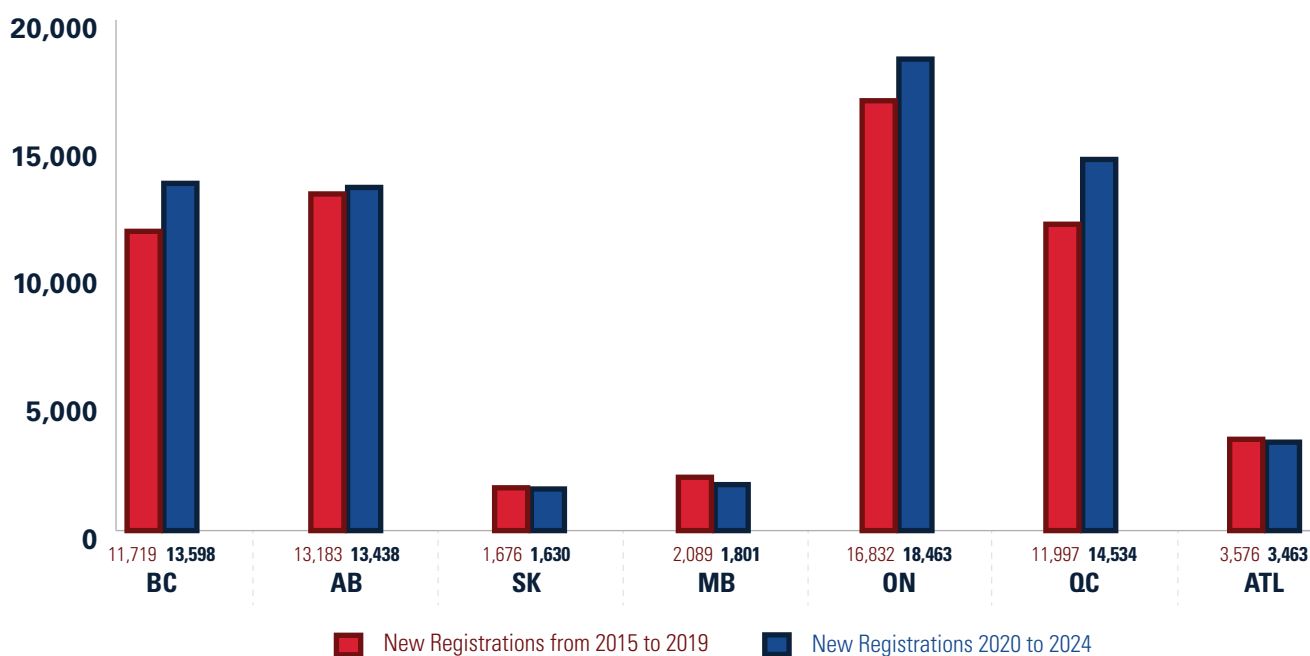
Source: Statistics Canada, RAIS (2018), CANTRAQ Prism Economics (2020)

4.2 Future Supply of New Journeypersons

Over the next five years, it is expected that 334,637 apprentices will register in a Red Seal trade in Canada. Of that total, 243,206 apprentices (73%) will be concentrated in the top 15 Red Seal trades. This projection is 10% higher than the number of new registrations recorded over the past five years (2015-2019), and is the result of significant declines in 2015 and 2016 following the 2014 peak. Looking ahead, total new registrations are expected to average just under 66,930 per year over the next five years, reflecting a period of projected modest employment growth. Most provinces are forecast to see an increase in new registrations relative to the previous five-year period, though Saskatchewan, Manitoba and Atlantic Canada are projected to experience a marginal decline. Quebec is projected to experience the largest increase, with new registrations rising 21% compared to the previous five-year period.

Figure 23 illustrates the average total registrations for Red Seal trades by province both historically (2015 to 2019) and over the near-term (2020 to 2024).

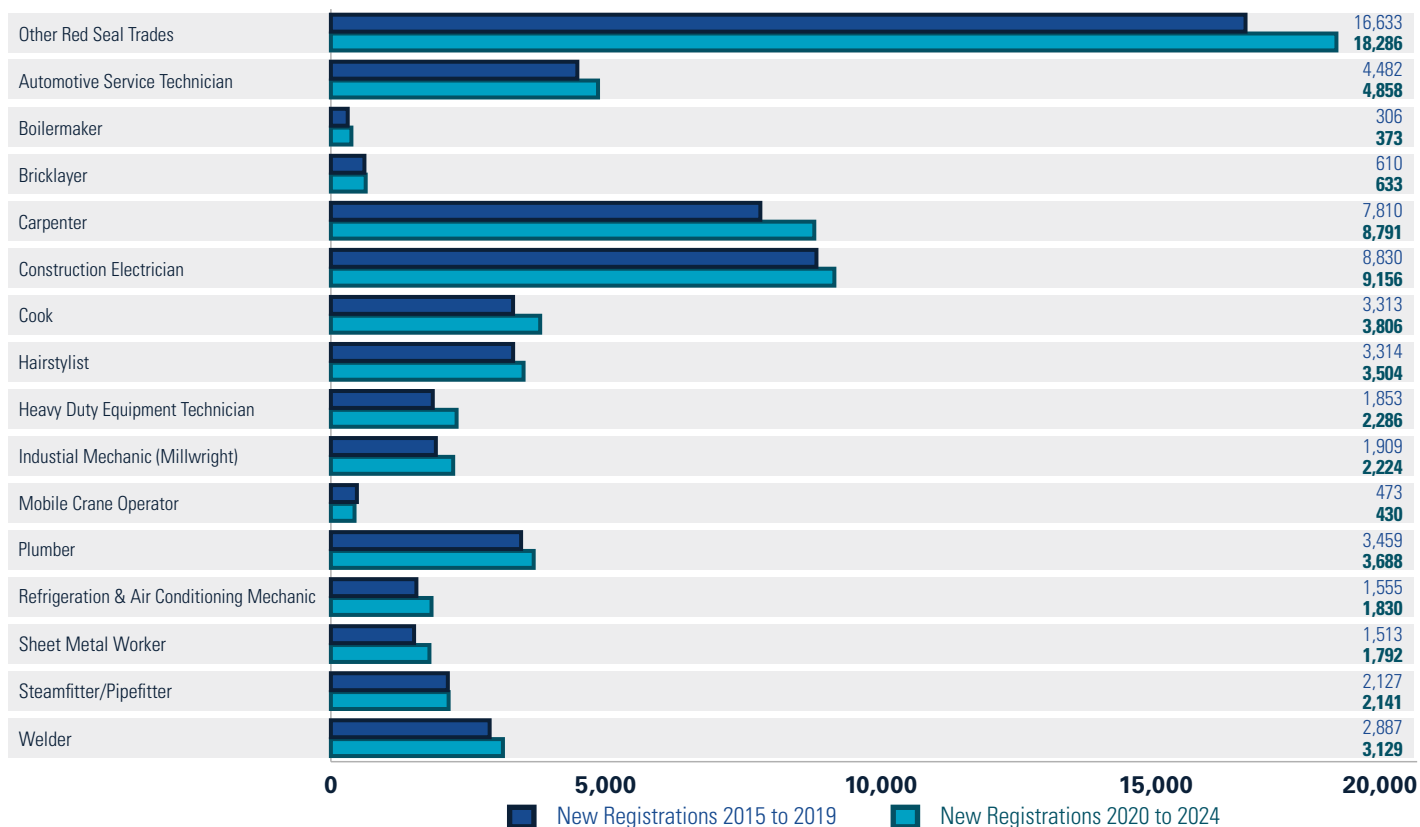
Figure 23- Average Annual New Registrations in Red Seal Trades, Historic (2015 to 2019) and Projected (2020 to 2024), by Province



Source: Statistics Canada, RAIS (2018), CANTRAQ Prism Economics (2020)

At the trade level, new registrations are forecast to increase across all trades, except mobile crane operator where average annual registrations are projected to fall 9% relative to the previous five-year period, with an average of 430 registrations per year over the next five years. Heavy duty equipment technician is forecast to experience the largest increase in new registrations (+23%), followed closely by boilermaker (+22%).

Figure 24- Average Annual New Registrations in Red Seal Trades, Historic (2015 to 2019) and Projected (2020 to 2024), Canada (Excluding Territories)



Source: Statistics Canada, RAIS, CANTRAQ Prism Economics (2020)

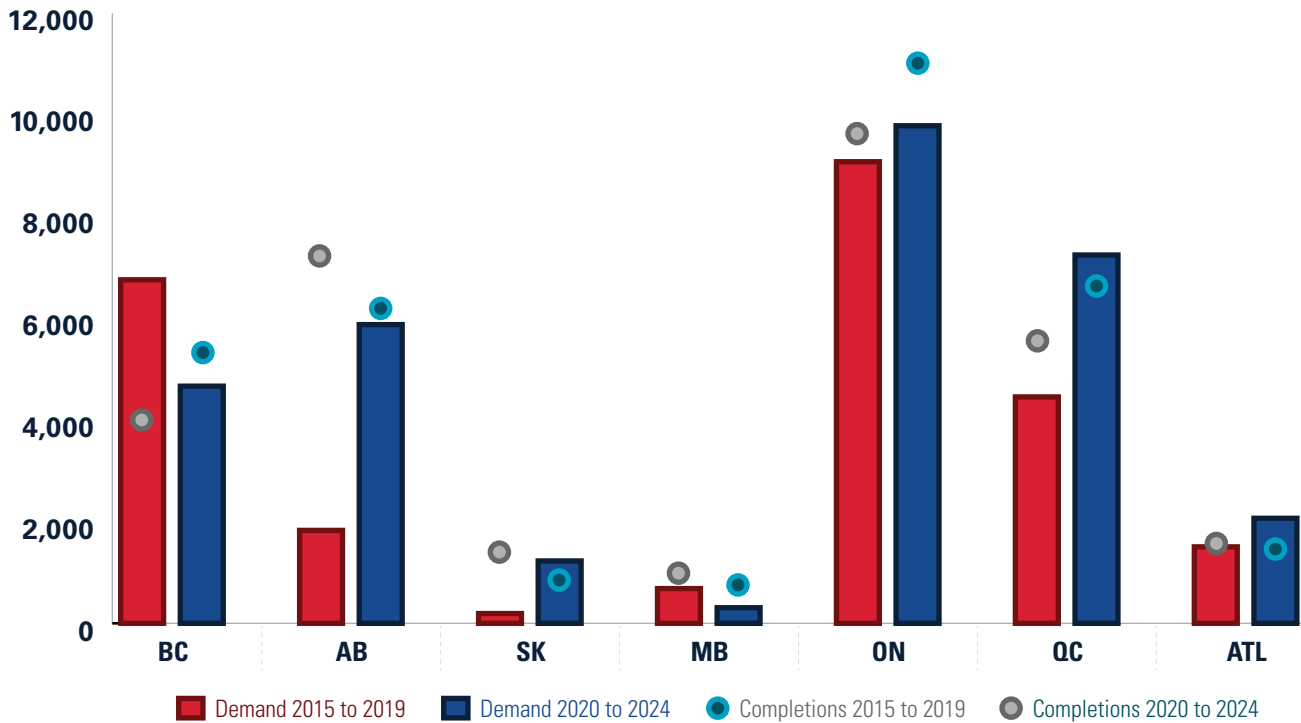
Gaps in Supply and Demand

The surge in new registrations during the peak in 2014 translated to record high levels of program completions in 2018. In the near-term, completions are projected to continue to rise in-line with the slow recovery of new registrations, averaging 33,296 per year between 2020 to 2024, which is 7% higher than the annual average of 31,184 between 2015 and 2019. Demand for certified journeypersons is projected to modestly decline, posing the potential for certified journeypersons to run ahead of demand requirements in the near-term.

Figure 25 highlights both historic (2015-2019) and forecasted (2020-2024) trends in program completions and certification requirements by province. In British Columbia, average annual completions are expected to continue to rise over the next 5 years, while demand requirements are forecast to recede following a peak in 2021. Though on a smaller scale, Manitoba is forecast to experience a similar trend, as the wind down of current projects and a decline in new-housing construction are set to lead to moderately lower employment between 2020 to 2024.

Although several provinces are forecast to have sufficient supply to meet certification requirements, the analysis suggests that given the current level of new registrations, any considerable acceleration of demand requirements could pose significant recruiting challenges.

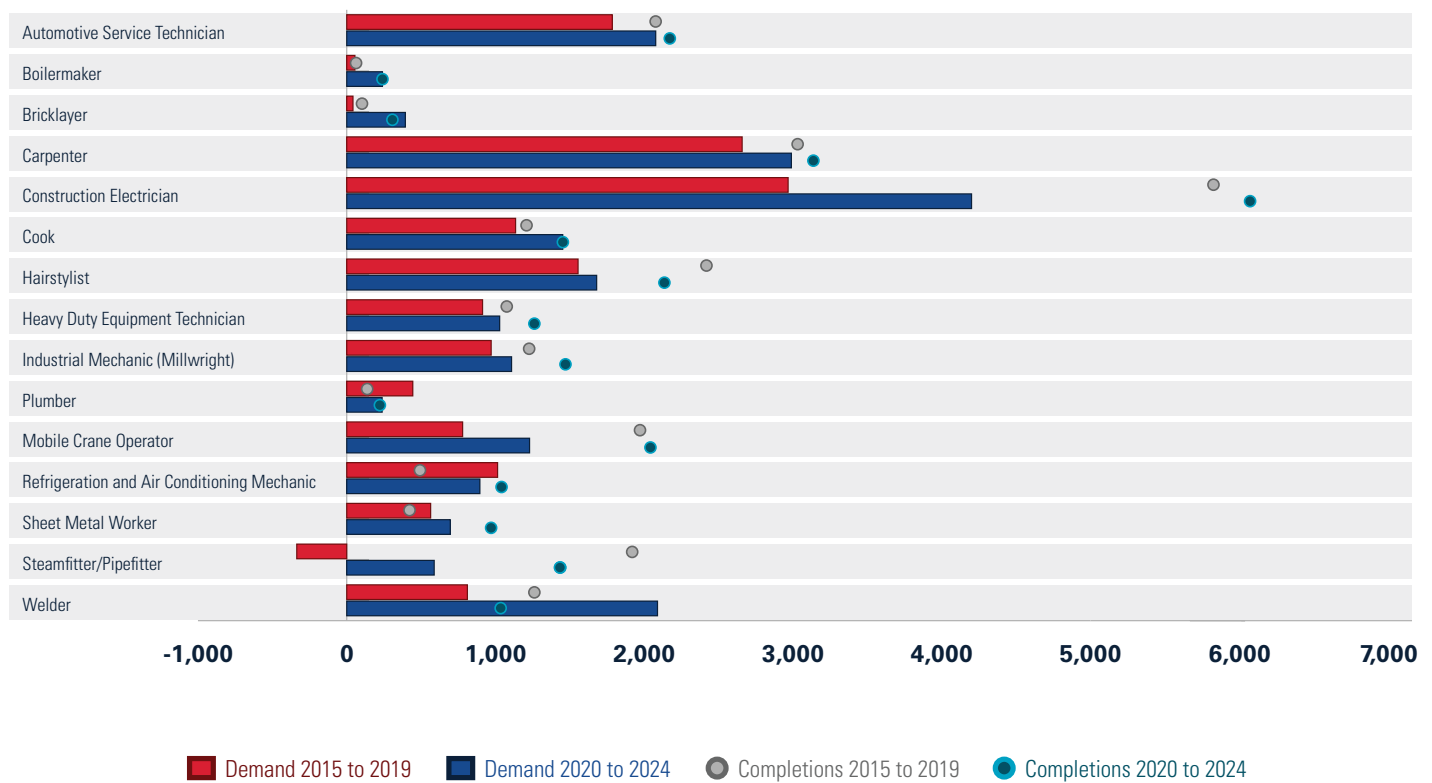
Figure 25- Average Annual Certification Demand by Province, Total Red Seal Trades, Historic (2015 to 2019) and Projected (2020 to 2024)



Source: Statistics Canada, RAIS (2018), CANTRAQ Prism Economics (2020)

At the trade level, the analysis suggests there is a potential risk that certification requirements may run ahead of completions for a number of trades, including bricklayers, boilermakers, and welders. Figure 26 highlights both historic (2015-2019) and forecasted (2020-2024) trends in program completions and certification requirements for the top 15 Red Seal Trades in Canada. Considering the current projected trend of new registrations, certification requirements will likely run ahead of projected completions in the near-term.

Figure 26- Average Annual Certification Demand by Red Seal Trade, Historic (2015 to 2019) and Projected (2020 to 2024), Canada (Excluding Territories)

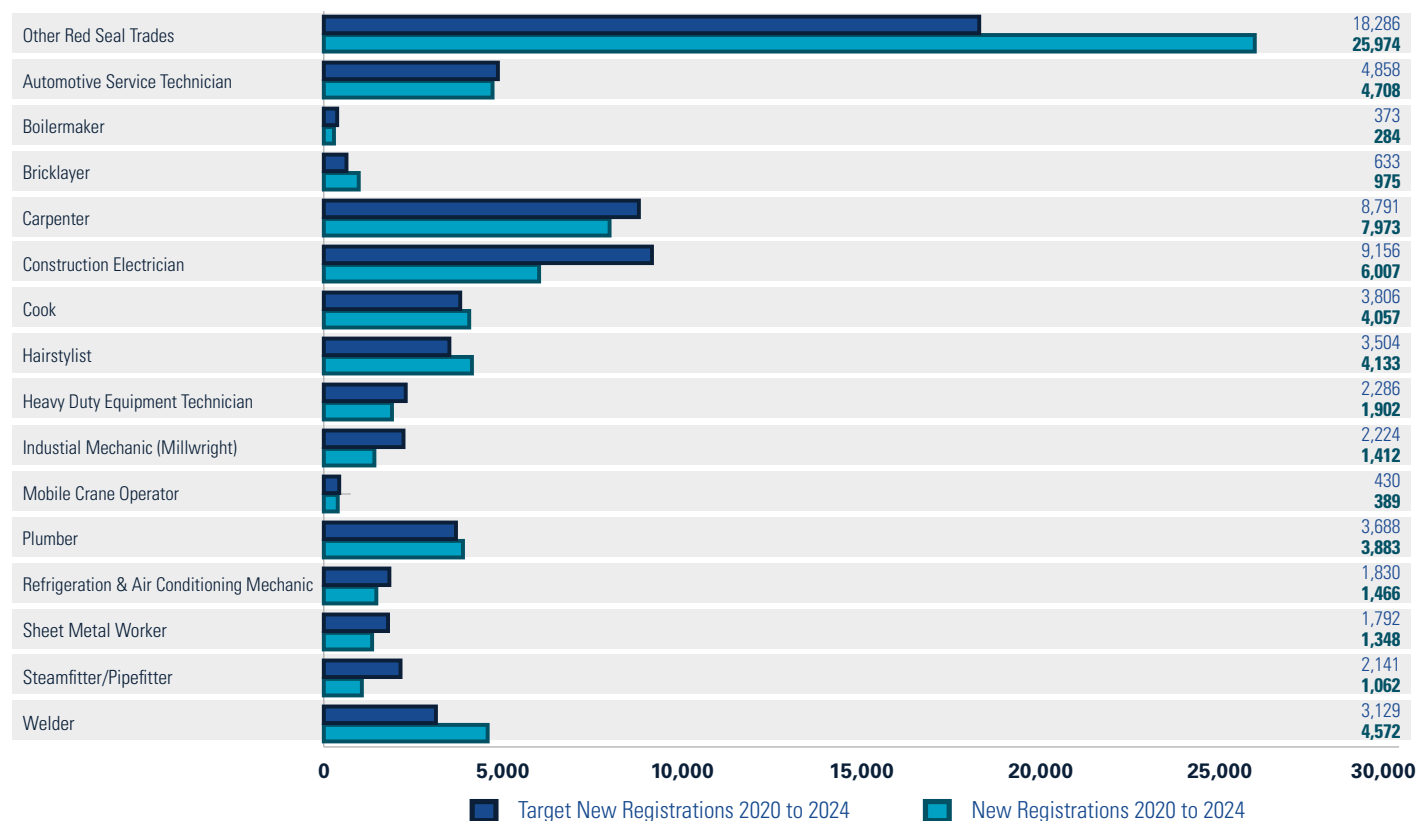


Source: Statistics Canada, RAIS (2018), CANTRAQ Prism Economics (2020)

Target Registrations

To meet certification requirements, an estimated 350,740 apprentices are likely to be required across Red Seal trades over the next five years. In the 15 largest Red Seal trades alone, nearly 220,870 apprentices are likely to be required to keep pace with certification requirements over the long-term. Figure 27 highlights the contrast between the projected trend (new registrations) and the target number of new registrations that are required to meet demand (target new registrations) on a trade-by-trade level. There are significant differences between the projections and requirements among individual trades and among each province. For more information, see the provincial and regional snapshots.

Figure 27- Average Annual New Registrations (Projected) and Target Registrations Required, Red Seal Trades, 2020 to 2024, Canada (Excluding Territories)



Source: Statistics Canada, RAIS (2018), CANTRAQ Prism Economics (2020)

The following tables provide a summary of supply and demand trends over the five-year period from 2020 to 2024, both provincially and at the trade specific level.

Table 8- Projected Registrations, Projected Completions, Certifications Required and Target Registrations by Province, 2020 to 2024

PROVINCE	PROJECTED NEW REGISTRATIONS	PROJECTED COMPLETIONS	CERTIFICATIONS REQUIRED	TARGET REGISTRATIONS
BC	67,990	28,325	23,243	70,468
AB	67,190	30,535	29,282	77,140
SK	8,152	4,754	6,116	8,476
MB	9,003	4,339	1,531	8,011
ON	92,315	55,757	48,772	100,903
QC	72,671	34,124	36,102	63,332
ATL	17,316	8,644	10,293	22,407
Total	334,637	166,480	155,338	350,737

Source: Statistics Canada, RAIS (2018), CANTRAQ Prism Economics (2020)

Table 9- Projected Registrations, Projected Completions, Certifications Required and Target Registrations by Red Seal Trade, 2020 to 2024, Canada (Excluding Territories)

RED SEAL TRADE	PROJECTED NEW REGISTRATIONS	PROJECTED COMPLETIONS	CERTIFICATIONS REQUIRED	TARGET REGISTRATIONS
Automotive Service Technician	24,289	11,445	10,383	23,542
Boilermaker	1,865	966	1,201	1,421
Bricklayer	3,165	1,290	1,971	4,877
Carpenter	43,955	16,181	14,945	39,864
Construction Electrician	45,781	30,263	21,000	30,037
Cook	19,030	7,402	7,261	20,285
Hairstylist	17,518	11,103	8,399	20,667
Heavy Duty Equipment Technician	11,430	6,353	5,142	9,511
Industrial Mechanic (Millwright)	11,121	7,833	5,541	7,061
Mobile Crane Operator	2,152	1,249	1,191	1,945
Plumber	18,439	10,189	6,147	19,414
Refrigeration and Air Conditioning Mechanic	9,152	5,052	4,473	7,331
Sheet Metal Worker	8,960	4,498	3,480	6,738
Steamfitter/Pipefitter	10,706	5,497	2,940	5,310
Welder	15,643	7,264	10,447	22,862
Other Red Seal Trades	91,431	39,898	50,816	129,871
Total	334,637	166,480	155,338	350,737

Source: Statistics Canada, RAIS (2018), CANTRAQ Prism Economics (2020)

Conclusion

This report summarizes apprenticeship trends data and projections from the CANTRAQ system, providing an assessment of demand and supply for trade certification across Red Seal trades in Canada, with a focus on the 15 largest Red Seal trades. The results indicate that over the next five years, an estimated 155,340 new journeypersons will be required, more than 104,520 of whom will be concentrated in the 15 largest programs. To keep pace with these certification requirements, nearly 350,740 apprentices need to be recruited over the next five years. Of this total, 220,866 of them will need to be recruited into the top 15 trades. Trades such as boilermaker, bricklayer and welder will likely require a greater number of apprentice registrations in order to meet demand. At the same time, however, demand requirements vary by province (See Table 10). Given the demand for certification, helping apprentices to progress and complete their programs remains a priority. It is important to note that this analysis considers only anticipated changes in demand and supply of new journeypersons, and as such, it does not take into account labour market conditions at the 2019 starting point. In markets currently experiencing shortages for skilled trades, trades characterised as having an “ample supply” can be interpreted as essentially catching-up to demand.



Table 10- Summary of Projected Supply and Demand Conditions, by Province, Top 15 Red Seal Trades, 2020 to 2024

TRADE	BC	AB	MB	SK	ON	QC	ATL
Automotive Service Technician	○	○	○	○	○	—	○
Boilermaker	○	○	○	○	○	○	○
Bricklayer	○	○	○	○	○	○	○
Carpenter	○	○	○	○	○	○	○
Construction Electrician	○	○	○	○	○	○	○
Cook	○	○	○	○	○	○	○
Hairstylist	○	○	○	○	○	○	○
Heavy Duty Equipment Technician	○	○	○	○	○	○	○
Industrial Mechanic (Millwright)	○	○	○	○	○	○	○
Mobile Crane Operator	○	○	○	○	○	○	○
Plumber	○	○	○	○	○	○	○
Refrigeration and Air Conditioning Mechanic	○	○	○	○	○	○	○
Sheet Metal Worker	○	○	○	○	○	○	○
Steamfitter/Pipefitter	○	○	○	○	○	○	○
Welder	○	○	○	○	○	○	○



At Risk Certifications Required Exceed Projected Completions



Balanced Conditions Certifications Required In-Line with Projected Completions



Ample Supply Projected Completions Exceed Certifications Required

Appendix A: List of Red Seal Trades

The following table lists the 56 designated Red Seal trades in Canada and their corresponding National Occupational Classification (NOC). The 15 largest Red Seal trades identified within this report are marked with an asterisk.

NOC	TRADE	NOC	TRADE
7312	Agricultural Equipment Technician	7236	Ironworker (Generalist)
7332	Appliance Service Technician	7236	Ironworker (Reinforcing)
7322	Auto Body and Collision Technician	7236	Ironworker (Structural/Ornamental)
7322	Automotive Refinishing Technician	2225	Landscape Horticulturist
7321	Automotive Service Technician*	7284	Lather (Interior Systems Mechanic)
6332	Baker	7231	Machinist
7234	Boilermaker*	7235	Metal Fabricator (Fitter)
7281	Bricklayer*	7371	Mobile Crane Operator*
7272	Cabinetmaker	7334	Motorcycle Mechanic
7271	Carpenter*	7331	Oil Heat System Technician
7282	Concrete Finisher	7294	Painter and Decorator
7611	Construction Craft Worker	1522	Parts Technician
7241	Construction Electrician*	7251	Plumber*
6322	Cook*	7244	Powerline Technician
7284	Drywall Finisher and Plasterer	7384	Recreation Vehicle Service Technician
7333	Electric Motor System Technician	7313	Refrigeration and Air Conditioning Mechanic*
7295	Floorcovering Installer	8232	Rig Technician
7253	Gasfitter — Class A	7291	Roofer
7253	Gasfitter — Class B	7233	Sheet Metal Worker*
7292	Glazier	7252	Sprinkler Fitter
6341	Hairstylist*	7252	Steamfitter/Pipefitter*
7312	Heavy Duty Equipment Technician*	7283	Tilesetter
7521	Heavy Equipment Operator (Dozer)	7232	Tool and Die Maker
7521	Heavy Equipment Operator (Excavator)	7371	Tower Crane Operator
7521	Heavy Equipment Operator (Tractor-Loader-Backhoe)	7321	Transport Trailer Technician
7242	Industrial Electrician	7321	Truck and Transport Mechanic
7311	Industrial Mechanic (Millwright)*	7237	Welder*
2243	Instrumentation and Control Technician		
7293	Insulator (Heat and Frost)		

Endnotes

1. Andrew Sharpe and James Gibson, Centre for the Study of Living Standards (CSLS), *The Apprenticeship System in Canada: Trends and Issues* (Ottawa: CSLS Research Report, September 2005).

2. BuildForce, *Construction and Maintenance Looking Forward National Highlights, 2019-2028* (Ottawa: BuildForce Canada, 2019).

3. The implementation of the Ontario College of Trades may have impacted the increase in completions in Ontario.

4. See Sandrine Prasil, *Registered Apprentices: The Class of 1992, A Decade Later* (Ottawa: Statistics Canada, 2005); Denis Morissette, *Registered Apprentices: The Cohort of 1993, A Decade Later, Comparisons with the 1992 Cohort* (Ottawa: Statistics Canada, 2008); and Louise Desjardins and Nicole Paquin, *Registered Apprentices: The Cohorts of 1994 and 1995, One Decade Later* (Ottawa: Statistics Canada, 2010).

5. Kristyn Frank and Emily Jovic, *National Apprenticeship Survey Canada Overview Report 2015*, (Ottawa: Statistics Canada, 2017).

6. Includes data for 44 individual 4-Digit NOC Level occupations.

