Government Science and Innovation in the New Normal (GSINN)

A Summary Report of the Hindsight Exercise

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About Government Science and Innovation in the New Normal

In December 2020, the IOG launched *Government Science and Innovation in the New Normal (GSINN),* a multi-year, collaborative research initiative designed to support medium-term planning for the federal science and innovation departments and agencies, and provide an in-depth examination of the evolving relationship among science, innovation and society. GSINN organizes an examination of this evolving relationship into eight themes:

- Equity, Diversity and Inclusion;
- Global Research Collaboration and Infrastructure;
- Inclusive Innovation;
- Interdisciplinary, Indigenous and Other Ways of Knowing;
- Mission-Driven Research and Innovation;
- Science Communications, Outreach and Public Engagement;
- Skills and Knowledge; and,
- Trust, Integrity and Science Ethics.

The first phase of the GSINN initiative includes a hindsight exercise, multiple foresight workshops, and a discussion paper on each of the above listed themes. The discussion papers explore how government science and innovation can remain relevant in the new reality.

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Background

The Institute on Governance (IOG) has launched a multi-year, collaborative research initiative to support medium-term planning for the federal science and innovation departments and agencies. This initiative will undertake an in-depth examination of, and provide recommendations regarding, the evolving relationship among science, innovation, and society. In doing so, GSINN will help science-based departments and agencies prepare for the "new normal" that is emerging in part as a response to the pandemic.

Pending sufficient funding, the GSINN initiative will achieve its purpose through a five-stage research process: a hindsight workshop and consultations, foresight workshops, discussion papers, roundtable discussions, and a final policy paper. On 1 February, 2021, representatives from nine federal departments and agencies met to discuss the impact of the pandemic on their staff and operations (See Appendix A for a list of participating departments and Appendix B for the list of research questions; a companion document details 'What We Heard').

Between 25 January and 12 March, 2021, the IOG accepted supplemental responses to the questions in Appendix B and held additional roundtable discussions with scientists[1] to inform this research.

Introduction

When COVID-19 hit Canada, overnight the lives of Canadians changed. Public servants were asked to work from home with no advance warning. This had a great impact on the public sector overall, including federal Science Based Departments and Agencies (SBDAs).

Some federal labs, particularly those involved in fulfilling health and safety roles, continued to operate throughout the pandemic, but faced new restrictions and had to use work arounds to complete their work. Other federal labs were closed or shuttered, or reduced their operational capacity, including field work.

The purpose of this paper is threefold. First, we highlight the key messages (lessons learned) that can be drawn based on the experiences that science-based departments and agencies faced during the pandemic. Second, we summarize the salient points raised during the hindsight workshop and

[1] This report uses the shorthand "science" and "scientist" inclusively of all public servants supporting the science, technology and innovation activities of the federal public service.

subsequent consultations and explore them in more detail. Finally, we identify questions that can provide insights for looking to the future in how federal science and innovation can build back better.

What Have We Learned? Key Messages and Questions

The key messages capture the lessons learned during the first year of the global pandemic, where federal scientists had to work together in altered or changed working environments. Each section also raises questions that should be considered in future Business Continuity Plans and medium-term planning exercises.

Increased Complexity of Work: Despite a general move to reduce red tape for federal public servants during the pandemic, federal scientists generally experienced an increase in the complexity of their daily tasks as a result of new safety protocols designed to prevent the spread of SARS COV2. In many cases, scientists were also forced to make decisions in the early stages of the pandemic that will impact national datasets for years to come.

Resiliency, and its Limits: Government scientists rose to the challenge of the pandemic, and they continue to do so, with creativity and determination. However, they are tired and in need of respite and reinforcement. The work burden is unevenly distributed across the public service, and concerns about poor mental health are climbing. *How can the workload be better calibrated? How can the public service better protect the mental health of all its employees?*

Planning: Business Continuity Plans did not generally foresee a pandemic situation nor a long-term crisis. Several departments reported working “flat out” to: design new protocols and communications plans, acquire necessary PPE, reconfigure command structures, reduce red tape, etc. Future planning must include considerations for science, as both the tool that presents solutions and a means by which many critical regulatory functions are maintained. *How can departments collectively improve upon individual contingency plans in advance of the next crisis? How can the particular needs of science be better addressed?*

Infrastructure and Digital: IM/IT teams, in collaboration with Shared Services Canada, worked quickly to deploy computers and increase bandwidth and network access for employees. Digital tools were rolled out to promote virtual collaboration. For the most part, scientists are embracing new tools for remote work (including remote inspections), virtual training, and to replace international travel with virtual meetings, and more. However, scientific staff continue to face computing challenges. For example, digital infrastructure does not address the

need to access special equipment or materials in labs. *How will the scientific needs, especially of critical service laboratories, be built into the planning for future pandemic scenarios? How will the pandemic experience inform infrastructure planning and new laboratory design? Is this virtual environment a new, permanent part of the public service culture?*

Collaboration: Departments quickly scaled up communications to maintain ongoing collaborations within and across government, with Indigenous communities, provincial and territorial counterparts, academic and industry stakeholders, and to disseminate information that detailed how evergreening pandemic protocols impacted their work. In the early stages of the pandemic, high levels of uncertainty generated demand for information and collaboration that quickly outpaced the capacity of some individual organizations to meet those demands. Often organizations could not align or demonstrate the agility required to respond in a timely manner and connect their expertise efficiently. Eventually, digital tools were rolled out en masse to promote virtual collaboration. However, many teams noted that these tools – e.g., MS-Teams – are a poor replacement for in-person collaborations. *What is the next stage in managing research collaborations and allowing for serendipitous/ opportunistic collaborations? What are the next generation tools for collaborative work? How can those tools be adopted/adapted to different work environments? What are their limits? How do teams build trust and demonstrate reliability via digital tools?*

Inconsistent Career Development and Talent Management: The pandemic has shone a light on the ability of scientists in some functions/disciplines to advance their career while others are stagnating. Many of these drivers are beyond the control of individual scientists – such as their research has been deemed non-essential and put on hold, or because they lack child care or elder care – the pandemic is creating inequalities. The long-term impact of these inequalities is unclear, though it is clear that the impact is disproportionately affecting women, single parents, and those from low-income households. *How will the pandemic impact the talent renewal and career progression of federal scientists? What mechanisms – supports – can the federal government put in place to better support the careers of those who are disproportionately affected? What are the implications for the GoC's implementation of the Dimensions Charter and other initiatives to advance equity, diversity and inclusion in STEM?*

Barriers to Inter-Departmental Mobility: The pandemic created disproportionate demand for specific types of scientific expertise inside Health Canada and the Public Health Agency which are central to the Government's pandemic response. A lack of suitable HR mechanisms to rapidly deploy staff across departments on short-term assignments prevented staff with in-demand

skills to take up assignments at these departments. *Are there better ways to: Share personnel across departments? Improve inter-departmental transfer of security clearances? Share expertise across levels of government, or between government and academe?*

Highlights from the Pandemic Period

Public servants are the Government's greatest strength. The hindsight exercise generated many stories that illustrate the ingenuity, creativity, dedication and problem-solving skills of public servants delivering for Canadians. Since the early days of the pandemic, public servants have been working very long hours to decode and fight the novel coronavirus and to keep Canadians safe. This section highlights how SBDAs functioned during a time of crisis and uncertainty.

Public Service-wide

Effective Crisis Management and Communication: in the first weeks of the pandemic, multiple departments worked independently or in partnership to accomplish a significant amount of work in a very short time, e.g., overseeing the repatriation of travelers and quarantine sites, amending key legislative frameworks, issuing guidance documents, developing and delivering mass media campaigns, responding to the concerns raised by Canadians, producing daily epidemiological reports, supporting surge capacity needs, and developing and validating diagnostic tests for the virus. Departments that introduced practices to support this rapid pace are keeping them up as they promote good and timely communication.

Teams use all technologies available to them to promote regular, ongoing communication among colleagues and with collaborators and stakeholders across Canada and around the world.

Business Continuity Plans: The vast majority of departments and agencies reported the existence of BCPs that varied greatly in the types of scenarios envisioned. Many departments agreed that the BCPs on file provided a useful place from which to start, enabling teams to focus on high priority activities, and guided the development of pandemic protocols. However, no department or agency reported the existence of a BCP that envisioned a novel coronavirus nor a situation where staff would not have access to their facilities for months.

Experimentation and Enhanced Collaborations: The pace and urgency of the pandemic created a sense of opportunity for innovation and experimentation. Several teams are adapting their processes to the new reality (virtual and distributed). Inside departments, teams that would not normally collaborate are

seeking out ways to do so. As a result, employees are learning about each other's work. In some cases, collaborations serve to address capacity issues by matching under-utilized resources with those that are stretched beyond capacity. Intra-departmental collaboration and information-sharing also became a challenge early on in the pandemic. In response, the Chief Science Advisor mandated the creation of CanCOVID (Canada-wide network of health, science and policy researchers to facilitate COVID-19 research collaboration) by 1 April, 2020, to meet the government's needs.

Unclear Roles and Responsibilities: Confusion often emerged in assigning responsibility for new tasks that resulted because of the pandemic (e.g., identifying a central function to order, collect, and distribute PPE).

Government Research

Loss of Fieldwork: Some departments were forced to forego their fieldwork entirely, while others managed a late launch. The loss of fieldwork season means a loss of firsthand perspectives of the environment being assessed for environmental impact. Teams in this situation are relying on third-party environmental information or will have gaps in their knowledge. Some departments attempted digital interactions for fieldwork and inspections in remote areas, but internet infrastructure was often weak or non-existent outside urban areas. With time, other impacts on long-term datasets of losing a field season may emerge.

The Impacts on Labs: Public health directives in the early days of the pandemic severely limited science activities and operations. Scientists and other lab staff were unable to access their labs and special equipment to perform their duties and continue their research. Many labs – constrained by space, requirements for social distancing, and tools and instruments that could no longer be shared between colleagues – had to scale back their work to only that which was critical, including necessary testing and standards, audit work, care of livestock and insect colonies, and genetic material protection. All other lab-based projects were put on hold (and at the time of this writing, many remain on hold).

In a limited number of cases, labs worked with their IM/IT teams and or Shared Services to provide scientists with remote operation of their lab equipment. In labs that were not deemed an essential service scientists and researchers focused on data analysis and writing and publishing scientific papers. Technical staff focused on updating methodologies and procedures.

Among policy, program, and IM/IT teams, many stories emerged from the pandemic period about a willingness to take risk, to reduce administrative

burdens and “just go for it”. This is a stark contrast to the reality of operating a lab with just 30% of the regular staff contingent. Social distancing meant that in some labs, staff were undertaking procedures alone where they would have previously worked in small groups. To ensure staff safety at all times, labs introduced new procedures. These safety protocols created more red tape and contributed to much longer days for supervisors, e.g., a supervisor of one lab would receive text messages over a 14-hour period five (or more) days a week. Each text message had to be entered into a central tracking system that recorded staff whereabouts for safety purposes.

Regulatory Science

All SBDAs contributing to this initiative reported some degree of disruption across their core functions. Yet, the nature of the disruptions that each department, agency or lab experienced varied according to their location, mandate, human and financial resources, culture inside the lab, and even the individual decisions of the leadership team.

Many of the critical core functions upheld during the pandemic fall into regulatory science and related scientific activities (RSA). These include, for example, reviewing and certifying all ingredients in a piece of candy and the information on that candy label, the calibration of weight scales at a highway toll station, and the temperature at which gasoline is stored in a petrol tank.

Through the provision of these regulatory functions, the Government of Canada serves to assure Canadians of the quality of goods and services they receive and to comply with internationally recognized standards. As such, regulatory laboratories must continue to provide essential services while ensuring the safety of lab staff. For example:

- A relatively small lab in Ottawa has a unique RSA function to ensure that any good sold in Canada has been accurately measured prior to sale. This lab has operated without interruption since the onset of the pandemic by introducing an extensive list of protocols to ensure staff felt safe in the workplace. These protocols included extended operating hours to implement voluntary shift work, free on-site parking for staff, and distributing PPE for all staff.

- Food safety inspections continued without interruption during the pandemic. This important RSA function ensures that only food and cosmetics which meet federal safety guidelines find their way onto store shelves.

- One agency completely shifted how they worked in order to continue to fulfil their regulatory functions: only 30% of staff were allowed onsite; the lab expanded to include unused boardroom space to allow for social distancing; staff purchased extra equipment to make each station a self-contained unit; staff shared time-sensitive tasks across teams, based on who was in the lab at what time; management rewrote the safety protocols to consider the reduced staff numbers onsite.

Unintended, Negative Consequences of the Pandemic for Science Labs

In the following ways, decisions taken to protect employees against the COVID19 pandemic had a disproportionately negative impact on science teams.

- A lack of recognition by senior management of the uneven distribution of work between labs and programs/policy, or even inside a lab, has negatively impacted the morale of overworked staff; e.g., one laboratory returned to work on 23 March, 2020 and works extended hours to meet services that are considered essential, yet the lab team continually receives emails from corporate office about an eventual progressive return to work (which applies to other staff).

- Unfair distribution of training opportunities. In some departments, management created learning opportunities for staff who have very little work. Overworked (science) staff were not offered the same training opportunities.

- Many departments did not hire students in the summer/fall. For many labs, the loss of summer students limited their ability to undertake data collection and analysis, which have knock-on effects for the broader functions of labs. The extent of those effects is as yet unknown.

Human Resources

The pandemic created disproportionate demand for specific types of scientific expertise. This demand was felt most acutely at Health Canada and the Public Health Agency of Canada. To fill that demand, HC and PHAC issued requests for support to other SBDAs. Several departments and agencies indicated they responded to the calls, but there was no follow up. Subsequent conversations with HC and PHAC indicate significant barriers related to human resources management that prevented the rapid, short-term deployment of staff from one department to another, or from one level of government to another.

As a result, staff from inside HC and PHAC were re-assigned to pandemic-related files. In the short term, re-assignments met the extra demands for pandemic response but failure to address this ongoing demand for staff is driving a decrease in morale, staff burnout/exhaustion, and concerns around mental and physical health. It also complicates career progression and succession planning.

A Day in the Life…

It's 5:00am and Sara's alarm clock just went off. Today is the five-month anniversary of the pandemic. Sara is a lab supervisor. Since the second week of the pandemic she has been routinely working 15-hour days. Her staff are divided into groups that rotate through the lab on two seven-hour shifts each day. At 6am, Sarah's cell phone will start buzzing as the first shift of the day arrives at the lab. New safety protocols – revised in light of the pandemic – require her staff to check in every 20 minutes of their shift. Sara is in turn required to file those messages in a central tracker that monitors staff safety. These new measures come in addition to her regular work load. Sara's lab has been deemed an essential service, but she has not yet received approval to buy additional equipment that would allow her to reorganize the lab to promote social distancing and reduce lab hours and there is no HR mechanism to bring in short term support or relief for she and her team.

Sara fixes a pot of coffee and settles in at the kitchen table. These days her three-bedroom house doesn't quite feel large enough for her family. But for the next hour she'll have the house to herself. Then her kids and husband will join her in the main living area. The kids will be at school this week, mercifully. She and Peter can share the kitchen table to work, or one of them might move to the desk they've set up in the basement, what was previously the kids' play area. That's a last resort as WiFi coverage in the basement is spotty.

Sara's husband works in a different department. Two months ago he was provided with a new laptop, smart phone, and has full access to his office files. His team is not directly implicated in pandemic response, and his director has been generally accommodating of balancing the team's work in light of the pandemic with demands of home life. Sara marvels at how different public servants can have such different "pandemic" experiences. Her phone buzzes and another works day begins…

Looking to the Future

The pandemic may have brought about changes that will outlast it, including: more staff teleworking after the pandemic; a migration from paper-based systems to digital approaches; better leveraging of external science advice and federal science collaborations; adoption of some remote/virtual inspection models; and there are anticipated changes to the design of at least one department with the creation of a new Corporate Data and Surveillance Branch.

While many departments deserve to be lauded for their quick – and sometimes creative – responses to challenges as they arose, it must be noted that if the aforementioned trends continue, some of the temporary solutions will not withstand long-term pressure. The government will need to:

- Design and deliver professional development for research managers to help them better manage remote teams, and to provide them with the skills to lead during a crisis. Staff support across departments has been inconsistent, ranging from supervisors who were supportive of their teams and the challenges they faced to those who weren't supportive and expected a level of work consistent with the pre-pandemic period.

- Produce clear, consistent guidelines – applied across all departments regardless of location – which outline the responsibilities the public service has to its employees relating to the provision of tools and equipment to do their job (e.g., desks, chairs, headsets, ergonomic assessments, etc.).

- The pandemic coincided with the early stages of Laboratories Canada's initiative to renew Canada's federal laboratories. How will the experience of the pandemic inform the design of these future work spaces? Will they be designed to enable remote research access?

- Each SBDA created a unique approach to meet its mandate during the pandemic. Given the varied nature of the work of these SBDAs, is there value in sharing and studying the plans collectively? Or should SBDAs be encouraged, instead, to work with their provincial and or municipal counterparts to harmonize their approaches by sector?

- Science is at risk of wearing out its welcome should it remain in the government/media/societal spotlight for too long. How can we leverage the role science has now, to encourage learning about "dis-/ mis-information," and a scientific process that leads to changing and contradictory messaging, so as to avoid a repeat situation during the next pandemic?

Conclusion

The impact of the pandemic on the federal public service is not unlike that of an earthquake in a high-risk zone. The impact was immediate, and the duration and the severity of the aftermath uncertain.

A year into the pandemic, the impact of the aftermath is becoming more clear. With the arrival of a vaccine comes hope for the end of the pandemic. But like an earthquake, the pandemic has shifted the ground underneath us. As we parse the impact of the pandemic, we reflect on the following questions:

- What barriers has the pandemic removed? What new divides has it created?
- What has the pandemic taught us about preparedness to perform government science in a time of crisis? What can we learn from the pandemic experience?
- How can we “build back better”? Can we build on the momentum that more Canadians view science favorably? Can we win back their trust and renew the social contract between science, innovation and society?

Appendix A: Contributing Departments/Agencies

- Agriculture and Agri-Food Canada
- Canadian Grain Commission
- Health Canada
- Innovation, Science and Economic Development Canada
  - Communications Research Centre
  - Measurement Canada
- National Research Council
- Natural Resources Canada
- Public Health Agency of Canada
- Public Services and Procurement Canada/Laboratories Canada
- Transport Canada

Appendix B: Workshop Questions and Consultation Questions

Questions to Inform the Virtual Hindsight Workshop:

Two weeks before the Hindsight Workshop, IOG distributed a SWOT analysis framework and invited participating departments to provide responses to the following questions.

When answering the following questions, departments were instructed to "*consider all the various types of government science and innovation functions, including but not limited to: research (laboratory, field, etc.), related scientific activities (monitoring, surveillance, inspection, compliance, etc.), regulatory science, technology development and demonstration, and innovation. Also, please consider program and policy offices; staff in remote areas or who teleworked prior to the pandemic; scientific and research staff in field offices or remote labs; federal labs co-located on university campuses or facilities shared by multiple departments and agencies.*"

- How prepared was your organization for the pandemic?
- What organizational strengths emerged as a result of the pandemic?
- What weaknesses became apparent during the pandemic?
- How early or how quickly did weaknesses appear in daily operations of the government during the pandemic?
- How quickly was the team able to respond to those weaknesses, or to develop a viable alternative?
- Before the pandemic, were there internal discussions about contingency planning? Did those conversations consider a situation with an impact like or similar to the COVID-19 pandemic?
- What or where were the vulnerabilities of your team, directorate, and department or agency?
- What has worked well during the pandemic?
- What process/program/service has operated without interruption during the pandemic?

- What change has come about as a result of the pandemic that is unlikely to change after the pandemic?

Questions for Consultations with Scientific Staff

In this first phase of the GSINN initiative, we are looking at the impacts of the pandemic on the federal scientific enterprise, including on the conduct of both research and development (R&D) and related scientific activities (RSA). Please respond to these questions based on your experiences during the last 12 months.

1. **Flexwork – How did the transition to work-from-home or hybrid onsite/offsite approaches impact the R&D/RSA conducted in your unit?**

    - Did the nature of your work continue as before or did it shift to activities such as data analysis of existing data sets, catching up on publishing papers, etc.?

    - If your work shifted to other duties, are you still focused on other duties, or has your regular work resumed?

    - If you shifted to working from home, what information technology issues did you face, e.g., insufficient bandwidth, lack of appropriate tools, etc.?

2. **Facilities – What major modifications to scientific work environments (e.g., laboratories, special purpose facilities) were necessary and why (e.g., social distancing?, PPE?, other?) and what were their impacts?**

    - Was remote access/control of equipment made possible where it had not been before the pandemic?

    - Did your facility implement shift work to enable social distancing where it had not been standard practice previously? If so, how well did this work?

3. **Fieldwork – What were the impacts of the pandemic on field research, monitoring, inspections, etc.?**

    - Did any field work activities continue without interruption?

    - For field work activities that were interrupted or altered, how might long-term datasets be affected?

- Were innovations or new tools introduced to prevent the disruption of normal activities, e.g., remote sensing, remote data collection, remote inspections?

4. Integrated science – How was collaboration across scientific disciplines or scientific departments/agencies affected?

- Did you see greater consideration/integration of insights from the social sciences (e.g., behavioural economics)?

- What was your experience in sharing trained personnel across the federal family? Did collective agreements, IMIT, or human resource policies present any barriers to this mobility?

5. Human resources – Was there any prioritization for government science and innovation functions or services that could directly address the pandemic? If so what are the human resource impacts of that focus?

- Were there impacts on the career progression of government researchers, scientists and engineers, especially those who are early-career and whose scientific focus is not directly related to addressing the pandemic?

- Were students able to have meaningful experiences?

- Did your HR teams introduce new solutions or practices as a result of the special demands and needs brought about by the pandemic?

6. Risks/Benefits – What might have fallen off the radar due to COVID-19? What positive developments would you like to see continued post-pandemic?

- What concerns do you have about what didn't happen/get done over the last 12 months that usually would have?

- On the other hand, what innovations (e.g., reductions of "red tape") occurred that should be sustained post-pandemic?

7. Do you have any other insights you would like to share regarding the impacts of the pandemic on the federal science and innovation enterprise?