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CANADA

SUCCESSES, CHALLENGES AND OPPORTUNITIES FOR SCIENCE IN CANADA

**Report of the Standing Committee on Science
and Research**

Honourable Kirsty Duncan, Chair

**JUNE 2022
44th PARLIAMENT, 1st SESSION**

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Chair**

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NOTICE TO READER

Reports from committees presented to the House of Commons

Presenting a report to the House is the way a committee makes public its findings and recommendations on a particular topic. Substantive reports on a subject-matter study usually contain a synopsis of the testimony heard, the recommendations made by the committee, as well as the reasons for those recommendations.

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THE STANDING COMMITTEE ON SCIENCE AND RESEARCH

has the honour to present its

FIRST REPORT

Pursuant to its mandate under Standing Order 108(2), the committee has studied Successes, Challenges and Opportunities for Science in Canada and has agreed to report the following:

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SUMMARY

The new House of Commons Standing Committee on Science and Research decided to begin its work with a study of successes, challenges and opportunities for science in Canada, with a special focus on government science, research during the pandemic, big science and emerging opportunities.

The witnesses heard by the Committee spoke about the strengths of Canada's science and research sector and some of the successes of Canadian scientists. They also discussed the challenges Canada faces with increasing international competition. The COVID-19 pandemic has laid bare some of these challenges, such as the connections between science and democracy, and Canada's biomanufacturing capacity. However, other issues, such as big science funding and governance, and investment levels in government research, were already there before the pandemic.

The evidence received by the Committee also outlined the opportunities that Canada should seize to consolidate its position on science and research. In particular, the witnesses shared recommendations with the Committee on the funding of research, the workings of the research ecosystem, research in colleges and in the regions, the commercialization of research, and investment in the next generation of scientists.

The evidence compiled by the Committee resulted in 13 recommendations for the Government of Canada on these themes.

LIST OF RECOMMENDATIONS

As a result of their deliberations committees may make recommendations which they include in their reports for the consideration of the House of Commons or the Government. Recommendations related to this study are listed below.

Recommendation 1

That the Government of Canada, in partnership with the provinces and territories where possible, consider creating a pan-Canadian health research data repository..... 15

Recommendation 2

That the Government of Canada consider new funding models for major research facilities covering their entire life cycle. 17

Recommendation 3

That the Government of Canada make the Chief Science Adviser position permanent by enshrining its mandate in an Act of Parliament. 22

Recommendation 4

That the Government of Canada review the advisability of more closely integrating the programming of the Social Sciences and Humanities Research Council of Canada, the Natural Sciences and Engineering Research Council of Canada and the Canadian Institutes of Health Research to strengthen their cooperation and align their policies. 22

Recommendation 5

That the Government of Canada review and increase its investments in fundamental research through increases to the budgets of the three granting councils..... 25

Recommendation 6

That the Government of Canada consider creating mechanisms to improve continuity of funding or to facilitate the renewal of funding provided by the three granting councils. 25

Recommendation 7

That the Government of Canada increase the number of scholarships and fellowships to graduate students and postdoctoral researchers and increase their value by 25% and index it to the consumer price index. 27

Recommendation 8

That the Government of Canada index science funding, including the value of scholarships and fellowships to graduate students and post-doctoral researchers, to the consumer price index on an ongoing basis. 27

Recommendation 9

That the Government of Canada consider improving how the indirect costs of research are taken into account in the funding provided by granting councils and the Canada Foundation for Innovation. 28

Recommendation 10

That the granting councils recognize a minimum of 225 technology access centres, including Quebec’s 59 college centres for technology transfer and innovative social practices, under the College and Community Innovation Program. 31

Recommendation 11

That the Government of Canada include part of the indirect costs of research in the research funding granted to colleges and that the granting councils reform the structure of the grants to better accommodate the research application model in Canada's colleges, CEGEPs and polytechnics. 31

Recommendation 12

That the Government of Canada study how the criteria used by the granting councils to evaluate excellence affect the ability of research institutions outside major cities to secure federal funding and consider new funding models to remedy any disproportionality in funding allocation between universities based on regionality. 33

Recommendation 13

That the Government of Canada step up its efforts in support of equity, diversity and inclusion in the research ecosystem in order to tap into all of the talent available in Canada. 34



SUCCESSSES, CHALLENGES AND OPPORTUNITIES FOR SCIENCE IN CANADA

INTRODUCTION

On 26 May 2021, during the 2nd session of the 43rd Parliament, the House of Commons unanimously passed a motion recognizing that “science and research are of critical importance to all Canadians” and creating a new Standing Committee on Science and Research.¹

On 1 February 2022, the Standing Committee on Science and Research (the Committee) decided to begin its work with a study of “successes, challenges and opportunities for science in Canada” and “to develop recommendations as to how to improve the current state of science research nationally.”² By a motion adopted on 10 February 2022, the Committee decided to consider “the themes of government science, research during the pandemic, big science, and emerging opportunities”³ as part of this study. The Committee held seven meetings on the subject between 8 February and 31 March 2022, during which it heard from 46 witnesses and received 14 briefs. The Committee greatly appreciates all the individuals who took the time to appear before it or to submit briefs.

The evidence received by the Committee gave an overview of the current state of science and research in Canada. It outlined the strengths of Canada’s science and research sector, as well as the challenges that were brought about by or had existed prior to the COVID-19 pandemic. Of the subjects discussed, the Committee heard evidence about funding for science at a time of strong international competition; government research and big science; research in the regions and in colleges; the commercialization of research results; and how to invest in the researchers of tomorrow. Based on the evidence, the Committee has made recommendations to the federal government on its role concerning science and research in Canada.

1 House of Commons, *Journals*, No. 104, 26 May 2021.

2 House of Commons, Standing Committee on Science and Research (SRSR), *Minutes of Proceedings*, 1 February 2022.

3 SRSR, *Minutes of Proceedings*, 10 February 2022.



SCIENCE SUCCESSSES IN CANADA

To begin, the witnesses who appeared before the Committee discussed the important contributions made by science and research to Canadian society and highlighted several examples of successes in the Canadian scientific community. The following sections detail some of these accomplishments.

Role of Science During the Pandemic

The contribution of science and research in Canada has been especially apparent since the start of the COVID-19 pandemic. Dr. Mona Nemer, Chief Science Adviser of Canada, said that “[s]cience guided us throughout the pandemic and gave us the tools—from diagnostics to vaccines to therapies—that saved lives and are allowing us to return to a more normal state.”⁴ Several witnesses pointed to the mobilization of the scientific community across the country.⁵ One result of this mobilization was the formation of thematic task forces, at the behest of the Chief Science Adviser of Canada, who advised the federal government at various stages of the pandemic.⁶

The pandemic also provided an opportunity for new collaborations between government researchers, academics and the private sector. For example, Genome Canada told the Committee about the April 2020 launch, with federal support, of CanCOGeN, “a national network involving universities, public health labs, hospitals and private industry to build a national surveillance system to track viral transmission, the variants of concern and their impact on Canadians.”⁷ Dr. Volker Gerdts told the Committee that during the pandemic, the Vaccine and Infectious Disease Organization (VIDO) “worked with almost 100 companies over the last almost two years now, testing their technologies, their prototypes, their vaccines and their therapeutics in our models here.”⁸

4 SRSR, [Evidence](#), 8 February 2022, 1835 (Dr. Mona Nemer, Chief Science Adviser).

5 SRSR, [Evidence](#), 15 February 2022, 1830 (Dr. Michael J. Strong, President, Canadian Institutes of Health Research); and SRSR, [Evidence](#), 31 March 2022, 1835 (Dr. John Bell, Scientific Director, BioCanRx).

6 SRSR, [Evidence](#), 8 February 2022, 1835 (Dr. Nemer).

7 SRSR, [Evidence](#), 17 February 2022, 1940 (Dr. Robert Annan, President and Chief Executive Officer, Genome Canada).

8 *Ibid.*, 1950 (Dr. Volker Gerdts, Director and Chief Executive Officer, Vaccine and Infectious Disease Organization - International Vaccine Centre).

A number of witnesses also pointed out that messenger ribonucleic acid technology, which was used in the development of several COVID-19 vaccines, was made possible by the many years of work by Dr. Pieter Cullis at the University of British Columbia.⁹

The Committee heard that the scientific community’s contribution was not limited to health specialists: “[S]ocial scientists have played a role in addressing vaccine hesitancy, economists in assessing the impact of pandemic measures, and medical geographers and historians in understanding past pandemics.”¹⁰ Dr. Jessie-Lee Mclsaac said that science also has a role to play in pursuing an equitable pandemic recovery.¹¹

Major Infrastructure and Government Research

Going beyond the pandemic, the evidence heard by the Committee provided a broader picture of the successes and achievements of the science and research sector.

The witnesses told the Committee that Canada is home to several major world-class science facilities where big science research projects are being conducted. The facilities referred to by witnesses include the Centre for Optics, Photonics and Lasers at Laval University; TRIUMF, Canada’s particle accelerator centre; SNOLAB in Sudbury; the Canadian Light Source synchrotron; and VIDO.

The evidence received by the Committee underscored the importance of these major facilities. According to Dr. Nigel Smith, Executive Director of the TRIUMF particle accelerator, they provide infrastructure that no single university could support, and “by bringing together a critical mass of researchers and engineers, can develop new ways of addressing problems and enable Canada to compete at scale in the global science and innovation enterprise.”¹² Major facilities also have the advantage of sitting at the interface between academia, industry and government.¹³

9 For example, SRSR, *Evidence*, 8 February 2022, 1940 (Dr. Gilles Patry, Executive Director, U15 Group of Canadian Research Universities); SRSR, *Evidence*, 1 March 2022, 1935 (Dr. Rémi Quirion, Chief Scientist, Chief Scientist Office of Quebec, Government of Quebec); and SRSR, *Evidence*, 17 February 2022, 1945 (Mr. Paul Davidson, President and Chief Executive Officer, Universities Canada).

10 SRSR, *Evidence*, 8 February 2022, 1945 (Dr. Vivek Goel, President and Vice-Chancellor, University of Waterloo).

11 SRSR, *Evidence*, 31 March 2022, 1935 (Dr. Jessie-Lee Mclsaac, Assistant Professor, Canada Research Chair in Early Childhood: Diversity and Transitions, Mount Saint Vincent University, As an Individual).

12 *Ibid.*, 1945 (Dr. Nigel Smith, Executive Director, TRIUMF).

13 *Ibid.*



Several witnesses commended the Canada Foundation for Innovation (CFI) for its role in supporting this type of infrastructure through its programs, including the Major Science Initiatives Fund.¹⁴

They also spoke highly of the calibre of federal scientists and their contribution to research.¹⁵ The National Research Council of Canada (NRC) told the Committee about the value of government research for the country because of its base of expertise and its foundational scientific capability, which make it possible to rapidly shift priorities in order to respond to emerging crises that could affect Canada.¹⁶

CHALLENGES

This overview reflects only part of the picture when it comes to science in Canada. Witnesses also told the Committee about their experiences with the challenges and difficulties facing scientists.

Funding for Research and Development (R&D)

Several witnesses told the Committee that Canada is the only G7 country whose research and development (R&D) expenditures as a proportion of gross domestic product (GDP) shrank between 2000 and 2020 (Figure 1).¹⁷ According to this indicator, Canada ranked 18th among Organisation for Economic Co-operation and Development (OECD) countries in 2020.¹⁸

14 SRSR, [Evidence](#), 8 February 2022, 1830 (Dr. Roseann O'Reilly Runte, President and Chief Executive Officer, Canada Foundation for Innovation); *Ibid.*, 2000 (Goel); SRSR, [Evidence](#), 1 March 2022, 1830 (Dr. Marc Nantel, Vice-President, Research and External Relations, Niagara College).

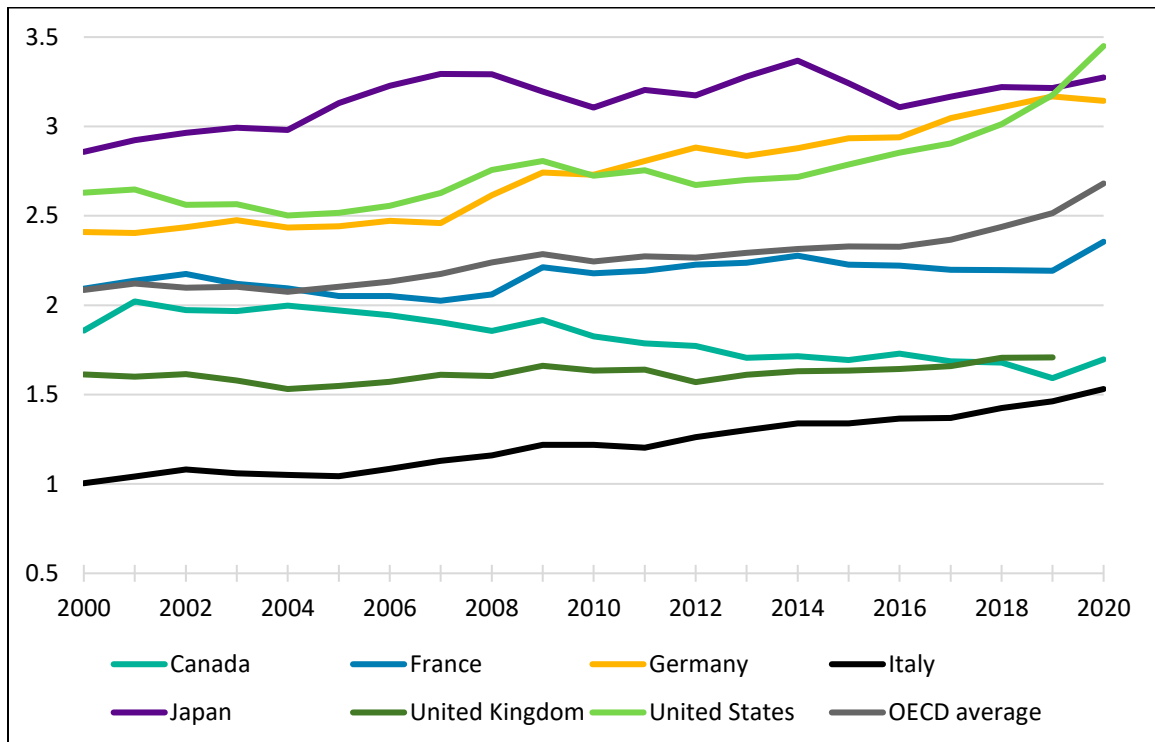
15 SRSR, [Evidence](#), 17 February 2022, 1835 (Dr. Danial Wayner, Departmental Science Advisor, National Research Council of Canada).

16 *Ibid.*, 1915 (Dr. Shannon Quinn, Secretary General, National Research Council of Canada).

17 SRSR, [Evidence](#), 31 March 2022, 1845 (Dr. Allen Eaves, President and Chief Executive Officer, STEMCELL Technologies Inc.).

18 Organisation for Economic Co-operation and Development (OECD), [Gross domestic spending on R&D](#), OECD Data, Database, accessed 19 April 2022.

Figure 1—Gross Expenditures on Research and Development in G7 Countries, As a Percentage of GDP, 2000–2020



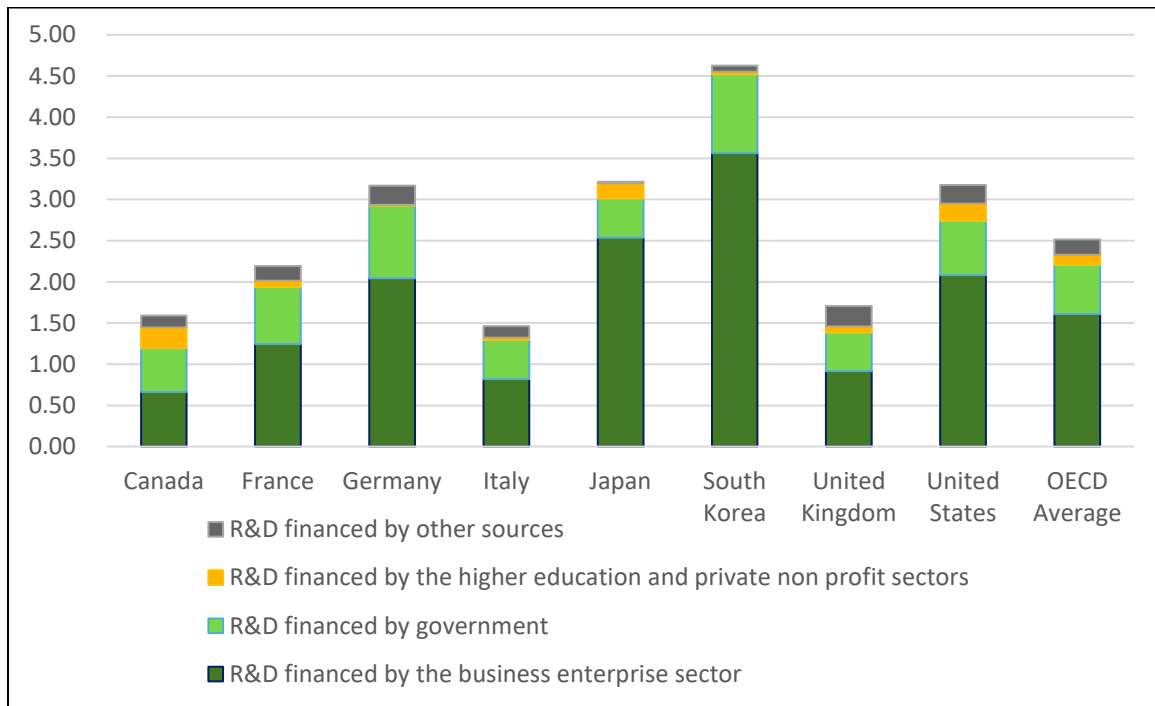
Source: Figure prepared by the Library of Parliament using data from the OECD, *Gross domestic spending on R&D*, OECD Data, Database, accessed 19 April 2022.

This first indicator provides a very general picture, since it covers R&D expenditures from all sources. However, it can be refined by distinguishing the various sources of R&D funding in each country. As noted by several witnesses, it is mainly the low level of business investment in R&D that explains why Canada lags behind most other G7 countries (Figure 2).¹⁹ In contrast, university research plays a greater role in Canada than in other G7 countries.

¹⁹ SRSR, *Evidence*, 17 February 2022, 1900 (Dr. Nipun Vats, Assistant Deputy Minister, Science and Research Sector, Department of Industry); and SRSR, *Evidence*, 10 February 2022, 1910 (Dr. Sylvain Charbonneau, Vice-President, Research and Innovation, University of Ottawa).



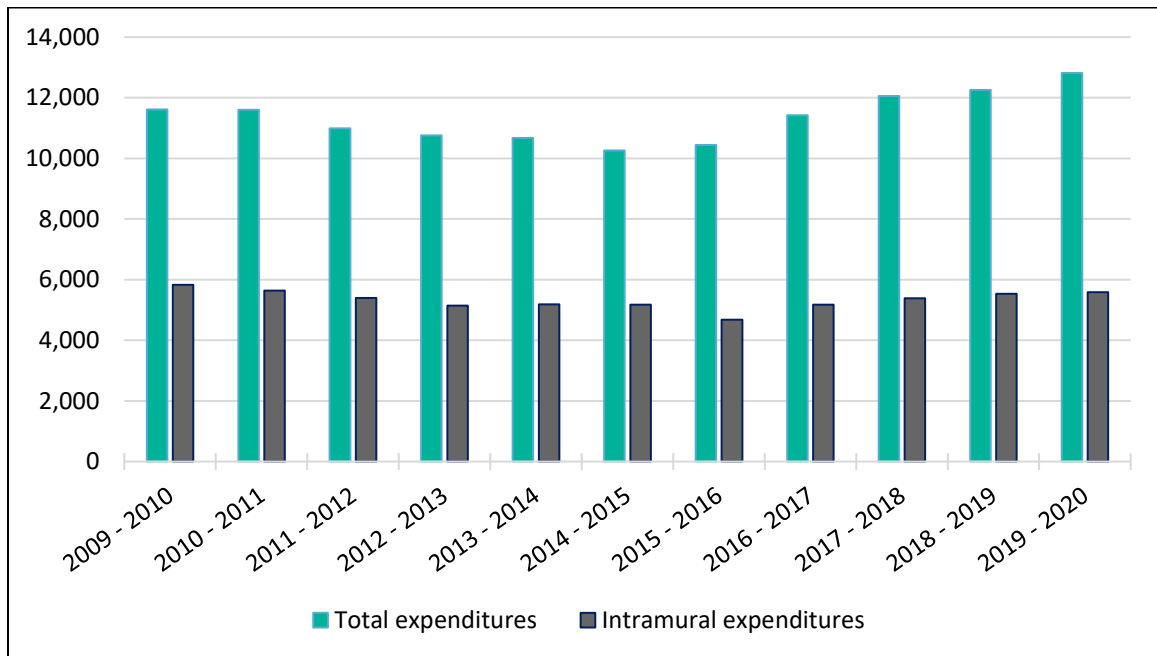
**Figure 2—Gross Domestic R&D Expenditure in G7 Countries,
By Source of Financing, As a Percentage of GDP, 2019**



Source: Figure prepared by the Library of Parliament using data from OECD Science, Technology and R&D Statistics, *Main Science and Technology Indicators*, Database, accessed 19 April 2022.

With respect to federal R&D expenditures, there are two types of activities: so-called “intramural” science and technology activities, which take place within government; and so-called “extramural” activities, which are conducted by entities outside the government, even though they are government funded. In recent years, intramural expenditures have grown less rapidly than total federal government expenditures on science and technology (Figure 3).

Figure 3—Federal Expenditures on Science and Technology, 2009–2010 to 2019–2020 (\$ millions)



Source: Figure prepared by the Library of Parliament using data from Statistics Canada, [“Table 27-10-0012-01,”](#) *Federal expenditures on science and technology, by type of science, performing sector and geography (x 1,000,000)*, 10 June 2021.

Science and Research Tested by the Pandemic

While the pandemic presented an opportunity to measure the positive contributions of scientific research, it was also a difficult time for researchers, and it exposed certain weaknesses in the research ecosystem.

First, several witnesses told the Committee how the pandemic disrupted or sometimes interrupted the work of scientists. According to the Canadian Association of University Teachers (CAUT), a survey of its members revealed that 64% of academic staff reported their research had slowed or stalled completely because of the pandemic.²⁰ The Canadian Association for Neuroscience believes that the pandemic caused “a tremendous setback to Canada’s research ecosystem ... leading to a loss of highly qualified personnel and of research materials developed during long-term

²⁰ Canadian Association of University Teachers, [Successes, Challenges and Opportunities for Science in Canada. Submission to the Standing Committee on Science and Research](#), February 2022.



experiments.”²¹ The association also regretted lost funding opportunities. The rapid mobilization of human and financial resources to conduct COVID-19 research sometimes came at the expense of research on other health issues.²² The pandemic also interrupted the arrival of graduate students from other countries and the ability to collaborate internationally.²³

The COVID-19 crisis also highlighted the importance of the link between science and democracy. A number of witnesses stressed the challenge facing science education when it comes to addressing disinformation.²⁴

The pandemic also highlighted Canada’s limited vaccine production capacity.²⁵ The Committee notes that the House of Commons Standing Committee on Industry and Technology has undertaken a study of the domestic manufacturing capacity for a COVID-19 vaccine.

A number of witnesses also discussed the issue of sharing health research data. Genome Canada told the Committee that in response to the urgency of the COVID-19 pandemic, an “infrastructure of really important governance committees” was created, “which included our public sector partners at the provincial health labs, the academics, and the government funding partners to really come together to develop cross-provincial standards around data sharing.”²⁶ This facilitated Canada-wide data sharing during the pandemic, but Pari Johnston thinks that it is something that can be “really enhanced.”²⁷ HealthCareCAN believes it would be worthwhile to “[c]reate a pan-Canadian health

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- 21 Canadian Association for Neuroscience, *Increased investment in scientific research: An investment in the health and prosperity of Canadians today and tomorrow, Written Submission for the Study on Successes, Challenges and Opportunities for Science in Canada for the Standing Committee on Science and Research*, 2022.
- 22 Canadian Society for Molecular Biosciences, *Boosting Investment in Scientific Research: An Important Piece for Post-COVID 19 Economic Recovery Readiness and for Meeting Future Challenges*, Written Submission for the House of Commons Standing Committee on Science and Research, 2022.
- 23 SRSR, *Evidence*, 1 March 2022, 1955 (Dr. Gail Murphy, Vice-President, Research and Innovation, University of British Columbia).
- 24 SRSR, *Evidence*, 8 February 2022, 1850 (Nemer); SRSR, *Evidence*, 1 March 2022, 2000 (Quirion); and SRSR, *Evidence*, 22 March 2022, 1840 (Ms. Rachael Maxwell, Executive Director, Evidence for Democracy).
- 25 For example, SRSR, *Evidence*, 15 February 2022, 1920 (Strong); *Ibid.*, 1945 (Dr. Karen Mossman, Vice-President, Research, McMaster University); and SRSR, *Evidence*, 17 February 2022, 1920 (Vats).
- 26 *Ibid.*, 2020 (Ms. Pari Johnston, Vice-President, Policy and Public Affairs, Genome Canada).
- 27 *Ibid.*

research data repository to centralize health research data from across Canada and facilitate health research and innovation across institutions and jurisdictions.”²⁸

Consequently, the Committee recommends:

Recommendation 1

That the Government of Canada, in partnership with the provinces and territories where possible, consider creating a pan-Canadian health research data repository.

Government Science

The scientific sector also faces a number of challenges unrelated to the pandemic. This is particularly the case for government science.

Dr. John Pomeroy told the Committee that although he started his career as a government scientist, he “wouldn’t want to be one right now as budgets have declined over the decades.”²⁹ He said that “the government scientists I have had the pleasure of working with have seen their budgets drop over the decades. Their numbers have dropped over the decades. Investments in federal laboratories have not continued apace. They have become isolated.”³⁰

Dr. Pomeroy also said that several federal funding program rules prevent government scientists from participating in major programs such as the Canada First Research Excellence Fund or the Natural Sciences and Engineering Research Council of Canada (NSERC) networks.³¹ Evidence for Democracy believes that there is a need to “revisit investments in federal government science to make sure government scientists are able to deliver on their work.”³² For Dr. Alan Winter, “we need to rejuvenate government science to help with the complex regulations and standards in our society and trade

28 HealthCareCAN, *Submission to the Standing Committee on Science and Research: Study on the Successes, Challenges and Opportunities for Science in Canada*, 17 February 2022.

29 SRSR, *Evidence*, 8 February 2022, 1935 (Dr. John Pomeroy, Distinguished Professor and Canada Research Chair, University of Saskatchewan, As an Individual).

30 *Ibid.*, 2015.

31 *Ibid.*

32 SRSR, *Evidence*, 22 March 2022, 1840 (Maxwell).



negotiations in an increasingly protectionist and, particularly recently, geopolitically unstable world.”³³

Big Science

In the area of big science, the evidence highlighted two issues in particular: funding for, and governance of, major research facilities.

First, with respect to funding, it was pointed out a number of times that major research facilities could benefit from a new funding model that takes a very long-term view, covering the facility’s entire life cycle.³⁴ The current funding cycles for these facilities, covering five to six years, were considered too short by several witnesses.³⁵ Witnesses also drew the Committee’s attention to the fact that the federal government covers only part of the funding for major facilities, which means involving other partners, such as the provinces.³⁶ According to Dr. Baljit Singh, “that creates a patchwork funding model, which is not very conducive to operating these large national facilities.”³⁷

As well, Dr. Volker Gerdts told the Committee that “investment into the infrastructure is effective only if there is also investment into the operating support. The [Major Science Initiatives] program is one of those arms that obviously works to support those facilities. Unfortunately, for many facilities, that is only 60% of the operating cost, and it doesn’t cover the expenses for research or even the researchers who are doing the work.”³⁸

On the issue of governance, the witnesses raised a number of points. First, one of the missions of large research facilities is to serve research teams across the country. Dr. Bedard-Haughn said that “it would be helpful to think about how we can ensure that

33 Ibid., 1935 (Dr. Alan Winter, Former British Columbia Innovation Commissioner, As an Individual).

34 SRSR, [Evidence](#), 15 February 2022, 1940 (Dr. Tim Kenyon, Vice-President, Research, Brock University); Ibid., 2005 (Dr. David Naylor, Professor, University of Toronto, As an Individual); SRSR, [Evidence](#), 1 March 2022, 1840 (Dr. Baljit Singh, Vice-President, Research, University of Saskatchewan); Ibid., 1955 (Murphy); SRSR, [Evidence](#), 31 March 2022, 1945 (Smith).

35 SRSR, [Evidence](#), 1 March 2022, 1905 (Singh); Ibid., 1955 (Murphy).

36 SRSR, [Evidence](#), 1 March 2022, 1905 (Singh); SRSR, [Evidence](#), 22 March 2022, 1935 (Winter).

37 SRSR, [Evidence](#), 1 March 2022, 1905 (Singh).

38 SRSR, [Evidence](#), 17 February 2022, 2000 (Gerdts).

we have optimized use of shared infrastructure,” since there is sometimes a “difference in terms of expectations or how we approach the governance structures.”³⁹

The Executive Director of TRIUMF told the Committee that optimizing the support mechanisms for the major research facilities provides Canada with an opportunity to extract greater value from the investments already made, provide a multidisciplinary environment to train highly qualified personnel and attract top talent to Canada.⁴⁰

Some witnesses discussed the importance of a strategic vision for building and managing big science infrastructure. The Committee heard that work could focus on coordination in order to develop a national strategy for major research facilities and to think about the priorities in this area.⁴¹ This coordination should include both the perspective of the researchers who will be using the facilities in question, and a vision of the major challenges that Canada will be facing in the future.⁴² According to Dr. Nigel Smith, “it revolves around thinking about the priorities the country has, the sorts of tools and techniques that will be required to deliver on those questions and the ability to tie together, and work collaboratively on, the infrastructures that we need to develop.”⁴³

The Committee therefore recommends:

Recommendation 2

That the Government of Canada consider new funding models for major research facilities covering their entire life cycle.

NEW OPPORTUNITIES

Five years after the release of the Advisory Panel on Federal Support for Fundamental Science report *Investing in Canada’s Future: Strengthening the Foundations of Canadian Research* (the Naylor Report), and as we emerge from the pandemic period, the evidence received by the Committee provided insight into some of the opportunities

39 SRSR, *Evidence*, 10 February 2022, 1855 (Dr. Angela Bedard-Haughn, Dean and Professor, College of Agriculture and Bioresources, University of Saskatchewan).

40 SRSR, *Evidence*, 31 March 2022, 1945 (Smith).

41 Ibid., 2005.

42 Ibid.

43 Ibid.



that Canada could capitalize on to position itself as a world leader in science and research.

Importance of a Strategic Approach

When it comes to identifying those scientific fields that are most promising for Canada, the Committee heard a range of possibilities. Some brought up artificial intelligence.⁴⁴ Others mentioned the field of quantum science.⁴⁵ The Committee's attention was also drawn to photonics,⁴⁶ genomics,⁴⁷ human brain research,⁴⁸ water research,⁴⁹ and agriculture.⁵⁰

However, several witnesses mentioned that it was difficult to select a particular scientific field or identify promising sectors.⁵¹ Innovation, Science and Economic Development Canada (ISED) explained the federal approach: "It's a combination of looking at what our research base is like, what the international context is, and whether there's a receptor capacity in Canada to grow it here from an industrial perspective."⁵² Dr. Roseann O'Reilly Runte had this to say about identifying the most promising areas for science in Canada: "I don't think it's simply looking at technology that doesn't exist where we're going to fill a gap. I think we have to take where we have talent, where we have already developed ability, what coincides with our culture and our ability."⁵³

44 SRSR, [Evidence](#), 17 February 2022, 1850 (Vats); SRSR, [Evidence](#), 8 February 2022, 1945 (Goel); and *Ibid.*, 2020 (Patry).

45 SRSR, [Evidence](#), 10 February 2022, 1915 (Dr. Robert Myers, Director, Perimeter Institute for Theoretical Physics); and SRSR, [Evidence](#), 17 February 2022, 1850 (Vats).

46 SRSR, [Evidence](#), 17 February 2022, 1855 (Wayner).

47 *Ibid.*, 1835 (Vats); and *Ibid.*, 1940 (Annan).

48 SRSR, [Evidence](#), 31 March 2022, 2000 (Dr. Victor Rafuse, Director and Professor, Dalhousie University, Brain Repair Centre); and Canadian Brain Research Strategy, [Establishing a Brain Research Initiative for Canada. Written Submission to the Standing Committee for Science and Research](#), 28 February 2022.

49 SRSR, [Evidence](#), 8 February 2022, 1935 (Pomeroy); *Ibid.*, 2020 (Patry).

50 SRSR, [Evidence](#), 10 February 2022, 1845 (Bedard-Haughn).

51 SRSR, [Evidence](#), 8 February 2022, 1915 (Dr. Roseann O'Reilly Runte, President and Chief Executive Officer, Canada Foundation for Innovation); and SRSR, [Evidence](#), 17 February 2022, 1910 (Vats).

52 SRSR, [Evidence](#), 17 February 2022, 1910 (Vats).

53 SRSR, [Evidence](#), 8 February 2022, 1845 (O'Reilly Runte).

Several witnesses spoke about the importance of fundamental research.⁵⁴ Dr. Adem summed it up this way: “[T]he whole point I think about fundamental research is that we do not choose the winners.”⁵⁵ This was echoed by Dr. David Naylor, who told the Committee: “I think the whole point of having a broad-ranging investment in fundamental science and scholarship is to let the winners emerge.”⁵⁶

According to Dr. Robert Annan, the difficulty of identifying winning sectors simply reinforces the need for a true national science strategy:

First, we need strong, stable investment in fundamental research and talent development. This is the base upon which everything rests. Second, we need coordinated, system-wide approaches that can marshal this research strength into impact, for instance, through mission- or challenge-driven initiatives. Third, we need strategic leadership to focus our efforts and resources.⁵⁷

In fact, the Committee heard that the NRC established a working group on horizon scanning “to identify key economic and societal challenges of significance for Canada over the next 10 to 15 years.”⁵⁸ In its April 2021 report, the NRC identified six broad subject areas: climate change, resource futures, big data and artificial intelligence, cybersecurity and privacy, health-care futures, and new models of innovation.⁵⁹ These major challenges could be incorporated into a national science strategy. Another witness believed that greater emphasis is needed on unique Canadian challenges: “We can solve Canadian problems first, and export technologies to the rest of the world.”⁶⁰

54 For example, SRSR, [Evidence](#), 10 February 2022, 1920 (Bedard-Haughn); SRSR, [Evidence](#), 17 February 2022, 1940 (Annan); SRSR, [Evidence](#), 8 February 2022, 1945 (Goel); and SRSR, [Evidence](#), 17 February 2022, 1910 (Vats).

55 SRSR, [Evidence](#), 15 February 2022, 1925 (Dr. Alejandro Adem, President, Natural Sciences and Engineering Research Council).

56 *Ibid.*, 2010 (Naylor).

57 SRSR, [Evidence](#), 17 February 2022, 1940 (Annan).

58 *Ibid.*, 1835 (Wayner).

59 National Research Council Canada, [On the horizon: Several perspectives on Canada’s technology future - 2030–35](#), April 2021.

60 SRSR, [Evidence](#), 22 March 2022, 1830 (Dr. Ken Coates, Professor, University of Saskatchewan, As an Individual).



Optimizing the Research Ecosystem

Another point that came out of the evidence is that an effort could be made to coordinate the components of the science ecosystem.

The key point from the evidence pertains to the complexity of Canada's science and research ecosystem. Dr. Quirion summed it up as follows:

Even I find this ecosystem complicated, and I have been immersed in the field every day for 40 years now in Quebec and Canada. I often liken it to a jigsaw puzzle. I'm not talking about something easy; it's a real jigsaw puzzle. It is sometimes difficult to understand how things work. It's like a new jigsaw puzzle that you receive as a gift: when you open the box, you think that there are far too many pieces, but when you start working on it, you realize that some pieces are missing.⁶¹

This architecture includes the three granting agencies: the Social Sciences and Humanities Research Council (SSHRC), the Natural Sciences and Engineering Research Council (NSERC), and the Canadian Institutes of Health Research (CIHR). Often included with these agencies is the Canada Foundation for Innovation (CFI), which provides funding for research infrastructure across the country. The Canada Research Coordinating Committee (CRCC) coordinates the policies and operations of the three funding agencies and the CFI.

These agencies are joined by other key government players such as the Chief Science Adviser of Canada, ISED, and the NRC, the main governmental research organization.

The funding agencies, the CFI and ISED each have their own funding programs, with different rules, for different target groups, with different time frames. Some of these programs are jointly administered, such as the Canada First Research Excellence Fund, or the New Frontiers in Research Fund, which is the responsibility of the three councils. Dr. John Pomeroy told the Committee how difficult it is to have to be "acronym surfers" in order to secure funding.⁶² The Committee heard that the way granting councils are organized around disciplinary boundaries could make it challenging to fund certain interdisciplinary research projects.⁶³

61 SRSR, *Evidence*, 1 March 2022, 2005 (Quirion).

62 SRSR, *Evidence*, 8 February 2022, 1935 (Pomeroy).

63 Ibid., 2020 (Goel); Ibid., 2000 (Pomeroy).

Witnesses acknowledged that progress has been made on support for research since the 2017 Advisory Panel on Federal Support for Fundamental Science report.⁶⁴ After being eliminated in 2008, the position of Chief Science Adviser was restored in 2017, and the federal government established the CRCC to promote greater coordination among the granting agencies. This structure in particular made significant progress, as seen by the creation of joint programs and a Tri-Agency Interdisciplinary Peer Review Committee.⁶⁵

That said, several solutions to improve the current ecosystem were presented.

A few witnesses were disappointed that the government never established a National Advisory Council on Research and Innovation as recommended by the Advisory Panel on Federal Support for Fundamental Science report,⁶⁶ which said that such a body would be able to “provide broad oversight of the federal research and innovation ecosystems.”⁶⁷ Dr. Nemer told the Committee that these types of institutions are in place in other countries, where “they’re helping in providing strategic advice to government in terms of either areas that need further attention or specific activities.”⁶⁸ In 2019 the government began establishing a science and innovation council, but none of the witnesses was able to tell the Committee what became of it.⁶⁹

Other witnesses raised the possibility of making the Chief Science Adviser position permanent by enshrining its mandate in legislation, as is the case for the Chief Scientist in Quebec and in some foreign countries.⁷⁰

Another suggestion was to consider creating the position of Parliamentary Science Officer.⁷¹ The Chief Science Adviser told the Committee that there is such an office in the

64 Evidence for Democracy, *Written Submission*, Brief submitted to the House of Commons Standing Committee on Science and Research, 9 February 2022; SRSR, *Evidence*, 22 March 2022, 1905 (Ms. Farah Qaiser, Director, Research and Policy, Evidence for Democracy); and SRSR, *Evidence*, 15 February 2022, 1955 (Naylor).

65 SRSR, *Evidence*, 15 February 2022, 1900 (Adem); *Ibid.*, 1930 (Dr. Ted Hewitt, President, Social Sciences and Humanities Research Council); and *Ibid.*, 1955 (Naylor).

66 SRSR, *Evidence*, 8 February 2022, 1925 (Nemer); SRSR, *Evidence*, 15 February 2022, 2005 (Naylor); and Evidence for Democracy, *Written Submission*, Brief submitted to the House of Commons Standing Committee on Science and Research, 9 February 2022.

67 Advisory Panel on Federal Support for Fundamental Science, *Investing in Canada’s Future: Strengthening the Foundations of Canadian Research*, 10 April 2017, p. 62.

68 SRSR, *Evidence*, 8 February 2022, 1925 (Nemer).

69 SRSR, *Evidence*, 17 February 2022, 1855 (Vats); and SRSR, *Evidence*, 22 March 2022, 1900 (Qaiser).

70 SRSR, *Evidence*, 8 February 2022, 1900 (Nemer); and SRSR, *Evidence*, 22 March 2022, 1840 (Maxwell).

71 SRSR, *Evidence*, 8 February 2022, 1910 (Nemer); SRSR, *Evidence*, 22 March 2022, 1925 (Maxwell).



U.K. and that “certainly all decision-making and parliamentarians would most likely benefit from something like this.”⁷² The organization Evidence for Democracy also recommends “expanding the science and research capacity in the Library of Parliament.”⁷³

The option of bringing the three granting councils closer together or even integrating them into a single structure was discussed. In Quebec, for example, the three research funding agencies were merged in 2011 under the Fonds de recherche du Québec, headed by the Chief Scientist of Quebec.⁷⁴ The Advisory Panel on Federal Support for Fundamental Science report recommends undertaking “a comprehensive review to modernize and, where possible, harmonize the legislation for the four agencies that support extramural research.”⁷⁵ Dr. David Naylor was disappointed that this did not occur.⁷⁶ Similarly, the possibility of establishing a one-stop approach for funding applications was also raised.⁷⁷ However, not all witnesses supported combining the three councils, with some highlighting the advantage of maintaining three separate councils to better reflect the diversity of scientific disciplines and perspectives from one province to the next.⁷⁸

The Committee therefore recommends:

Recommendation 3

That the Government of Canada make the Chief Science Adviser position permanent by enshrining its mandate in an Act of Parliament.

Recommendation 4

That the Government of Canada review the advisability of more closely integrating the programming of the Social Sciences and Humanities Research Council of Canada,

72 SRSR, [Evidence](#), 8 February 2022, 1910 (Nemer).

73 SRSR, [Evidence](#), 22 March 2022, 1840 (Maxwell).

74 SRSR, [Evidence](#), 15 February 2022, 1910 (Strong); *Ibid.* (Adem); and *Ibid.* (Hewitt).

75 Advisory Panel on Federal Support for Fundamental Science, [Investing in Canada’s Future: Strengthening the Foundations of Canadian Research](#), 10 April 2017, p. 77.

76 SRSR, [Evidence](#), 15 February 2022, 1955 (Naylor).

77 SRSR, [Evidence](#), 8 February 2022, 2000 (Goel).

78 SRSR, [Evidence](#), 15 February 2022, 1910 (Adem); and *Ibid.*, 1910 (Hewitt).

the Natural Sciences and Engineering Research Council of Canada and the Canadian Institutes of Health Research to strengthen their cooperation and align their policies.

Properly Funding Research

The Committee heard extensively about research funding.

The evidence received by the Committee was unanimous in stating that more funding for research and science is needed in Canada. Many witnesses pointed to the decline in the level of R&D investment in Canada relative to GDP over the past two decades, at a time of increasing international competition.⁷⁹

Some witnesses welcomed the investments made in Budget 2018.⁸⁰ However, some of the funding announced in 2018 is coming to an end.⁸¹ Inflation has also eroded some of the impact. Similarly, the government's announced investments in biomanufacturing and life sciences were welcomed, but it was noted that this is a one-time, sectoral initiative.⁸²

Consequently, all witnesses recommend that the government increase its investments in science and research. Several said that Canada should increase its R&D expenditures in order to catch up with the OECD or G7 average.⁸³

A number of areas were specifically identified by witnesses.

79 For example, SRSR, [Evidence](#), 10 February 2022, 1840 (Charbonneau); SRSR, [Evidence](#), 17 February 2022, 1945 (Davidson); SRSR, [Evidence](#), 1 March 2022, 1935 (Quirion); and Canadian Association for Neuroscience, [Increased investment in scientific research: An investment in the health and prosperity of Canadians today and tomorrow](#), Brief submitted to the House of Commons Standing Committee on Science and Research, 2022.

80 For example, SRSR, [Evidence](#), 17 February 2022, 2000 (Davidson); and SRSR, [Evidence](#), 22 March 2022, 1955 (Kerr).

81 SRSR, [Evidence](#), 17 February 2022, 2030 (Davidson).

82 SRSR, [Evidence](#), 10 February 2022, 1905 (Charbonneau); and SRSR, [Evidence](#), 15 February 2022, 2005 (Naylor).

83 For example, SRSR, [Evidence](#), 17 February 2022, 1945 (Davidson); SRSR, [Evidence](#), 1 March 2022, 1935 (Quirion); and SRSR, [Evidence](#), 31 March 2022, 1845 (Eaves).



Greater Resources for Granting Councils

In the area of fundamental research, the Chief Scientist of Quebec, Dr. Rémi Quirion, remarked that Canada was lagging behind other countries.⁸⁴ He believes that Canada has not adequately reinvested in fundamental research in the three granting councils since the release of the Advisory Panel on Federal Support for Fundamental Science report, estimating the shortfall at \$1.3 billion.⁸⁵ A number of witnesses and organizations recommend that the government reinvest in fundamental research.⁸⁶

Universities Canada proposed an investment of \$1.12 billion over five years for the funding agencies and \$100 million per year to fund new research chairs.⁸⁷ The Canadian Association of University Teachers recommends that the government “increase investments in basic science by \$600 million and commit an additional \$185 million to base funding per year ongoing, to fully implement the recommendations of the 2017 report.”⁸⁸ The Canadian Society for Molecular Biosciences would like to see the government increase investment in science and discovery research by 25%.⁸⁹

The Canadian Association for Neuroscience called for an initial 25% boost to the budgets of the three granting councils followed by a 10% yearly increase.⁹⁰

84 SRSR, *Evidence*, 1 March 2022, 2005 (Quirion).

85 Ibid., 1935.

86 For example, SRSR, *Evidence*, 8 February 2022, 1835 (Nemer); HealthCareCAN, *Submission to the Standing Committee on Science and Research: Study on the Successes, Challenges and Opportunities for Science in Canada*, 17 February 2022; Canadian Society for Molecular Biosciences, *Boosting Investment in Scientific Research: An Important Piece for Post-COVID 19 Economic Recovery Readiness and for Meeting Future Challenges*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022; and Canadian Association for Neuroscience, *Increased investment in scientific research: An investment in the health and prosperity of Canadians today and tomorrow*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022.

87 SRSR, *Evidence*, 17 February 2022, 2010 (Ms. Ann Mainville-Neeson, Vice-President, Policy and Government Relations, Universities Canada).

88 Canadian Association of University Teachers, *Successes, Challenges and Opportunities for Science in Canada. Submission to the Standing Committee on Science and Research*, February 2022.

89 Canadian Society for Molecular Biosciences, *Boosting Investment in Scientific Research: An Important Piece for Post-COVID 19 Economic Recovery Readiness and for Meeting Future Challenges*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022.

90 Canadian Association for Neuroscience, *Increased investment in scientific research: An investment in the health and prosperity of Canadians today and tomorrow*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022.

As for the funding allocated to the three granting councils, some witnesses believe that special attention should be paid to funding for social science research.⁹¹

The Committee therefore recommends:

Recommendation 5

That the Government of Canada review and increase its investments in fundamental research through increases to the budgets of the three granting councils.

Importance of Funding Continuity

Several witnesses drew to the Committee's attention the importance of funding continuity for conducting research.⁹² Dr. Vivek Goel said that "we have different cycles of programs that lead to people having to constantly reinvent themselves."⁹³ Dr. Stéphanie Michaud illustrated this using the BioCanRx network as an example. This network received funding through the Networks of Centres of Excellence Program, which ended in December 2018. BioCanRx secured reduced funding through spring 2023. The network will be able to maintain its Network of Centres of Excellence status through 2024 by being self-funded. According to Dr. Michaud, unless the network secures new funding from the Strategic Science Fund after that date, there will be departures from the team and a complete shutdown of its clinical trial activities.⁹⁴

The Committee therefore recommends:

Recommendation 6

That the Government of Canada consider creating mechanisms to improve continuity of funding or to facilitate the renewal of funding provided by the three granting councils.

91 SRSR, *Evidence*, 1 March 2022, 1840 (Singh); SRSR, *Evidence*, 15 February 2022, 1930 (Hewitt); and SRSR, *Evidence*, 31 March 2022, 2020 (McIsaac).

92 SRSR, *Evidence*, 8 February 2022, 1935 (Pomeroy); *Ibid.*, 1945 (Goel); and SRSR, *Evidence*, 10 February 2022, 1855 (Myers).

93 SRSR, *Evidence*, 8 February 2022, 2000 (Goel).

94 SRSR, *Evidence*, 31 March 2022, 1855 and 1925 (Dr. Stéphanie Michaud, President and Chief Executive Officer, BioCanRx).



Revitalization of Graduate and Postdoctoral Scholarships

Several witnesses were critical of the stagnation in the number and amounts of graduate and postdoctoral scholarships provided by the three funding councils. According to Universities Canada, “the individual value of the federal scholarships and fellowships for these individuals has not increased since 2010. The accessibility of these scholarships and fellowships has also generally declined with more students competing for the same number of awards.”⁹⁵

A number of witnesses pointed out that the actual value of scholarships has largely diminished over the years due to inflation.⁹⁶ According to Dr. Jeremy Kerr, “such scholarships help enormously, but they are falling increasingly far below the poverty line. They are also incredibly hard to get. The resulting hypercompetition imposes a filter that excludes many talented people from pursuing their dreams of contributing as a scientist.”⁹⁷ Another witness linked stagnation in graduate student scholarships to the fact that Canada ranks 28th in the OECD in graduate degree attainment.⁹⁸

The U15 Group recommends tripling the number of graduate student scholarships and increasing the amounts.⁹⁹ Universities Canada calls for doubling the number of awards available for graduate students and post-doctoral fellows and to increase their value by 25%, which would amount to an investment of \$770 million over five years.¹⁰⁰ The Science and Policy Exchange and the Toronto Science Policy Network urge abolishing the Vanier and Banting Awards and redirecting funds toward increasing the number and value of Canada Graduate Scholarships and postdoctoral fellowships.¹⁰¹

The Committee therefore recommends:

95 Universities Canada, *Additional Evidence to Submit to the House of Commons Standing Committee on Science and Research*.

96 For example, SRSR, *Evidence*, 8 February 2022, 1945 (Patry); SRSR, *Evidence*, 15 February 2022, 1915 (Adem); SRSR, *Evidence*, 1 March 2022, 1945 (Murphy); and Science and Policy Exchange, and Toronto Science Policy Network, *Joint Brief*, Brief submitted to the House of Commons Standing Committee on Science and Research, 22 February 2022.

97 SRSR, *Evidence*, 22 March 2022, 1940 (Kerr).

98 SRSR, *Evidence*, 1 March 2022, 1945 (Murphy).

99 SRSR, *Evidence*, 8 February 2022, 2010 (Patry).

100 Universities Canada, *Additional Evidence to Submit to the House of Commons Standing Committee on Science and Research*.

101 Science and Policy Exchange, and Toronto Science Policy Network, *Joint Brief*, Brief submitted to the House of Commons Standing Committee on Science and Research, 22 February 2022.

Recommendation 7

That the Government of Canada increase the number of scholarships and fellowships to graduate students and postdoctoral researchers and increase their value by 25% and index it to the consumer price index.

Recommendation 8

That the Government of Canada index science funding, including the value of scholarships and fellowships to graduate students and post-doctoral researchers, to the consumer price index on an ongoing basis.

Better Recognition of Indirect Costs of Research

Another funding-related issue brought to the Committee's attention involves the indirect costs of research.¹⁰² The federal Research Support Fund covers part of these indirect costs, such as those attributed to the management and administration of the research enterprise, maintenance of research equipment and facilities, regulatory requirements and accreditation, and costs related to intellectual property.¹⁰³

According to HealthCareCAN, federal funding does not cover part of the indirect costs of research: "[T]he current level of coverage for indirect costs is 22%. For larger institutions it's 18-19%. Quite a bit lower than the 40%-60% reimbursement range received by our American counterparts."¹⁰⁴ The Canadian Society for Molecular Biosciences recommends "that the government increase its investment in the Research Support Fund, over four years, to an additional \$478 million."¹⁰⁵

Universities Canada recommends an investment of \$135 million per year in research security and an investment of \$500 million over five years for the greening of campuses.¹⁰⁶

102 SRSR, *Evidence*, 10 February 2022, 1840 (Charbonneau); and SRSR, *Evidence*, 31 March 2022, 2020 (Smith).

103 Government of Canada, *Research Support Fund, Eligible and ineligible indirect cost expenditures*.

104 HealthCareCAN, *Submission to the Standing Committee on Science and Research: Study on the Successes, Challenges and Opportunities for Science in Canada*, 17 February 2022.

105 Canadian Society for Molecular Biosciences, *Boosting Investment in Scientific Research: An Important Piece for Post-COVID 19 Economic Recovery Readiness and for Meeting Future Challenges*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022.

106 SRSR, *Evidence*, 17 February 2022, 2010 (Mainville-Neeson).



The Committee therefore recommends:

Recommendation 9

That the Government of Canada consider improving how the indirect costs of research are taken into account in the funding provided by granting councils and the Canada Foundation for Innovation.

Promoting the Commercialization of Research

As noted earlier, industry R&D expenditures as a percentage of GDP in Canada are the lowest in the G7. The Committee heard a number of possible solutions to rectify this situation.

Jim Balsillie, on behalf of the Council of Canadian Innovators, told the Committee that he believes this business investment deficit is related to the issue of intellectual property: “We invest in science and research and developing ideas that have significant commercial potential, and then we either squander them or give them away.”¹⁰⁷ He recommends to the Committee that the Economic Council of Canada be re-established. He also recommends “[creating] provisions for research agreements in line with what our Five Eyes partners have done. Properly delineate strategic technologies requiring oversight and regulation that are developed out of publicly funded research.”¹⁰⁸ Lastly, he believes that there is a need to “invest in IP collectives that can provide professional, centralized resources for the science and research community.”¹⁰⁹ The Committee notes that in Budget 2022 the government announced an investment of \$96.6 million over five years starting in 2022-2023 and \$22.9 million ongoing in a series of initiatives to strengthen Canada’s intellectual property regime.¹¹⁰

Another witness called for a review of the Scientific Research and Experimental Development (SR&ED) Program, designed to encourage Canadian companies to invest in R&D through three forms of tax incentives: an income tax deduction, an investment tax credit, and, in certain circumstances, a refund.¹¹¹ The Committee notes that in

107 SRSR, *Evidence*, 22 March 2022, 1835 (Mr. Jim Balsillie, Co-Founder and Chair, Council of Canadian Innovators).

108 Ibid.

109 Ibid.

110 Government of Canada, *A Plan to Grow Our Economy and Make Life More Affordable*, p. 75.

111 SRSR, *Evidence*, 8 February 2022, 2005 (Patry); Government of Canada, *Scientific research and experimental development tax incentive – Overview*.

Budget 2022 the government announced that it intends to undertake a review of the SR&ED program, “first to ensure that it is effective in encouraging R&D that benefits Canada, and second to explore opportunities to modernize and simplify it.”¹¹²

Some witnesses felt that the links between government research, university research and industry should be strengthened.¹¹³ Several of them suggest, for example, that funding needs to be in place from the outset to develop research ideas, by involving industry and commercial partners in the early stages of research.¹¹⁴

Dr. Gail Murphy told the Committee that researchers need to be better educated and supported on how to bring forward ideas that could actually be commercialized. This could be some kind of financial support to help develop “skills that are not just the research side of the skills, but the skills for seeing what the product could be out of that research, doing the product fit, building out the marketing and expertise in terms of running a company.”¹¹⁵

The Committee heard several examples of successes in various parts of the research ecosystem. Dr. Allen Eaves discussed the achievements of STEMCELL Technologies Inc. in the field of biotechnology. Dr. Robert Myers presented the work of the Perimeter Institute for Theoretical Physics, an independent research centre that is supported by the federal government and provincial and private partners.¹¹⁶ He said that the institute is “at the end of fundamental research, but we connect with people who are doing experiments and we connect with people who are looking for applications.”¹¹⁷

The Committee also learned about Canada’s Global Nexus for Pandemics and Biological Threats, a research partnership model developed at McMaster University.¹¹⁸ This

112 Government of Canada, *A Plan to Grow Our Economy and Make Life More Affordable*, p. 70.

113 For example, SRSR, *Evidence*, 8 February 2022, 2005 (Patry); SRSR, *Evidence*, 17 February 2022, 1900 (Vats); *Ibid.*, 2000 (Gerdts); and SRSR, *Evidence*, 22 March 2022, 1935 (Winter).

114 SRSR, *Evidence*, 15 February 2022, 1900 (Strong); and SRSR, *Evidence*, 17 February 2022, 2005 (Gerdts).

115 SRSR, *Evidence*, 1 March 2022, 2020 (Murphy).

116 SRSR, *Evidence*, 10 February 2022, 1830 (Myers).

117 *Ibid.*, 1855.

118 SRSR, *Evidence*, 15 February 2022, 1945 (Mossman); and *Ibid.*, 2000 (Dr. Gerry Wright, Director, Michael G. DeGroot Institute for Infectious Disease Research, and Lead, Canada’s Global Nexus for Pandemics and Biological Threats, McMaster University).



network connects academic researchers, government and industry to bring together the best pandemic expertise and foster collaboration.¹¹⁹

Supporting Research in Colleges, CEGEPS and Institutes

Another type of actor also plays an important role in the collaboration between research and business: colleges, CEGEPs and institutes.

The Committee learned that 95% of Canadians and 86% of Indigenous peoples live within 50 kilometres of a college campus.¹²⁰ These institutions, which have deep ties to their community, are increasingly active in research. According to Dr. Marc Nantel, 90% of the 140 colleges across Canada conduct applied research.¹²¹ The contributions of these institutions are twofold: they train students for careers in science and technology across Canada; and they conduct a form of applied research directly linked to local businesses.¹²²

The applied research carried out in these institutions have three unique features: “[T]he research question is driven by the partner; the partner retains the intellectual property; and we develop solutions quickly, with 85% of projects being completed in under one year.”¹²³ By partnering with often small and medium-sized businesses, colleges are able to secure private funding equal to federal investments.¹²⁴

Synchronex, the network of Quebec’s 59 College Centres for Technology Transfer and Innovative Social Practices (CCTTs), presented the work of Quebec’s college-affiliated research and innovation centres. Each year CCTTs work with 6,000 businesses on 10,000 innovation projects.¹²⁵ This success story has inspired the rest of the country, since in 2010, “NSERC decided to create similar centres affiliated with colleges and institutes across Canada: Technology Access Centres, or TACs.”¹²⁶

119 SRSR, [Evidence](#), 15 February 2022, 1945 (Mossman).

120 SRSR, [Evidence](#), 22 March 2022, 1945 (Ms. Denise Amyot, President and Chief Executive Officer, Colleges and Institutes Canada).

121 SRSR, [Evidence](#), 1 March 2022, 1910 (Nantel).

122 Ibid.

123 SRSR, [Evidence](#), 22 March 2022, 1945 (Amyot).

124 Ibid.

125 SRSR, [Evidence](#), 1 March 2022, 1940 (Ms. Marie Gagné, Chief Executive Officer, Synchronex).

126 Ibid.

However, there have been a number of challenges. Although the NSERC College and Community Innovation Program has provided some support, these investments represent only about 2% of the total tri-council support for postsecondary research, with the remaining 97% going to universities.¹²⁷ Several witnesses called for this to be increased in order to better support college research.¹²⁸

Specifically, Synchronex stated that a minimum of 225 TACs need to be recognized, as initially planned by NSERC, including the 59 CCTTs in Quebec. Each TAC, including the CCTTs, needs \$350,000 in recurring annual funding, which would mean annual funding of \$80 million.¹²⁹

It was also pointed out that the Government of Canada does not recognize the indirect costs of research at the college level, requiring colleges to cover these costs themselves.¹³⁰ According to Synchronex, federal funding should include an additional 46% to cover these costs.¹³¹

The Committee therefore recommends:

Recommendation 10

That the granting councils recognize a minimum of 225 technology access centres, including Quebec's 59 college centres for technology transfer and innovative social practices, under the College and Community Innovation Program.

Recommendation 11

That the Government of Canada include part of the indirect costs of research in the research funding granted to colleges and that the granting councils reform the structure of the grants to better accommodate the research application model in Canada's colleges, CEGEPs and polytechnics.

127 Ibid., 1830 (Nantel).

128 Ibid.; SRSR, *Evidence*, 22 March 2022, 1945 (Mr. Don Lovisa, President, Durham College, Colleges and Institutes Canada); and Synchronex, *Applied Research in Colleges: An Essential Tool For Transforming Academic Knowledge into Collective Wealth*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022.

129 Synchronex, *Applied Research in Colleges: An Essential Tool For Transforming Academic Knowledge into Collective Wealth*, Brief submitted to the House of Commons Standing Committee on Science and Research, 2022.

130 SRSR, *Evidence*, 1 March 2022, 1925 (Nantel).

131 Synchronex, Written response to questions, 17 March 2022.



Supporting Science in the Regions

Other witnesses stressed the need to support research institutions outside major cities. Dr. Pomeroy summed it up this way: “[T]here’s a wealth of capacity that comes from rural Canada that will be crucial for our science moving forward.”¹³² The value of the scientific contribution made by small and medium-sized research institutions outside major cities was brought up by several witnesses.¹³³ François Deschênes said that “quite often, that research reflects the circumstances in the community, which means that we are developing knowledge that is transferrable within those regions, and that is important.”¹³⁴

However, these institutions often have trouble accessing research funding. One witness said that some of the excellence measurement criteria used for allocating funding put smaller institutions at a disadvantage.¹³⁵ For instance, quotas established for the CFI and the Canada Research Chairs Program are often based on past federal grants received.¹³⁶ One witness believes that some of these criteria need to be reviewed so that they evaluate potential, not past excellence.¹³⁷ According to Dr. Adel El Zaïm, what is needed is to “simplify procedures, thereby giving small universities more means.”¹³⁸

Witnesses also brought up the fact that some federal grants do not cover the entire amount of the projects they support but require matching funds from another partner. This kind of arrangement is problematic for less-resourced research institutions.¹³⁹ According to Dr. Victor Rafuse, this type of inequity is especially problematic when it comes to the largest grants, such as those provided by the CFI: “To say the CFI is true federal funding, in my opinion, is not accurate. It advantages the wealthier provinces over others.”¹⁴⁰

132 SRSR, [Evidence](#), 8 February 2022, 1955 (Pomeroy).

133 For example, SRSR, [Evidence](#), 15 February 2022, 1940 (Dr. Tim Kenyon, Vice-President, Research, Brock University); and SRSR, [Evidence](#), 1 March 2022, 1850 (Nantel).

134 SRSR, [Evidence](#), 31 March 2022, 1840 (Mr. François Deschênes, Rector, Université du Québec à Rimouski, Université du Québec).

135 Ibid., 1855 (Deschênes).

136 Ibid.

137 Ibid.

138 SRSR, [Evidence](#), 1 March 2022, 1835 (Dr. Adel El Zaïm, Vice-President, Research, Creation, Partnership and Internationalisation, Université du Québec en Outaouais).

139 SRSR, [Evidence](#), 31 March 2022, 1855 (Deschênes); and Ibid., 1940 (Rafuse).

140 SRSR, [Evidence](#), 31 March 2022, 1940 (Rafuse).

The Committee therefore recommends:

Recommendation 12

That the Government of Canada study how the criteria used by the granting councils to evaluate excellence affect the ability of research institutions outside major cities to secure federal funding and consider new funding models to remedy any disproportionality in funding allocation between universities based on regionality.

INVESTING IN PEOPLE

Based on all the evidence heard, Canada has an exceptional ability to compete globally, provided that it gives itself the means to do so.

As a number of witnesses pointed out, “fundamentally, investing in research is about investing in people.”¹⁴¹ Attracting and training future researchers was identified as a critical challenge for Canada.¹⁴² For the Chief Science Adviser of Canada, in order to keep young researchers and scientists in Canada, they need to be given career opportunities.¹⁴³ According to another witness, “an appreciation for a university education [needs to be] developed in young people.”¹⁴⁴

Another point that emerged from the evidence is that Canada should continue its work to promote equity, diversity and inclusion in science in order to tap into the country’s full range of talent.¹⁴⁵ Several aspects of this point were raised. Dr. Singh called on the Committee “to consider creating a better funding model that galvanizes the partnerships between universities and Indigenous communities to create a better and prosperous way of life for our Indigenous peoples in Canada.”¹⁴⁶ Dr. Murphy discussed what was being done to get more women involved in science and research.¹⁴⁷ The Committee also heard about linguistic and regional disparities. Several witnesses discussed the challenges that researchers working in French encounter when trying to get published or

141 SRSR, [Evidence](#), 17 February 2022, 1945 (Davidson); and SRSR, [Evidence](#), 8 February 2022, 1945 (Patry).

142 SRSR, [Evidence](#), 10 February 2022, 1840 (Charbonneau).

143 SRSR, [Evidence](#), 8 February 2022, 1905 (Nemer).

144 SRSR, [Evidence](#), 1 March 2022, 1855 (El Zaïm).

145 For example, SRSR, [Evidence](#), 22 March 2022, 1940 (Kerr).

146 SRSR, [Evidence](#), 1 March 2022, 1840 (Singh).

147 Ibid., 2005 (Murphy).



have funding applications assessed.¹⁴⁸ François Deschênes also felt that regional disparities must be taken into account when assessing the potential of research projects.¹⁴⁹

The Committee therefore recommends:

Recommendation 13

That the Government of Canada step up its efforts in support of equity, diversity and inclusion in the research ecosystem in order to tap into all of the talent available in Canada.

148 Ibid., 1905 (El Zaïm); and SRSR, [Evidence](#), 31 March 2022, 1920 (Deschênes).

149 SRSR, [Evidence](#), 31 March 2022, 1855 (Deschênes).

APPENDIX A LIST OF WITNESSES

The following table lists the witnesses who appeared before the committee at its meetings related to this report. Transcripts of all public meetings related to this report are available on the committee’s [webpage for this study](#).

Organizations and Individuals	Date	Meeting
As an individual	2022/02/08	3
Dr. John Pomeroy, Distinguished Professor and Canada Research Chair University of Saskatchewan		
Canada Foundation for Innovation	2022/02/08	3
Dr. Roseann O'Reilly Runte, President and Chief Executive Officer		
Office of the Chief Science Advisor	2022/02/08	3
Dr. Mona Nemer, Chief Science Advisor		
U15 Group of Canadian Research Universities	2022/02/08	3
Dr. Gilles Patry, Executive Director		
University of Waterloo	2022/02/08	3
Dr. Vivek Goel, President and Vice-Chancellor		
Perimeter Institute for Theoretical Physics	2022/02/10	4
Dr. Robert Myers, Director		
University of Ottawa	2022/02/10	4
Dr. Sylvain Charbonneau, Vice-President Research and Innovation, University of Ottawa		
University of Saskatchewan	2022/02/10	4
Dr. Angela Bedard-Haughn, Dean and Professor College of Agriculture and Bioresources, University of Saskatchewan		
As an individual	2022/02/15	5
Dr. David Naylor, Professor University of Toronto		

Organizations and Individuals	Date	Meeting
Brock University Dr. Tim Kenyon, Vice-President Research	2022/02/15	5
Canadian Institutes of Health Research Dr. Michael J. Strong, President	2022/02/15	5
Dr. Gerry Wright, Director Michael G. DeGroot Institute for Infectious Disease Research, and Lead, Canada's Global Nexus for Pandemics and Biological Threats	2022/02/15	5
Natural Sciences and Engineering Research Council Dr. Alejandro Adem, President	2022/02/15	5
Social Sciences and Humanities Research Council Dr. Dominique Bérubé, Vice-President Research Dr. Ted Hewitt, President	2022/02/15	5
Department of Industry Dr. Nipun Vats, Assistant Deputy Minister Science and Research Sector	2022/02/17	6
Genome Canada Dr. Robert Annan, President and Chief Executive Officer Pari Johnston, Vice-President Policy and Public Affairs	2022/02/17	6
National Research Council of Canada Dr. Shannon Quinn, Secretary General Dr. Danial Wayner, Departmental Science Advisor	2022/02/17	6
Universities Canada Paul Davidson, President and Chief Executive Officer Ann Mainville-Neeson, Vice-President Policy and Government Relations	2022/02/17	6
Vaccine and Infectious Disease Organization - International Vaccine Centre Dr. Volker Gerds, Director and Chief Executive Officer	2022/02/17	6

Organizations and Individuals	Date	Meeting
Government of Quebec Dr. Rémi Quirion, Chief Scientist Chief Scientist Office of Quebec	2022/03/01	7
Niagara College Dr. Marc Nantel, Vice-President Research and External Relations	2022/03/01	7
Synchronex Marie Gagné, Chief Executive Officer	2022/03/01	7
Université du Québec en Outaouais Dr. Adel El Zaïm, Vice-President Research, Creation, Partnership and Internationalisation	2022/03/01	7
University of British Columbia Dr. Gail Murphy, Vice-President Research and Innovation	2022/03/01	7
University of Saskatchewan Dr. Baljit Singh, Vice-President Research	2022/03/01	7
As an individual Dr. Ken Coates, Professor Johnson-Shoyama Graduate School of Public Policy, University of Saskatchewan Dr. Jeremy T. Kerr, Professor of Biology Faculty of Science, University Research Chair, University of Ottawa Dr. Alan E. Winter, Former British Columbia Innovation Commissioner	2022/03/22	8
Colleges and Institutes Canada Denise Amyot, President and Chief Executive Officer Don Lovisa, President Durham College	2022/03/22	8
Council of Canadian Innovators Jim Balsillie, Co-Founder and Chair	2022/03/22	8

Organizations and Individuals	Date	Meeting
Evidence for Democracy Rachael Maxwell, Executive Director Farah Qaiser, Director Research and Policy	2022/03/22	8
As an individual Dr. Jessie-Lee Mclsaac, Assistant Professor Canada Research Chair in Early Childhood: Diversity and Transitions, Mount Saint Vincent University	2022/03/31	9
BioCanRx Dr. John Bell, Scientific Director Dr. Stéphanie Michaud, President and Chief Executive Officer	2022/03/31	9
Brain Repair Centre Dr. Victor Rafuse, Director and Professor Dalhousie University	2022/03/31	9
STEMCELL Technologies Inc. Dr. Allen Eaves, President and Chief Executive Officer	2022/03/31	9
TRIUMF Dr. Nigel Smith, Executive Director	2022/03/31	9
Université du Québec Etienne Carbonneau, Director Support for Internationalization and Government Relations Senior Advisor François Deschênes, Rector Université du Québec à Rimouski	2022/03/31	9

APPENDIX B LIST OF BRIEFS

The following is an alphabetical list of organizations and individuals who submitted briefs to the committee related to this report. For more information, please consult the committee's [webpage for this study](#).

Active Leaders of Love

BioCanRx

Canadian Association for Neuroscience

Canadian Association of University Teachers

Canadian Brain Research Strategy

Canadian Society for Molecular Biosciences

Evidence for Democracy

HealthCareCAN

Let's Talk Science

Microbix Biosystems Inc.

MindFuel

Research Canada: An Alliance for Health Discovery

Science and Policy Exchange

Synchronex

The Arthritis Society

Toronto Science Policy Network

Université du Québec à Rimouski

REQUEST FOR GOVERNMENT RESPONSE

Pursuant to Standing Order 109, the committee requests that the government table a comprehensive response to this Report.

A copy of the relevant *Minutes of Proceedings* ([Meetings Nos. 3 to 9 and 12](#)) is tabled.

Respectfully submitted,

Hon. Kirsty Duncan, P.C., M.P.
Chair

Supplementary Report
New Democratic Party of Canada

While the New Democratic Party agrees in broad terms with the report on science and research in Canada, it feels that there are two areas where it could have been greatly improved.

First, the committee would have benefitted from a longer, more encompassing study of science in Canada. Many facets of Canadian science have yet to be studied by the committee and members would benefit through the provision of a broad baseline understanding of the scientific ecosystem in Canada. For instance, although university students and postdoctoral fellows are a critical part of academic research in Canada, no student groups were invited to testify before the committee. And although it is clear in the study's findings that private sector research is lagging in Canada, the committee heard from only two private sector witnesses. Similarly, while the government itself undertakes a considerable amount of scientific research through Statistics Canada, the Geological Survey of Canada, the Canadian Forest Service, the Canadian Wildlife Service and other agencies, only Industry Canada and the National Research Council testified on government's role in Canadian scientific research. Another sector that was not heard from is the large non-governmental organization research sector, including the rapidly expanding area of citizen science.

Secondly, it is disappointing that the committee did not recommend that Parliament create the position of Parliamentary Science Officer. In doing so, it did not heed the advice of both Dr. Mona Nemer, Canada's Chief Science Advisor, and Rachael Maxwell, Executive Director, Evidence for Democracy. Both these expert witnesses testified that Parliament would benefit from an independent source of scientific advice.¹ Most Parliamentarians do not have a scientific or technological background but, as has been illustrated by the Covid-19 Pandemic and the climate crisis, science and technology issues are increasingly integral to public policy. Daily, MPs and Senators are bombarded with lobbying, public enquiries and media stories about science and technology. It can be challenging for non-experts to determine the authority and accuracy of the scientific information provided and Parliamentarians are not well placed to identify poor quality information and are therefore vulnerable to erroneous data and deliberate misinformation.

It is difficult for Parliamentarians to rely on the Chief Science Advisor for scientific advice, as that office answers to the Prime Minister and the Minister of Innovation, Science and Industry

¹ SRSR, Evidence, 8 February 2022, 1910 (Dr. Mona Nemer, Chief Science Advisor).

SRSR, Evidence, 22 March 2022, 1840 (Rachael Maxwell, Executive Director, Evidence for Democracy).

for both subjects to study and reports to be produced. As such the advice could hardly be considered independent or easily accessible. "It is an ideal of democratic government that representatives should be independent of undesirable forces that might bias their judgment on public matters. In particular they should be free of the executive...." wrote University of Saskatchewan Political Science Professor Norman Ward.²

The Parliamentary Budget Officer was established in 2006 with a mission to "support Parliament in exercising its oversight role in the government's stewardship of public funds by ensuring budget transparency and promoting informed public dialogue with an aim to implement sound economic and fiscal policies in Canada." Since then, the PBO has provided Parliamentarians with an excellent source independent analysis, which often does not support that provided by government sources. In terms of scientific accountability, a Parliamentary Science Officer would provide similar support to Parliament in its oversight role.

Many national legislatures have either created an independent advisory body or rely upon a third-party organization for scientific advice. The best example of a parliamentary science office is the UK Parliamentary Office of Science and Technology (POST). It is governed by a board of 14 parliamentarians, plus four experts appointed by the UK's scientific academies. POST provides short evidence syntheses and briefs with rapid (1 –3 month) turnaround, as requested by Parliament. Sweden has established the Parliamentary Evaluation and Research Secretariat which is similar. Some European countries outsource the provision of science advice to parliament, for example:

- Austria's Institute for Technology Assessment, a consortium of the Austrian Academy of Sciences and the Austrian Institute of Technology;
- The Office of Technology Assessment at the German Bundestag, an independent scientific institution operated by the Institute of Technology Assessment and Systems Analysis of the Karlsruhe Institute of Technology;
- The Norwegian Board of Technology, which provides technology assessments for the Norwegian government and parliament; and
- The Foundation for Technical Assessment a publicly funded, non-profit body under the auspices of the Swiss Academies of Arts and Sciences, which provides advice to the Swiss Federal Council, parliament and administration.

² Norman Ward Assistant Professor In Political Science University Of Saskatchewan "The Canadian House Of Commons Representation" 1950 University Of Toronto Press Pg83

The New Democratic Party recommends that Parliament create the position of parliamentary science officer responsible for advising and reporting to Parliament on all matters relating to science and technology in Canada.

