

Research and development personnel, 2021

Released at 8:30 a.m. Eastern time in *The Daily*, Tuesday, March 12, 2024

Canada has a dynamic workforce engaged in science, technology, engineering and mathematics (STEM). Underpinning its success are diverse and highly skilled employees engaged in research and development (R&D) positions across both the public and private sectors. These employees generally hold high qualifications and extensive education, and help to enhance the competitiveness of the Canadian economy.

Research and development personnel is up for the fifth consecutive year

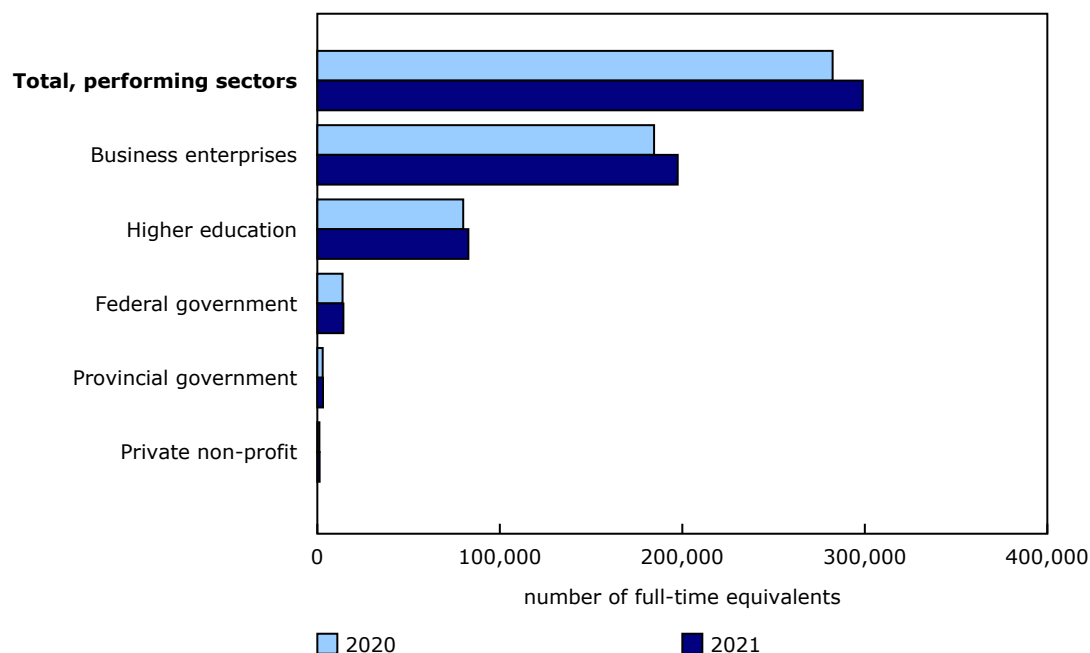
The number of full-time equivalent (FTE) R&D personnel rose for the fifth consecutive year in 2021, reaching 298,850 FTEs (+16,500 FTEs; +5.8%), after a 6.9% increase in 2020 (+18,300 FTEs). The growth in personnel correlates with the rise in [Canada's gross domestic R&D spending](#), which reached a high of \$46.9 billion in 2021 (+\$4.0 billion; +9.3%).

R&D personnel gains recorded during the COVID-19 pandemic from 2020 and 2021 were more than twice the increase observed in 2019 (+6,580 FTEs), but lower than the record increase in 2018 (+20,220 FTEs).

The uptick in the overall number of R&D personnel in 2021 was spread across all performing sectors, albeit with 95.4% of the growth occurring in the two largest sectors: business enterprises and higher education. Specifically, the business enterprise sector added 12,940 FTEs to reach 197,460 FTEs, while the higher education sector increased by 2,800 FTEs to 82,750 FTEs. For the remaining sectors, the federal government added 460 FTEs for a total of 14,280 FTEs, while the provincial government rose by 160 FTEs to 3,100 FTEs and the private non-profit sector increased by 120 FTEs to 1250 FTEs.

Chart 1

Canada's research and development personnel by performing sector, 2020 and 2021



Source(s): Table 27-10-0023-01.

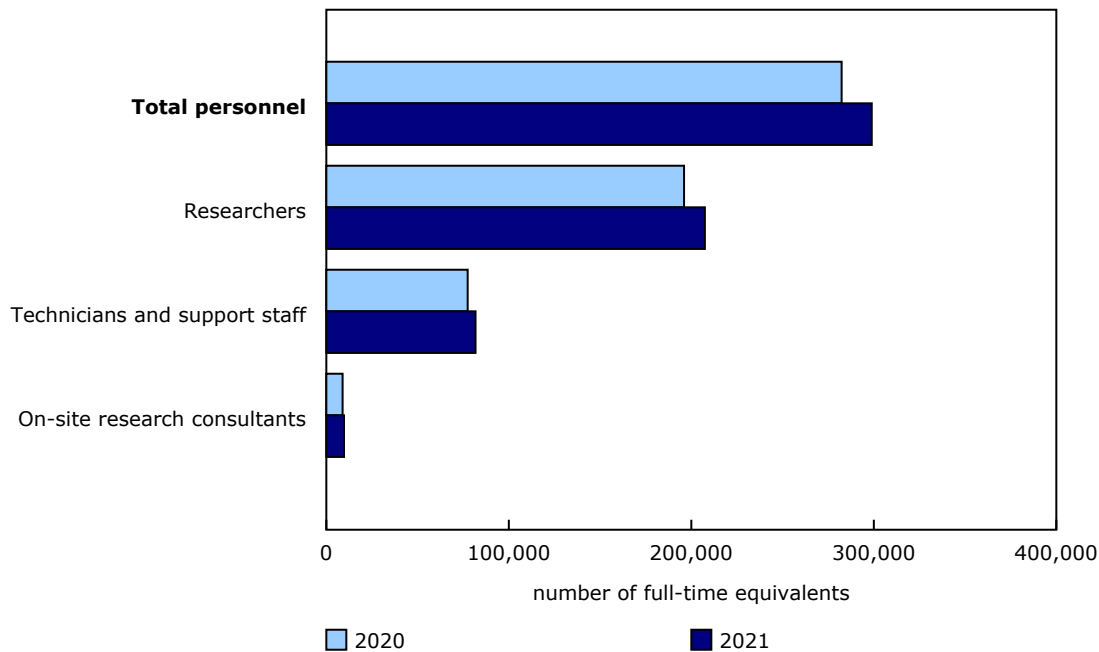
R&D personnel growth by occupation

R&D personnel in 2021 were comprised of three occupational categories: researchers (the largest occupational category, accounting for 69.4% of R&D personnel employed in Canada), followed by technicians and support staff (27.4%) and on-site research consultants (3.2%).

The majority of the growth in R&D personnel in 2021 was driven by increased researcher positions, which rose to 207,420 FTEs (+11,410 FTEs; +5.8%). Technicians and support staff positions also saw a noticeable rise, to 81,750 FTEs (+4,310 FTEs; +5.6%).

Chart 2

Canada's research and development personnel by occupational category, 2020 and 2021



Source(s): Table 27-10-0023-01.

Ontario and Quebec remain key employers

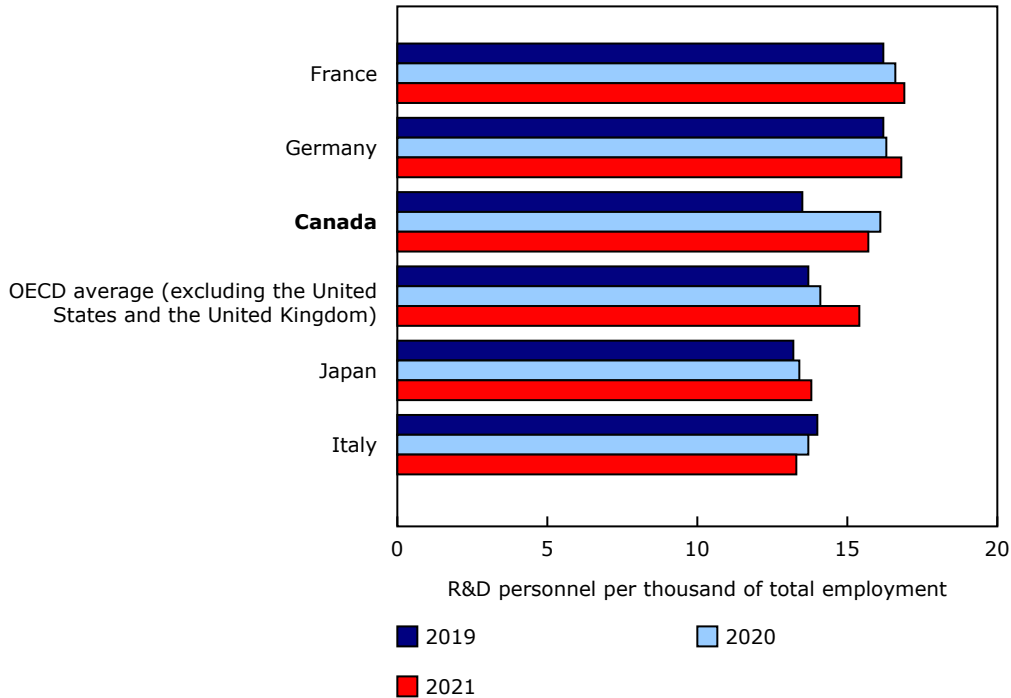
Almost 80% of the increase in FTEs in 2021 came from Ontario and Quebec. Ontario accounted for more than half of the total growth (+8,700 FTEs to 136,570 FTEs), while Quebec accounted for about one-quarter (+4,240 FTEs to 81,430 FTEs).

International comparison

On a global scale, Canada's R&D personnel per thousand total employment ratio declined from 16.1 in 2020 to 15.7 in 2021. Canada remains above the Organisation for Economic Co-operation and Development (OECD) average of 15.4 (excluding the United States and the United Kingdom).

Chart 3

Research and development (R&D) personnel per thousand of total employment in Organisation for Economic Co-operation and Development (OECD) countries, 2019 to 2021



Note(s): The United Kingdom and the United States are not included in the calculation of the average on R&D ratio amongst OECD countries from 2019 to 2021 as their data were not available at the time of this publication. The R&D personnel ratio per thousand of total employment is calculated as the number of R&D personnel divided by the total labour force, then multiplied by 1,000. The methodology for the calculation of R&D personnel per thousand of total employment was changed to match the methodology used by the OECD with this publication.

Source(s): Tables 27-10-0023-01 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:



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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.

R&D personnel ratio per thousand of total employment is an indicator that allows for data comparisons between countries over time. It is calculated as the total R&D personnel (in full-time equivalents, FTEs) divided by the total employment (in persons), then multiplied by 1,000.

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

[Main Science and Technology Indicators \(MSTI Database\)](#). (2024). On the left side of this page, under "Data by Theme," select "Science and Technology Indicators," then "Main Science and Technology Indicators (MSTI Database)" and search for "Total R&D personnel per thousand labour force" from the drop-down list. (Accessed on March 8, 2024.)

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).