

# Federal Science and Technology Expenditures and Personnel, 2021/2022 (actual), 2022/2023 (preliminary), and 2023/2024 (intentions)

*Released at 8:30 a.m. Eastern time in The Daily, Tuesday, June 6, 2023*

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Federal government spending on scientific and technological (S&T) activities is an important driver in today's economy. Through its spending and collaborations with various sectors, such as businesses and higher education institutions, the federal government contributes to the creation of new businesses, the development of new products and services, and a more in-demand and highly skilled workforce.

## Spending intentions expected to decline for the first time in nine years

Early estimates of S&T spending by the Canadian federal government are expected to grow \$566 million from 2021/2022 levels to \$15.6 billion in 2022/2023. Looking further ahead, S&T spending intentions are expected to decrease \$501 million to \$15.1 billion in 2023/2024. Despite this decrease, spending will remain above pre-COVID-19 pandemic levels.

## Science and technology expenditures rose in 2021/2022

Following a record \$1.8 billion rise in S&T spending in 2020/2021, which occurred against the backdrop of the COVID-19 pandemic, S&T spending rose another \$391 million to \$15.0 billion in 2021/2022.

S&T spending by the federal government can be broken down into two core activities: research and development (R&D); and related scientific activities (RSA), which are activities that support R&D.

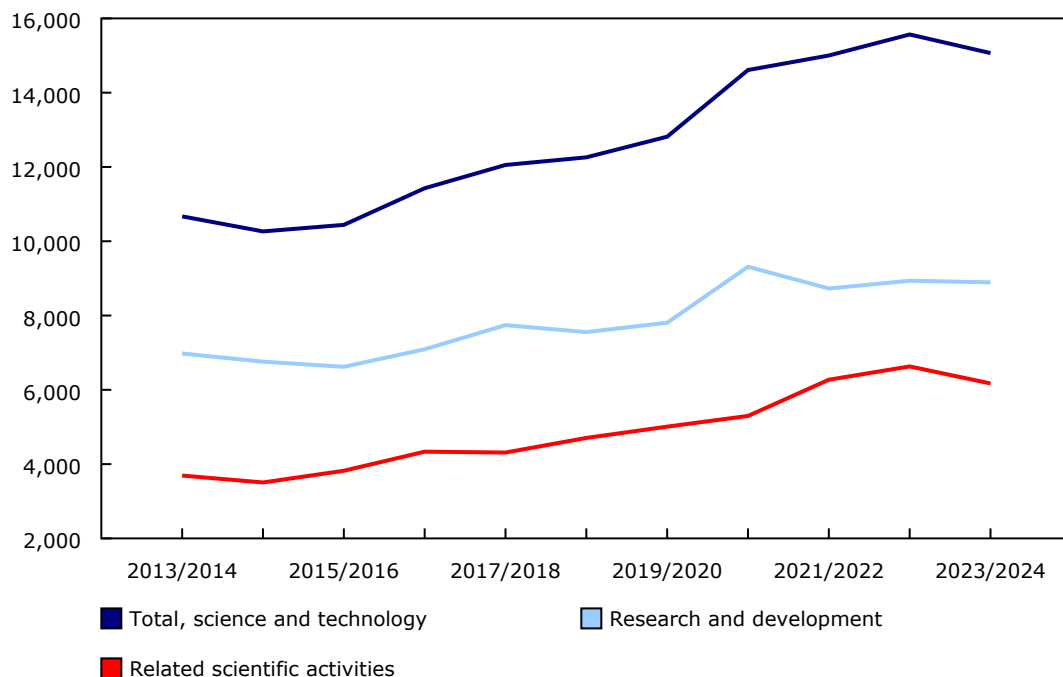
For the 2021/2022 reference year, the increase in overall spending was attributed to a rise in RSA spending (+\$975 million to \$6.3 billion). Spending on R&D decreased \$584 million to \$8.7 billion as a result of a decline in in-house R&D (-\$421 million to \$1.7 billion) and decreased R&D grants and contributions to the higher education sector (-\$248 million to \$5.8 billion).

Looking at the breakdown by type of science, spending on the natural sciences (+\$516 million to \$11.6 billion) continued to outstrip spending on the social sciences (-\$124 million to \$3.4 billion).



**Chart 1**  
**Federal spending by science and technology component, 2013/2014 to 2023/2024**

millions of dollars



Source(s): Table 27-10-0005-01.

## Extramural and intramural spending rose in 2021/2022

In addition to funding its own S&T initiatives, the federal government also provides funding to other sectors to perform S&T activities on its behalf.

In 2021/2022, extramural payments to business enterprises rose \$365 million to \$2.1 billion, while payments to foreign performers increased \$295 million to \$1.2 billion. These increases were both larger than the increase in intramural or in-house spending within the federal government itself, which rose \$158 million to \$6.2 billion.

Over the same period, total extramural expenditures to the higher education sector declined by \$419 million to \$4.3 billion.

## Scientific and technological expenditures rose among most major scientific and technological federal organizations

Across major federal S&T departments and agencies (organizations whose S&T spending exceeded 2% of the total S&T expenditures by the federal government in 2021/2022), 11 reported increased spending (+\$1.1 billion) in 2021/2022, while 4 reported decreases (-\$813 million).

The largest increase in S&T spending was attributed to Global Affairs Canada (+\$268 million to \$1.0 billion), which was followed by Statistics Canada (+\$266 million to \$1.0 billion) and Health Canada (+\$122 million to \$540 million).

## **Federal expenditures and personnel by geography**

From a regional perspective, the increase in S&T expenditures in 2021/2022 was tied primarily to the National Capital Region (NCR; +\$299 million to \$4.0 billion) which comprises Ottawa, Ontario and the neighbouring city of Gatineau, Quebec. Most of the provinces had increased spending, with the exception of spending decreases in Ontario (excluding the NCR; -\$410 million to \$3.3 billion) and in Alberta (-\$218 million to \$806 million).

The NCR also saw growth in the number of S&T personnel employed (+3,853 full-time equivalents [FTEs] to 25,537 FTEs) in 2021/2022 which helped push up the total number of S&T personnel to 41,550 FTEs from the 36,893 FTEs in the previous year. The overall gain was partially offset by Ontario (excluding the NCR), which saw a decrease in personnel (-710 FTEs to 2,734 FTEs).

## Note to readers

*Federal Science Expenditures and Personnel, Activities in the Social Sciences and Natural Sciences* is an annual survey of all federal government departments and agencies that perform or fund science and technology activities. Actual data for 2021/2022, preliminary data for 2022/2023 and intentions for 2023/2024 were collected from September to December 2022, based on the federal government's fiscal year running from April 1 to March 31.

**Science and technology activities(S&T)** comprise two types of scientific activities: research and development (R&D), and related scientific activities (RSA). They can be defined as all systematic activities that are directly related to the generation, advancement, dissemination and application of scientific and technical knowledge in all fields of science and technology.

**Research and development** comprise creative and systematic work done to increase the stock of knowledge—including knowledge of humankind, culture and society—and to devise new applications of available knowledge. R&D activities must satisfy all five of the following core criteria:

1. They are aimed at new findings (novel).
2. They are based on original, not obvious, concepts and hypotheses (creative).
3. They are uncertain about the final outcome (uncertainty).
4. They are planned and budgeted (systematic).
5. They lead to results that could be possibly reproduced (transferable/or reproducible).

**Related scientific activities(RSA)** are all systematic activities directly related to the generation, advancement, dissemination and application of scientific and technological knowledge. RSA generally include general purpose data collection, which excludes the collection of data as part of an R&D project; information services (the collection, coding, analysis, evaluation, recording, classification, translation and dissemination of scientific and technological information); special surveys and studies (systematic investigations carried out to provide information needed for planning or policy formulation); education supports (grants to support the postsecondary education of students in the natural or social sciences and technology).

**Natural sciences and engineering** consist of all disciplines concerned with understanding, exploring, developing or using the natural world. Included are engineering, technology, mathematics, computer and information sciences, physical sciences, medical and health sciences, agricultural sciences, veterinary sciences, and forestry.

**Social sciences, humanities and the arts** consist of disciplines concerned with the study of human actions and conditions and the social, economic and institutional mechanisms that affect humans. Included are the arts, economics and business, education, history and archeology, law, languages and linguistics, media and communications, philosophy, ethics and religion, psychology and cognitive sciences, social and economic geography, and sociology.

The **performer** is equivalent to the sector in which the scientific activity is conducted. The basic distinction is between intramural and extramural performance.

**Intramural (in-house) activities** include all current expenditures incurred for scientific activities carried out by in-house personnel of units assigned to the program.

**Extramural (outsourced) activities** include all expenditures incurred by the federal government's agencies and departments for scientific activities carried out by the five following performers: business enterprises, higher education, Canadian non-profit institutions, provincial and municipal governments and foreign performers.

**Full-time equivalent** is the personnel expressed as a ratio of working hours actually spent on scientific activities during a specific reference period divided by the total number of hours conventionally worked in the same period by an individual or a group. For example, an employee who is engaged in scientific activities for half a year has a full-time equivalence of 0.5.

**Scientific and professional personnel** (also called 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.

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

**Other personnel** (also called support staff) includes skilled and unskilled workers, as well as administrative, secretarial and clerical staff directly associated with research and development projects.

More information on the concepts and definitions of the survey (4212) is available from this release's Related information tab.

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*With the release of data for the reference period 2023/2024, previously released, actual data for 2020/2021 have been revised.*

*To better understand the concepts outlined in this survey, please consult the [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.*

**Available tables:** [27-10-0005-01](#) to [27-10-0014-01](#) and [27-10-0026-01](#) to [27-10-0029-01](#) .

**Definitions, data sources and methods:** survey number [4212](#).

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](mailto:infostats@statcan.gc.ca)) or Media Relations ([statcan.mediahotline-ligneinfomedias.statcan@statcan.gc.ca](mailto:statcan.mediahotline-ligneinfomedias.statcan@statcan.gc.ca)).