

Research and development personnel, 2020

Released at 8:30 a.m. Eastern time in *The Daily*, Wednesday, March 29, 2023

Gross expenditures on research and development (R&D) reached \$41.9 billion in 2020 on strong spending by the federal government and businesses in Canada. At the heart of this spending are talented R&D professionals involved in the creation and improvement of products, processes and services through scientific and technological innovation. These professionals effectively help drive the competitiveness of Canada's economy.

Characteristics of research and development employment in Canada

In 2020, 1.6% of all jobs in Canada were tied to R&D and were spread across a wide range of industries, including pharmaceuticals, biotechnology, aerospace, automotive, electronics and information technology. Due to the nature and complexity of tasks performed, R&D-based employees in these industries tend to be highly qualified and well educated, with strong backgrounds in science, engineering or related fields.

Research and development personnel rise for the fourth consecutive year

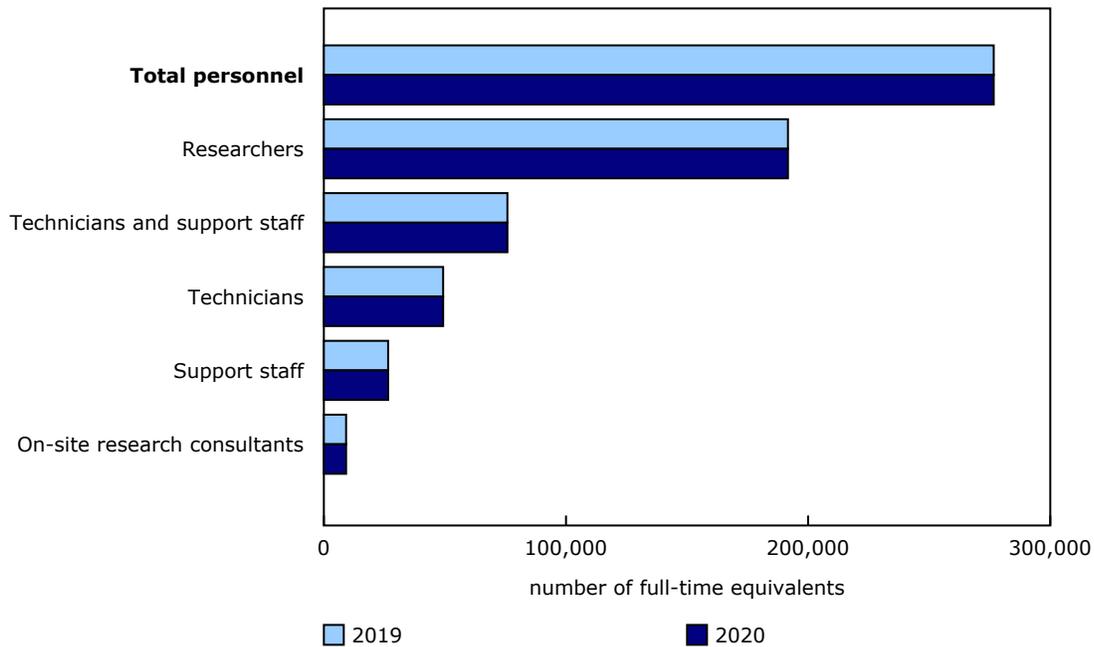
The total number of full-time equivalent (FTE) personnel engaged in R&D in Canada rose by 12,230 FTEs to 276,640 FTEs in 2020. This marks the fourth consecutive year-over-year gain and is almost double the increase recorded in 2019 (+6,600 FTEs).

The overall growth in the number of FTEs in 2020 was driven by increased hiring of researchers (+9,170 FTEs to 191,660 FTEs). Researchers also served as the largest occupational category, accounting for almost 70% of R&D personnel employed in Canada. The significance of this group is underscored by the fact that researchers generally hold advanced science, technology, engineering and mathematics degrees and are heavily engaged in conducting research related to the development of new products, technologies and services.

The remaining occupational categories also saw gains in 2020. Specifically, technicians and support staff increased by 1,790 FTEs to 75,800 FTEs, while on-site research consultants rose by 1,270 FTEs to 9,180 FTEs.



Chart 1
Canada's research and development personnel by occupational category, 2019 and 2020



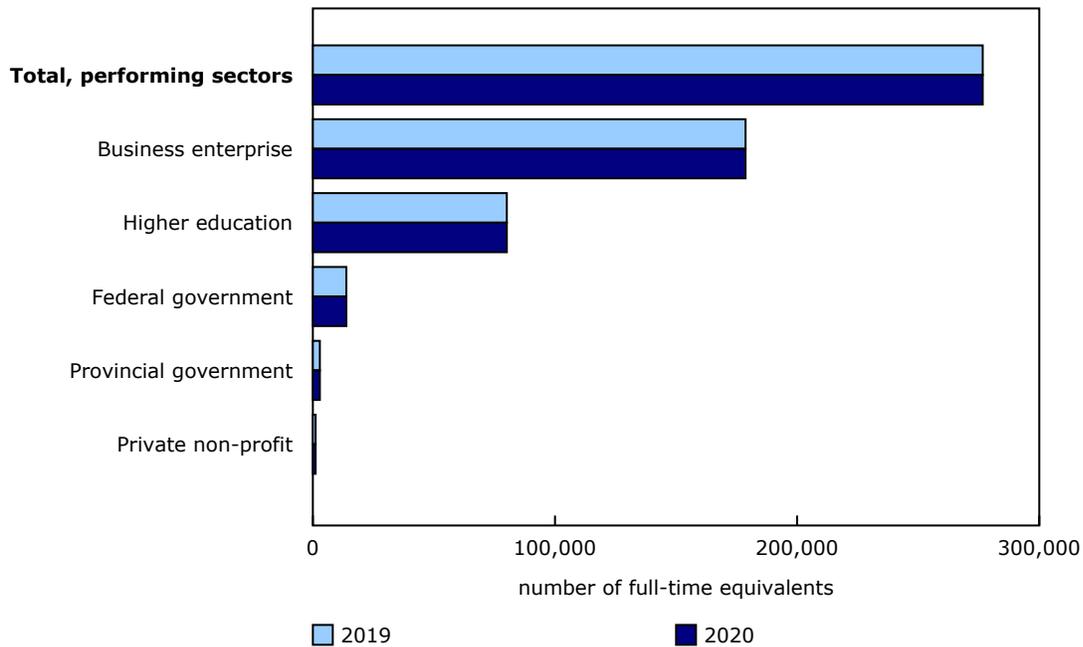
Source(s): Table 27-10-0022-01.

Business enterprise sector remains a key employer of research and development personnel

In 2020, the business enterprise sector remained the largest employer of R&D personnel in Canada, accounting for about 65% of total R&D employment. For the year, the sector added 10,300 FTEs, which pushed its overall total to 178,690 FTEs. This gain represents more than a threefold increase compared with 2019 (+2,980 FTEs) and was driven by an increase in the number of researchers (+7,390 FTEs).

The higher education sector was the second-largest employer of R&D personnel in 2020; the number of FTEs in this sector rose by 2,070 to 80,100 FTEs. The gain was also attributed to a rise in the number of researchers (+1,880 FTEs to 65,330 FTEs).

Chart 2
Canada's research and development personnel by performing sector, 2019 and 2020



Source(s): Table 27-10-0022-01.

Increase in research and development personnel tied to Ontario

Looking at the distribution of R&D personnel across Canada in 2020, Ontario accounted for the highest proportion (45%), followed by Quebec (28%) and British Columbia (13%).

Ontario also saw the strongest gains in R&D personnel, adding 11,120 FTEs in 2020, which was significantly higher than the increase observed in 2019 (+3,870 FTEs).

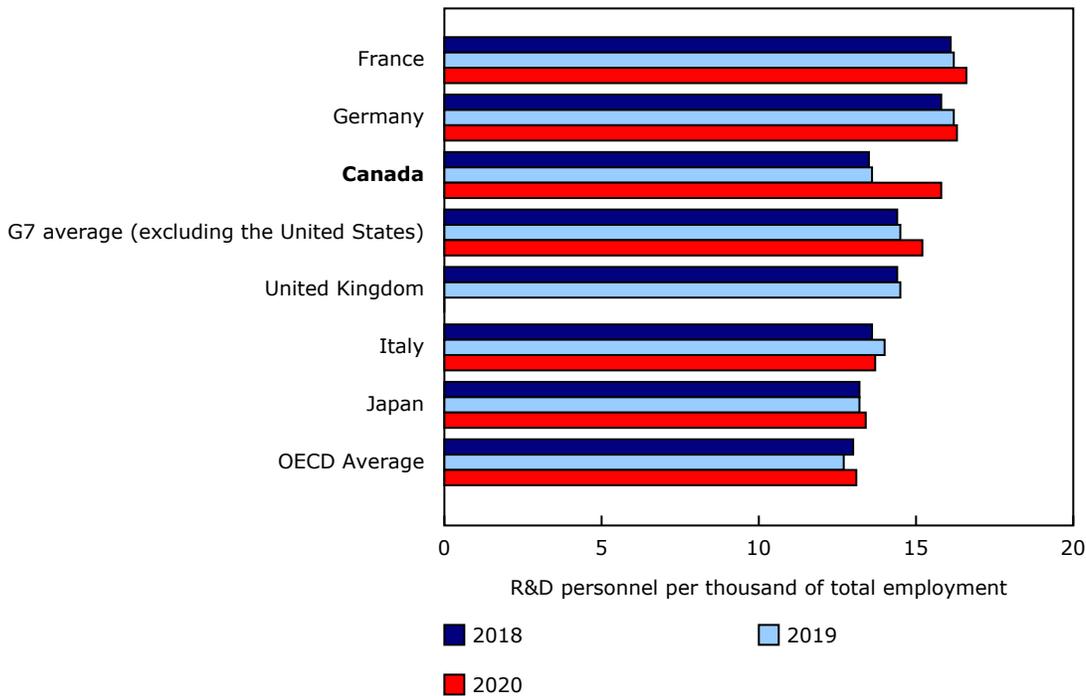
Canada's research and development personnel on a global scale

On an international scale, Canada's R&D personnel ratio per 1,000 jobs rose to 15.8 in 2020, after being stable at 13.6 in 2018 and 2019. The 2020 ratio placed Canada in third among the G7 countries (excluding the United States), behind France (16.6) and Germany (16.3), after several years of being below the G7 countries' average. Canada's ratio of R&D personnel per 1,000 jobs as part of total employment has been consistently above the Organisation for Economic Co-operation and Development average.

Overall, Canada's increasing share of R&D personnel in total employment is a positive sign for the country's economic development, as it indicates a growing emphasis on innovation and technological advancement.

Chart 3

Research and development (R&D) personnel per 1,000 jobs in G7 countries, 2018, 2019 and 2020



.. not available for a specific reference period

Note(s): G7 (Group of Seven) is an intergovernmental forum of the world's largest economies, consisting of Canada, France, Germany, Italy, Japan, the United Kingdom and the United States. The United Kingdom is not included in the calculation of average on research and development ratio among G7 countries for 2020; its data are not available at the time of this publication. The United States data are not available. OECD is the Organisation for Economic Co-operation and Development.

Source(s): Tables 27-10-0022-01 and 36-10-0489-01, and the Organisation for Economic Co-Operation and Development, Main Science and Technology Indicators (MSTI database).

Sustainable development goals

On January 1, 2016, the world officially began implementation of the [2030 Agenda for Sustainable Development](#)—the United Nations' transformative plan of action that addresses urgent global challenges over the next 15 years. The plan is based on 17 specific sustainable development goals.

Providing data on research and development personnel is an example of how Statistics Canada supports the reporting on the global sustainable development goals. This release will be used to help measure the following goal:



Note to readers

Research and development (R&D) personnel counts are rounded to the nearest 10 and reported as full-time equivalents. **Full-time equivalent** is a measure of the time actually devoted to R&D. An employee who is engaged in R&D for half a year has a full-time equivalence of 0.5.

R&D personnel encompasses a variety of occupations that are classified into three categories according to their R&D function (Frascati Manual 2015): researchers, technicians and support staff.

Researchers are professionals engaged in the conception or creation of new knowledge. They conduct research and improve or develop concepts, models and methods. Managers and administrators who plan and manage the scientific and technical aspects of a researcher's work, as well as graduate students, are also included.

Technicians and equivalent staff perform scientific and technical tasks involving the application of concepts and operational methods in one or more fields of natural sciences and engineering or social sciences, humanities and the arts, normally under the supervision of researchers.

Support staff includes skilled and unskilled craftspeople, and administrative, secretarial and clerical staff directly associated with R&D projects.

On-site research consultants represent self-employed individuals or contractors who work on the site of the R&D performer and contribute to their intramural R&D. While on-site research consultants are not considered part of the performer's intramural R&D personnel, the Organisation for Economic Co-operation and Development has directed countries to include these consultants as part of total R&D personnel.

Beginning with 2014 data, the business enterprise R&D sector's statistical program concepts and methodology were redesigned. Users should therefore exercise caution when comparing data from 2014 onwards with historical datasets. Documentation on this methodology can be found on the [Research and Development in Canadian Industry](#) (changes to the survey for reference year 2014) page of our website.

There are five performing sectors in Canada's R&D personnel release: business enterprise, private non-profit, higher education, federal government and provincial government (which includes provincial research organizations).

References

OECD. (2015). *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development, The Measurement of Scientific, Technological and Innovation Activities*, OECD Publishing, Paris.

Main Science and Technology Indicators (database). (2023). On this page, search for "GERD as a percentage of GDP." (Accessed on March 27, 2023).

Available tables: [27-10-0022-01](#) and [27-10-0023-01](#).

Definitions, data sources and methods: survey number [5193](#).

For more information, or to enquire about the concepts, methods or data quality of this release, contact us (toll-free 1-800-263-1136; 514-283-8300; infostats@statcan.gc.ca) or Media Relations (statcan.mediahotline-ligneinfomedias.statcan@statcan.gc.ca).