Evaluation of PHAC's Corporate Data and Surveillance Modernization Activities

FINAL REPORT – OCTOBER 2024

Prepared by the Office of Audit and Evaluation
Public Health Agency of Canada

Public Health Agency of Canada | Agence de la santé publique du Canada

Canada

TO PROMOTE AND PROTECT THE HEALTH OF CANADIANS THROUGH LEADERSHIP, PARTNERSHIP, INNOVATION AND ACTION IN PUBLIC HEALTH.

—Public Health Agency of Canada

Également disponible en français sous le titre :
Évaluation des activités de modernisation des données et de la surveillance organisationnelles de l'ASPC

To obtain additional information, please contact:

Public Health Agency of Canada
Address Locator 0900C2
Ottawa, ON K1A 0K9
Tel.: 613-957-2991
Toll free: 1-866-225-0709
Fax: 613-941-5366
TTY: 1-800-465-7735
E-mail: publications-publications@hc-sc.gc.ca

Publication date: February 2025

Cat.: HP5-257/2025E-PDF
ISBN: 978-0-660-75575-5
Pub.: 240836

Table of contents

List of acronyms

CDC	Centers for Disease Control and Prevention
CEDARS	Canadian Enteric Detection Assessment and Response System
CFOCMB	Corporate Financial and Operations Management Branch
CITF	COVID-19 Immunity Task Force
DMI	Data Modernization Initiative
DMIA	Centre for Data Management, Innovation and Analytics
DSFB	Data, Surveillance and Foresight Branch
DTB	Digital Transformation Branch
DUA	Detect, Understand, and Act
EAG	Expert Advisory Group
FPT	federal, provincial, and territorial
G&Cs	grants and contributions
IT	information technology
MLISA	Multi-Lateral Information Sharing Agreement
MRAP	Management Response Action Plan
NMLB	National Microbiology Laboratory Branch
O&M	operations and maintenance
PCHDS	Pan-Canadian Health Data Strategy
PHAC	Public Health Agency of Canada
PHDSC	Public Health Data Steering Committee
PT	provincial and territorial
SGBA Plus	Sex and Gender-based Analysis Plus
SIIRA	Centre for Surveillance, Integrated Insights and Risk Assessment
SSRP	Sero-Surveillance and Research Program

Executive summary

Background and evaluation scope

Public health data and surveillance modernization refers to efforts to improve and transform the collection, sharing, analysis, and use of public health data, with the goal of creating modern and responsive public health and surveillance systems. However, long-standing issues with the collection, sharing, analysis, and use of pan-Canadian public health data have hampered the ability of the Public Health Agency of Canada (PHAC) and its health data partners to anticipate, prepare for, and respond to public health events and threats.

In 2020, PHAC launched the Data, Surveillance and Foresight Branch (DSFB) to lead corporate data and surveillance initiatives to address these long-standing issues. DSFB oversees both the coordination of external data and surveillance partnerships and leadership, as well as the delivery of internal and corporate data and surveillance functions that aim to improve PHAC's capabilities through modern data analytics, data integration, and data governance.

The evaluation focused on progress and achievements made from January 2020 to August 2024 on the following corporate data and surveillance-related initiatives and commitments led by DSFB:

- Development of the Federal, Provincial, and Territorial (FPT) Health Data Commitments and the Joint FPT Action Plan on Health Data and Digital Health, following recommendations from the Pan-Canadian Health Data Strategy (PCHDS);
- Implementation of DSFB-led data and surveillance modernization activities funded within the Detect-Understand-Act (DUA) Framework; and
- Implementation and renewal of the 2019 PHAC Data Strategy.

The evaluation triangulated evidence from various sources, including a review of internal documents and performance data, internal and external interviews, an international comparative analysis, case studies, and a literature review.

Findings

Progress on commitments

Over the past four years, PHAC implemented new and innovative data and surveillance modernization initiatives to improve public health data sharing, collection, and use within PHAC and with its partners. Key achievements within PHAC included the development of an integrated risk assessment function, improved horizontal surveillance coordination, and data infrastructure improvements. In addition, PHAC, in partnership with Health Canada and provincial and territorial (PT) governments, developed the federal, provincial, and territorial (FPT) Health Data Commitments and Joint Action Plan. This partnership offers a platform, process, and commitments linked to the “Working Together” funding agreements that aim to advance intergovernmental collaboration on health data. PHAC advanced these commitments despite cross-cutting obstacles, including pandemic-based interruptions, limitations of a federated health system, and administrative delays.

Areas of greatest risk and need

PHAC leveraged significant, but temporary pandemic response funding to address a long-standing and widely acknowledged need to improve the pan-Canadian public health data system. Despite many beneficial outputs and progress made both to improve PHAC’s internal functions and to support external partnerships, work remains to address ongoing barriers to the collection, sharing, access, and use of health data for public health purposes in Canada. Meanwhile, since the COVID-19 pandemic, public trust in public health and government institutions has eroded, affecting health data sharing and use. Finally, given the changing context of public health, partners and experts are increasingly emphasizing non-technological health data priorities, including improving health equity data and enhancing Indigenous engagement and data sovereignty.

Perspectives on PHAC’s approach

While creating a dedicated branch for corporate data and surveillance has filled gaps in capacity and mandate, its corporate initiatives have encountered confusion, hesitation, and resistance. There are still opportunities for PHAC to improve uptake of corporate data and surveillance modernization initiatives by further clarifying and communicating roles and responsibilities, by identifying a common set of public health-driven priorities and vision to connect initiatives, and by improving internal coordination.

Recommendations

Recommendation 1: Coordinate PHAC's ongoing and planned corporate data and surveillance modernization initiatives, and ensure they all align with a common, clearly defined, and public health-driven vision.

The evaluation observed opportunities to improve coordination between the many corporate data and surveillance modernization, innovation, and improvement efforts at PHAC. There is also an opportunity to better communicate how initiatives connect with each other and with public health priorities in order to build staff engagement. As such, there is a need for representatives from all program areas implicated in public health data and surveillance to collaboratively define a clear and shared vision and end state for PHAC's data and surveillance modernization initiatives.

Recommendation 2: Clarify and communicate roles and responsibilities at PHAC for public health data and surveillance to Agency staff and external data partners.

The evaluation identified areas of overlap in roles and responsibilities for data and surveillance coordination that have hindered effective collaboration within PHAC, and between PHAC and its data partners. Ensuring clarity and consensus in roles and responsibilities on data across PHAC can help avoid unnecessary duplication, leverage existing efforts, and facilitate progress, particularly for DSFB in its role as the Agency's policy and strategic lead on data and surveillance.

Recommendation 3: Develop a feasible and realistic implementation plan to achieve the shared vision defined in Recommendation 1, based on the accountabilities defined in Recommendation 2.

As the Agency transitions away from a state of pandemic emergency response and fulfills its remaining commitments for the final year of DUA funding, there is a need to articulate a clear plan to address remaining gaps, while preserving and building on existing progress. This could come in the form of an implementation plan that describes feasible and realistic actions and deliverables.

Program description and context

Public health data and surveillance modernization refers to efforts that aim to improve and transform the collection, sharing, analysis, and use of public health data with the goal of creating modern and responsive public health and surveillance systems. Health data is defined as publicly and privately held data related to health care, public health, population health, and health research, and includes relevant socio-demographic factors, such as race, ethnicity, gender, and age, as well as data from other sectors that influence health outcomes.[1]

However, long-standing issues with the collection, sharing, analysis, and use of pan-Canadian public health data have hampered the Public Health Agency of Canada's (PHAC) ability to anticipate, prepare for, and respond to public health threats and are a strong impetus for the modernization of Canada's public health data system. Recent reviews have reinforced this message, particularly in relation to the Agency's preparedness and response to the COVID-19 pandemic, notably:

- The 2020 Audit of Surveillance Activities concluded that challenges remain for PHAC's surveillance functions due to the need for a coordinated approach to surveillance, the continued lack of formal data sharing agreements, information technology (IT) challenges, gaps in surveillance capacity at PHAC, and a need to further incorporate a Sex and Gender-based Analysis Plus (SGBA Plus[2]) lens into data collection and analysis.[3]
- The 2021 Office of the Auditor General Report on Pandemic Preparedness concluded that PHAC was not adequately prepared to respond to the COVID-19 pandemic because "it had not resolved long-standing issues in health surveillance information, including shortcomings that impeded the effective exchange of health data between the Agency and the provinces and territories."[4]
- The 2022 Office of the Auditor General Report on COVID-19 Vaccines confirmed that long-standing issues with data sharing affected PHAC's effectiveness in sharing vaccine safety surveillance data with national and international partners, and limited the Agency's ability to collect disaggregated vaccine coverage data.[5]
- The Pan-Canadian Health Data Strategy Expert Advisory Group noted long-standing problems with Canada's health data system that were exacerbated by COVID-19. The Expert Advisory Group's final report in 2022 stated that the pandemic highlighted "the systemic fragmentation of health data, ineffective pan-Canadian health data governance and antiquated policies that have prevented timely data sharing."[6]

To coordinate and provide leadership in responding to these calls to improve public health data and surveillance, PHAC launched the Corporate Data and Surveillance Branch, now called the Data, Surveillance and Foresight Branch (DSFB), in December 2020. DSFB oversees both the coordination of external data and surveillance partnerships and leadership, and delivers internal and corporate data and surveillance functions focused on improving PHAC's capabilities through modern data analytics, data integration, and data governance.

Finally, the federal government has made temporary but significant investments to pursue public health data modernization, especially in support of the COVID-19 pandemic response. These include three years of funding that started in fiscal year 2022-23 "to strengthen key surveillance and risk assessment capacities" at PHAC. This funding was intended to enhance the Agency's ability to access data through surveillance, build capacity and infrastructure to assess health risks, and drive evidence-informed public health responses.

Evaluation scope and approach

This evaluation addressed senior management's information needs for future decision making on public health data and the Treasury Board Secretariat's recommendation for an evaluation of PHAC's various public health data and surveillance modernization activities.

Evaluation scope

The evaluation focused on progress and achievements from January 2020 to August 2024 for DSFB-led initiatives and commitments to address both PHAC's corporate data and surveillance functions, and external initiatives to improve pan-Canadian health data sharing. These are:

- Development of the Federal, Provincial, and Territorial (FPT) Health Data Commitments and the Joint FPT Action Plan on Health Data and Digital Health, following recommendations from the Pan-Canadian Health Data Strategy (PCHDS);
- Implementation of DSFB-led data and surveillance modernization activities, funded within the Detect-Understand-Act (DUA) Framework; and
- Implementation and renewal of the 2019 PHAC Data Strategy.

The evaluation also examined the following time-limited grants and contributions programs delivered by other PHAC branches or program areas as additional case studies of how PHAC is modernizing data collection, sharing, and integration:

- the Integral Genomics Innovation Program;
- the Wastewater Innovative Technologies Program; and
- the Sero-Surveillance and Research Program.

Improving pan-Canadian health data requires interdependent collaboration with other PHAC branches, as well as external data partners. However, the evaluation has scoped out the implementation and modernization of individual surveillance systems and programs, including those receiving DUA funding, as they will be covered by separate program evaluations. For instance, the Evaluation of PHAC's Vaccination Program covers vaccine surveillance modernization, while the Evaluation of PHAC's Emergency Preparedness and Response covers Global Public Health Intelligence Network (GPHIN) modernization and risk assessment.

Methodology

The evaluation developed findings based on a triangulation of evidence from internal documents, internal performance data, interviews with internal PHAC staff and external data partners, an environmental scan, a comparative analysis of international data modernization initiatives and strategies, a scoping literature review, and case studies. Further details on data collection and limitations are presented in Appendix A.

Evaluation Questions

1. Are resources directed towards the areas of greatest risk and need?
    a) To what extent have stakeholder needs been understood and addressed in the planning and implementation of activities?
    b) Are changes needed to improve PHAC's ability to address the areas of greatest risk and need?
2. What progress has been made in addressing PHAC's commitments to improve public health data collection, sharing, and use in Canada?
    c) What are the strengths and challenges of PHAC's current approach to public health data modernization?

d) What are lessons learned and best practices from other jurisdictions that could be considered in the Canadian context?

Findings

Progress on commitments

Key Takeaway: Over the past four years, PHAC has leveraged significant, but temporary funding investments to implement new and innovative corporate data and surveillance modernization initiatives. The Agency has made progress on all key commitments to expand its data and analysis capacity, build governance and coordination structures, and introduce technological solutions.

Progress on key commitments to advance data and surveillance modernization

Data and surveillance modernization activities funded under the Detect, Understand, and Act (DUA) Framework

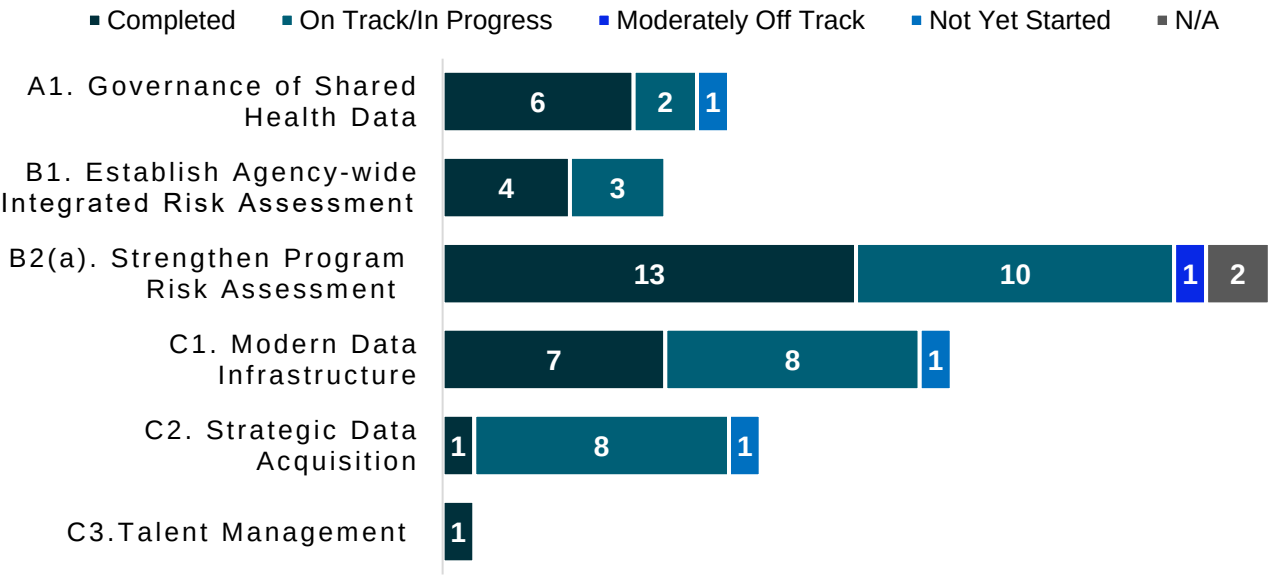
PHAC has advanced numerous activities as part of its DUA-funded data and surveillance modernization commitments since the funding began in late 2022. These have resulted in new data governance structures, a dedicated integrated risk assessment function, IT infrastructure improvements to support surveillance and data activities, and initiatives to build the Agency's data skills and capacity.

PHAC received $399.5 million over three years, beginning in fiscal year 2022-23, to advance activities within the Detect, Understand, and Act (DUA) Framework for public health surveillance. DUA represents multiple aspects of public health surveillance, from data collection to public health action, and is conceptualized as four pillars: Detect, Understand, Act, and Foundational Enablers. Five Agency branches received DUA funding to implement 13 initiatives with the overall goal to strengthen key data, surveillance, and risk assessment capacities at PHAC. DSFB is leading the implementation of several deliverables associated with corporate data and surveillance modernization, including all seven deliverables of the Foundational Enablers pillar and several Detect and Understand deliverables. See Table 6 in Appendix C for more details. However, this funding did not address the Act pillar.

As of February 2024, DSFB has made progress on or completed nearly all of its DUA-funded commitments, which include 69 milestones across 17 deliverables and six high-

level initiatives. DSFB has completed nearly half (46%) of its milestones and is on track to complete another 45%; see Figure 1. Another 6% of the milestones are progressing with minor delays, or have not yet started but are expected to begin soon in order to meet their deadlines for fiscal year 2024-25. Implementation is expected to continue until March 2025.

Figure 1: Progress on milestones for DSFB-led DUA initiatives as of February 2024



Since the start of DUA funding in late 2022, DSFB has advanced numerous activities aimed at improving PHAC's data and surveillance capabilities, including internal and external collaborations. Key outputs include:

- **Establishing data governance and accountability:** DSFB has established new external structures to govern, manage, and coordinate work on shared health data, such as the FPT Public Health Data Steering Committee and the Federal Health Data Councils. Internally, DSFB established the Strategic Surveillance Management Committee, a new governance table to facilitate coordination and information sharing across PHAC's surveillance programs. There appear to be mixed views of this new committee, with some describing it as having helped to reduce siloes, to inform decision making, and to communicate information to senior management, while a few others expressed concerns about potential overreach into issues specific to a single surveillance system. A few staff also cited DSFB's Horizontal Surveillance Operations Division as having promoted internal collaboration at the working level.

- **Integrating risk assessments:** DSFB created a new centre dedicated to integrating public health risk assessments across the Agency. Originally called the Centre for Integrated Risk Assessment (CIRA), the Centre has since merged with the Centre for Surveillance Coordination and the Behavioural Science Office to become the Centre for Surveillance, Integrated Insights and Risk Assessment (SIIRA). Since SIIRA began operations in April 2022, until the end of March 2024, it produced 94 weekly threat reports and 14 risk assessments. SIIRA also worked with partners across sectors to develop a framework for a One Health approach to risk assessment. One Health is a collaborative, multisectoral, and transdisciplinary approach. Many staff members from across PHAC appreciated how the coordinated approach to integrating risk detection from various sources is enabling a more fulsome view of assessing potential threats and actions and more timely identification of, and response to public health risks.
- **Improving data and surveillance infrastructure:** DSFB launched various new tools and systems to support data and surveillance. For example, the Branch helped launch the Integrated Threat Assessment Platform (ITAP) and the Canadian Enteric Detection Assessment and Response System (CEDARS) for automated and integrated threat assessment and surveillance data, respectively. In collaboration with the Digital Transformation Branch, DSFB built a cloud-based National Surveillance Platform that offers a suite of tools for data collection, transformation, storage, dissemination, and visualization that are now used by over half of PHAC's surveillance systems. DSFB also developed data-sharing pipelines, improved data dashboards, and published new dashboards and datasets, such as those for wastewater surveillance, opioid and stimulant related harms, and the Health of people in Canada dashboard. While there is some duplication in reporting between these products, these solutions have generally alleviated manual data processing for epidemiologists, improved data flows between various surveillance programs, standardized data collection and intake for participating surveillance systems, and enabled open data.
- **Building workforce capacity:** DSFB used DUA funding to introduce time-limited workforce training and recruitment initiatives. For example, in collaboration with Health Canada, it introduced online data bootcamps to train staff from both organizations in data analysis and visualization skills. DSFB also ran a data science and epidemiologist recruitment program and established a post-secondary talent recruitment pipeline to enhance data capacity among PHAC's workforce.

However, as shown in Figure 1, two milestones have been marked as not applicable (N/A). One of the milestones was tied to the planned building of a knowledge translation platform,

but was cancelled in fall 2022. This was based on a decision to replace the platform and dissolve the dedicated knowledge translation unit in DSFB in place of alternate approaches to knowledge translation, such having the activity be led within existing teams and structures, as relevant.

Meanwhile, another milestone marked as N/A was associated with a deliverable to address data priorities by facilitating cross-cutting collaborations to address data gaps for priority populations and advance health equity. The milestone was excluded from performance monitoring as no lead in DSFB was assigned to implement this deliverable, nor track its progress until late June 2024. The evaluation did not identify clear plans to facilitate Agency-wide collaborations on addressing data gaps for priority populations, as described in the original DUA deliverable.

Despite this, DSFB has applied a consideration for data gaps and health equity in specific activities. These include population-based research with a focus on populations that are disproportionately affected by health issues, interdepartmental collaboration during the pandemic on addressing barriers for COVID-19 data collection for race, ethnicity, and indigeneity variables, and negotiations and signing of a Memorandum of Agreement with the Inuit Tapiriit Kanatami (ITK) and Indigenous Services Canada (ISC) regarding collaboration on Inuit-specific public health data. The Strategic Surveillance Review and Public Health Vision 2030 consultations, which were completed in spring 2024, as well as the launch of a DSFB SGBA Plus Plan in May 2024, identified plans to prioritize disaggregated data to support intersectional SGBA Plus and equity-informed analyses.

There are several limitations to DUA performance monitoring information. First, not all data modernization activities at PHAC have received DUA funding and not all DUA activities are suitable for data modernization. As such, the current DUA funding performance monitoring data provides a partial view of PHAC's data modernization progress. An earlier performance monitoring framework, the integrated Management Response Action Plan plus (iMRAP+), tracked progress for a broader set of DUA Framework activities, with a focus on actions to respond to recent audits and reviews, but it was discontinued in late 2022. Additionally, some of the milestones and targets developed at the outset to track implementation of DUA-funded activities were unclear or irrelevant once implementation began. As such, performance monitoring only began in the second year of implementation, in fall of 2023, after the DUA performance monitoring team had worked with program areas to develop clearer and more measurable milestones. Finally, in some cases, targets like those for PHAC surveillance system interoperability were set without prior definitions or measurement methods in mind, which delayed improvements.

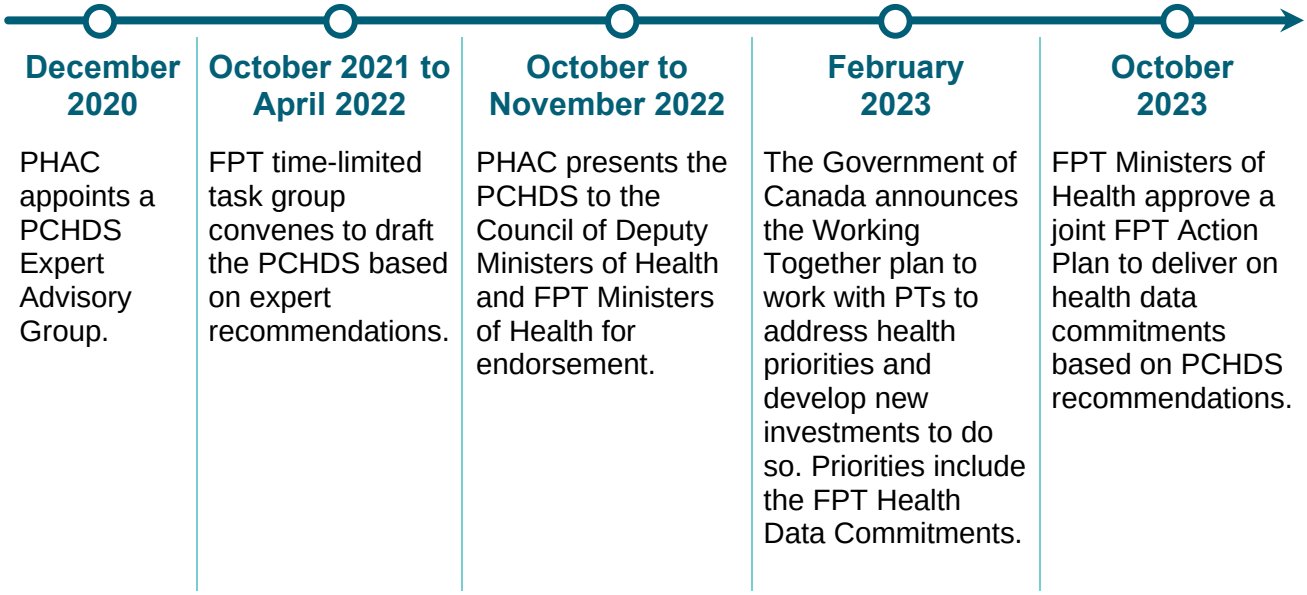
Federal-Provincial-Territorial (FPT) Health Data Commitments and Action Plan

The FPT Health Data Commitments and Action Plan represent a promising step towards achieving common data priorities among pan-Canadian health data partners. The Commitments and Action Plan were informed by expert recommendations for improving the pan-Canadian health data system.

From December 2020 to November 2022, PHAC worked with FPT partners to co-develop the pan-Canadian Health Data Strategy (PCHDS); see Figure 2. DSFB, as the PHAC lead for the development and implementation of the PCHDS, leveraged DUA funding to complete this work. PHAC presented the draft Strategy to FPT governance tables in the fall of 2022 and received endorsement from the Council of Deputy Ministers of Health.

The work to collaborate and draft a PCHDS was a direct response to recommendations from two Office of the Auditor General audits calling for a strategy to address long-standing issues with the collection, access, sharing, use, and protection of health data in Canada. While PHAC did not fully implement the audit recommendations to "implement a long-term, pan-Canadian health data strategy," key elements of the PCHDS were integrated into the FPT Health Data Commitments announced in February 2023. The Commitments and associated Action Plan were created as part of the "Working Together to Improve Health Care for Canadians" (Working Together) plan and funding agreements. For example, the Health Data Charter, one of the joint action plan commitments, was created based on 10 requirements set out by the PCHDS Expert Advisory Group. These requirements addressed issues of person-centred health information, while respecting individual privacy, inclusion of diverse members in a culturally integrated health system, commitment to support First Nations, Inuit, and Metis data sovereignty, commitment to interoperability, health data literacy, and harmonization of FPT health data governance and policy, among others. Plus, as part of the federal government's Budget 2023, the Working Together plan includes funding for FPT governments to modernize their health systems with standardized health data and digital tools.

Figure 2: Timeline of FPT efforts to modernize public health data



Moreover, FPT health data partners launched the Public Health Data Steering Committee (PHDSC) in spring 2023 to deliver on the joint FPT Action Plan. The PHDSC, with PHAC's Centre for Strategic Data Partnerships, Policy and Planning in DSFB serving as the secretariat, is working alongside the Digital Health and Health Data Priorities FPT governance. See Table 5 in Appendix C for a summary of the Action Plan. The PHDSC also has a broader mandate to provide strategic federal, provincial, territorial and Indigenous leadership to drive progress on health data in order to address public health challenges.

2019 PHAC Data Strategy

With DUA investments, PHAC was able to progress on many of the goals outlined in the 2019 Data Strategy. However, internal staff and external partners noted that implementation was limited due to the pandemic response and other competing priorities.

The 2019 PHAC Data Strategy, launched in fall 2019, was intended to provide an Agency-wide approach to public health data management. PHAC appointed a Chief Data Officer as one of the first steps to implementing the strategy. However, further rollout of the strategy was paused in March 2020 to redirect resources to the COVID-19 pandemic response and other competing priorities.

In 2021, PHAC resumed strategy implementation with DSFB as the lead, but altered the approach to reflect changes in the Agency resulting from the pandemic. The new implementation approach and roadmap consolidated the six themes in the original strategy into three, with goals of building working-level data capacity, delivering data services for surveillance and science teams, and developing supportive data infrastructure and policy structures. See Appendix C for full descriptions of themes and goals.

DSFB has made some progress in implementing initiatives to meet goals outlined in the strategy's themes. For example, DSFB helped build the Agency's data capacity through various initiatives like data training bootcamps and data science and epidemiologist recruitment programs. It also launched data service teams to provide custom data solutions for PHAC program areas. Notable projects include partnering with the National Microbiology Laboratory Branch (NMLB) and Health Infobase to create a centralized platform to facilitate the integration and publication of wastewater monitoring data, and working with the Infectious Disease and Vaccine Programs Branch and provincial and territorial (PT) partners to build a data platform to collect and correct Mpox data and facilitate data analysis and sharing. While these examples demonstrate progress on completing outputs outlined in the strategy's implementation roadmap, there is limited evidence of how these solutions have contributed to long-term improvements to the Agency's data capacity, infrastructure, and policy structures. Assessing progress was particularly challenging due to a lack of clear milestones, targets, and performance data.

Some PHAC program staff suggested that, because PHAC's existing systems lack the flexibility and scalability to support and adapt to innovative uses, successful projects were centered around new surveillance systems, like wastewater and Mpox, rather than legacy systems.

The majority of the information technology (IT) staff in DSFB were authorized through a Memorandum of Understanding with the Digital Transformation Branch (DTB), a shared service between PHAC and Health Canada, to support urgent pandemic response needs. The agreement ended in July 2024 and the technical group was reintegrated into DTB. Although these IT resources still support PHAC, continued delivery on data management initiatives will require coordination between DSFB and DTB.

In addition, internal documents and interviews indicate that the various initiatives tied to the Data Strategy would have benefited from a more collaborative approach to achieve larger goals and deliverables. At the same time, there was limited evidence to show that the strategy informed other corporate data modernization initiatives or aligned with other

Agency or Health Portfolio strategies and priorities, as these became focused on COVID-19 and DUA priorities.

Finally, DSFB leveraged DUA investments to support this work, as there was no funding tied to the original Data Strategy. Internal staff and external partners flagged this lack of dedicated resources as a barrier to implementation.

Recently, the Office of the Chief Data Officer at DSFB initiated work to renew the PHAC Data Strategy. Planning documents indicate that staff are leveraging lessons learned from the COVID-19 pandemic response and current implementation, and seek to align the renewed strategy with broader priorities, including the 2023 to 2026 Data Strategy for the Federal Public Service, PHAC's organizational values and priorities, including the Health Portfolio's SGBA Plus Policy and Indigenous reconciliation, and other transformation initiatives such as the PHAC Science Strategy, Public Health Surveillance Vision 2030 ("Vision 2030"), the Strategic Surveillance Review of PHAC's surveillance systems, and public health generally. The Office of the Chief Data Officer has proposed five public health priorities for the renewed strategy. These have been endorsed by the Chief Public Health Officer and are being shared with internal governance committees for feedback and endorsement.

Barriers to implementation

The evaluation identified cross-cutting barriers that hindered the implementation of commitments relating to three areas: competing priorities during the pandemic, challenges with partner engagement, including efforts to advance Indigenous data sovereignty within a federated health system, and administrative delays exacerbated by constrained timelines.

PHAC faced several cross-cutting challenges that hindered its ability to deliver on key commitments as intended or within prescribed timelines. It should be noted that these barriers are shared by data and surveillance activities delivered by other branches, as well as the Agency's activities beyond corporate data and surveillance modernization.

- **COVID-19 pandemic response:** Throughout the pandemic, PHAC and its data partners had limited capacity to focus on modernizing foundational and legacy aspects of health data systems, as staff and resources were mobilized to public health emergency management activities. As such, the need to prioritize the pandemic response delayed progress on implementation of the PHAC Data Strategy and the development of a pan-Canadian Health Data Strategy. At the

same time, there is extensive evidence that the COVID-19 pandemic spurred innovation and expedited adoption of new kinds of data and new methods for data collection, management, and analysis. As a result, between 2020 and 2021, PHAC addressed short-term data priorities specifically around COVID-19, including establishing weekly reporting on national COVID-19 cases, launching a publicly available COVID-19 data portal, and developing a virtual COVID-19 health evidence library. However, given the prolonged duration of the pandemic response, many key commitment timelines were delayed, particularly those involving FPT collaboration, such as the PCHDS and FPT data sharing agreements.

- **Limitations in a federated health system:** PHAC is largely dependent on voluntary data sharing by external data providers to meet its public health data and information needs. Of the datasets that PHAC holds, which include health system administration, survey, and population data, 85% are provided by Statistics Canada. In addition, approximately 64% of PHAC's public health surveillance data is collected and shared by the provinces and territories. As such, successful public health data and surveillance modernization depends on the willingness and capabilities of PHAC's data partners. However, jurisdictions have variable levels of digitization and IT infrastructure modernization, as well as differing capacity to take on new tools and systems. Furthermore, PHAC is increasingly working with Indigenous organizations to access Indigenous data. However, limited receptor capacity has affected progress on advancing Indigenous data sovereignty, a commitment that is now embedded in the Pan-Canadian Health Data Charter. So far, DSFB has brought two out of three national Indigenous organizations to FPT data governance tables and has participated in data initiatives led by Indigenous Services Canada and other Indigenous organizations. Still, DSFB has experienced challenges in ensuring consistent and appropriate Indigenous representation in FPT data governance structures and initiatives in order to increase inclusion of Indigenous public health data and address Indigenous data sovereignty.
- **Administrative delays:** The evaluation found that corporate data and surveillance modernization was affected by administrative delays. These largely related to difficulties in hiring and retaining staff and to lengthy timelines for procurement and security processing. Internal interviewees also described repeated organizational re-structuring, high staff turnover, and senior management changes over the past four years as challenges that delayed implementation.

The section on Challenges of PHAC's current approach in this report discusses how aspects of PHAC's approach to corporate data modernization also hindered progress on key commitments.

Areas of greatest risk and need

Key takeaway: PHAC leveraged significant resources and government-wide prioritization for public health data during the pandemic to advance foundational enablers for data and surveillance modernization. Still, barriers remain to effective data sharing between Canadian jurisdictions, as well as emerging non-technological needs and risks that require attention.

Efforts to address areas of greatest risk and need

In recent years, PHAC has accelerated its efforts to address fundamental, long-standing, and widely acknowledged challenges to Canada's public health data system that were exacerbated by the pandemic.

The evaluation found that the key achievements described in this report are addressing public health data modernization priorities identified by public health experts, including from the PCHDS Expert Advisory Group. Key priorities such as shared data governance, interoperability of health data systems, building workforce capacity, and modernizing outdated IT infrastructure, are being addressed through DUA funding and are part of the PHAC Data Strategy implementation roadmap. Meanwhile, other key priorities such as data literacy, Indigenous data sovereignty, inclusion of diverse populations, privacy and security, ethical use of health data, and renewed data governance are being addressed by the FPT Health Data Commitments and joint Action Plan and are encapsulated in the new Pan-Canadian Health Data Charter's principles.

In a comparative analysis and environmental scan of international data and surveillance modernization efforts, the evaluation found that health data challenges and priorities in countries like the United States, the United Kingdom, Australia, and New Zealand are comparable to those in Canada. These countries faced similar challenges related to a fragmented health data system, outdated infrastructure, and capacity gaps. At the same time, these countries shared PHAC's priorities of improving trust and transparency around health data, promoting data sharing through consistent agreements and interoperability initiatives, recognizing Indigenous data sovereignty principles, investing in public health data workforce and expertise, building governance structures, and having a clear and robust understanding of data assets.

Internal and external interviewees described how PHAC's efforts were accelerated by increased interest and funding among policy makers and the public, and by greater willingness among staff and partners to take on innovative projects and collaborate more

closely during the pandemic. As a result, PHAC expedited adoption of new data sources, methods, and tools during the pandemic, such as the expansion of wastewater surveillance for monitoring COVID-19 cases in collaboration with FPT partners and non-governmental organizations, use of genomic surveillance to track COVID-19 variants in collaboration with a network of provincial public health laboratories, acceleration of sero-surveillance research and data in collaboration with academic partners, and the creation of public data dashboards to increase accessibility and timeliness of reporting of various surveillance system data. Beyond these innovations, PHAC has helped advance health data as a pan-Canadian public health priority. The Working Together bilateral agreements include commitments to improve the collection, sharing, use, and reporting of health information, while the Pan-Canadian Public Health Network recognizes public health data as a top priority in its forthcoming strategic plan.

SPOTLIGHT: Examples of innovations in public health data modernization at PHAC

During the pandemic, PHAC introduced various initiatives to advance surveillance and address data gaps. These included time-limited grants and contributions (G&Cs) programs and IT projects. Evidence from internal and external sources indicated that these initiatives are successful examples of how PHAC is improving the usefulness of public health data for informing decision making. However, it should be noted that these programs and projects were delivered with temporary, pandemic response-related funding, and may not be sustainable at current levels in the long term.

Integral Genomics Innovation Program (National Microbiology Laboratory Branch)

What it did: The G&C program supported public health laboratories in expanding their genomic sequencing and surveillance infrastructure, helped PT capacity in genomic sequencing to improve the quality and timeliness of data, and fostered stronger FPT relationships.

Impact on public health: The program improved turnaround times for FPT data sharing, as well as the quality and completeness of data. This enabled PHAC to analyze data more quickly and identify potential outbreaks.

Wastewater Innovative Technologies Program (National Microbiology Laboratory Branch and DSFB)

What it did: The G&C program funded projects to improve data collection capacity and address data gaps among priority populations, promoted open data by publishing wastewater data from over 40 jurisdictions on Health Infobase, and strengthened a pan-Canadian network for wastewater surveillance beyond the traditional pan-Canadian laboratory network to include academics and non-profit organizations. DSFB built the data infrastructure and tools to support data collection and analysis based on open data standards.

Impact on public health: The program established wastewater monitoring in northern, remote and Indigenous communities to enable more rapid local public health interventions to limit the spread of COVID-19 in priority populations. The program also expanded wastewater surveillance in the Atlantic region and in international airports, enabling earlier detection and sharing of data to inform public health response.

Canadian Enteric Detection Assessment and Response System (Infectious Diseases and Vaccination Programs Branch and DSFB)

What it did: PHAC developed CEDARS to streamline data management for foodborne and enteric illness data. The system consolidated over 100 databases into one easily searchable repository. Work has also begun to allow data integration between CEDARS and laboratory data from the National Microbiology Laboratory. CEDARS demonstrates how surveillance systems can be improved through modernized data management systems that enhance data quality, break down silos, and facilitate interoperability.

Impact on public health: By integrating large volumes of foodborne and enteric illnesses into one system, CEDARS allows PHAC to more rapidly identify and respond to enteric illness outbreaks. The system also enhances efficiency by enabling public health experts to focus more on outbreak investigation and other specialized activities rather than on data management.

Despite these beneficial outputs, work remains for PHAC to fully address barriers **and needs related to public health data, both in its role as a federal leader on public** health policy and planning and in improving internal processes.

The PCHDS Expert Advisory Group concluded in their final report that for Canada to achieve a "world-class health data system," it will require a "strong foundation… that supports the collection, access, sharing, and use of health data in a timely and trusted manner for the benefit of all persons in Canada."[7] Since the onset of the pandemic in 2020, PHAC has accelerated efforts both to modernize its own data and surveillance systems and enhance collaborations, though work remains to fulfill the vision laid out in the Expert Advisory Report.

Strengthening intergovernmental collaboration on the pan-Canadian public health data system

To start, public health professionals and data partners continue to cite the need for appropriate foundational policy and technological structures to enable effective inter-jurisdictional data sharing.[8] They described concerns that the pan-Canadian public health data system remains insufficiently prepared to collect health data in the next public health emergency, particularly data on priority populations. Recent reviews and audits have identified similar gaps in the current FPT Multi-Lateral Information Sharing Agreement (MLISA) agreement, which was established to be a framework for the sharing, use, disclosure, and protection of public health information among Canadian jurisdictions, including during public health events. These reviews found shortcomings related to the Agreement's level of comprehensiveness, clarity in its roles and responsibilities, its ability to ensure consistent data across surveillance systems, and its ability to support data needs during a public health emergency.

PHAC is leading work to renew the MLISA, although this work experienced significant delays due to the long duration of the pandemic, with priorities focused on emergency response. Still, the Agency has led internal and external reviews and consultations to identify needs and propose policy options for a renewed FPT data sharing agreement. Working documents for the renewal reflect the need for a new national multilateral information sharing agreement that could provide a clear foundation for FPT data sharing, with clear articulation of roles and responsibilities and recognition of jurisdictional and Indigenous data sovereignty principles. At the same time, PHAC is pursuing concurrent initiatives to modernize public health data sharing with secondary partners. These include the development of a strategic work plan and Memorandum of Understanding between PHAC and Statistics Canada for 2024 and 2025.

Meanwhile, internal and external sources also expressed the continued need for greater interoperability through common processes, tools, and data standards. The PCHDS Expert Advisory Group defines interoperability as the "capacity for seamless sharing of health

data and information between health sector stakeholders by means of policy, governance, workflow and, especially, technical alignment."[9] Common data standards ensure that data collected by and from various jurisdictions and surveillance systems are gathered, stored, and defined in the same way. This will allow public health professionals to link data across systems to gain more integrated insight to support public health decision making.

PHAC is working with its FPT counterparts on additional initiatives to address the need for common data standards to promote interoperability. For instance, under the FPT Health Data Commitments and joint Action Plan, efforts are underway to improve sharing and standards for vaccination data. Meanwhile, PHAC is supporting Canada Health Infoway in implementing a Pan-Canadian Interoperability Roadmap. The focus of the Roadmap has been on primary care data, namely medical records, rather than on broader public health data. These initiatives are still in their preliminary stages and cannot yet be evaluated for impact.

Improving interoperability of PHAC's surveillance systems

PHAC has also implemented activities to improve internal interoperability, both at the level of individual surveillance systems and at the Agency level, though it is too early to properly measure progress. For instance, DSFB is implementing an Interoperability Initiative to define and measure the baseline interoperability of PHAC's surveillance systems and subsequently identify improvement opportunities. The most recent data from 2024 shows that 58% of PHAC's active surveillance systems meet at least one of two interoperability criteria defined by DSFB.[10] This measure is up from 50% the previous year, although this change was due to a decrease in number of active surveillance systems, thereby reducing the denominator, rather than an increase in the number of interoperable systems. Meanwhile, the suite of cloud-based tools that DSFB developed as part of its DUA deliverables supports next steps to improve interoperability between PHAC's surveillance systems by standardizing tools for data collection, transformation, storage, dissemination, and visualization.

Emerging risks and needs

As PHAC stabilizes operations after its pandemic response, there are emerging non-technological needs and risks for data and surveillance modernization due to a changing public health context. These include rising public mistrust towards the sharing and use of health data, health equity needs, and data quality issues (e.g., PHAC's ability to disaggregate data to address health inequalities; tailored and purposeful data collection over a focus on easily accessible big data) in an era of big data and "infodemics".

Infodemics result from too much information, including false or misleading information, in digital and physical environments during a disease outbreak.[11]

A review of recent research and international data and surveillance modernization initiatives revealed an increasing emphasis on addressing issues that concern the broader public health sector, rather than solely focusing on IT innovation, as a means to improve public health decision making. These include:

- **Addressing public mistrust:** Recent research reports an erosion of public trust in government and public health institutions around the world since the pandemic that could affect the use and sharing of public health data. A 2023 PHAC-supported study found that distrust in the Canadian federal government has become more pronounced since the pandemic, along with a rise in belief in misinformation.[12] Meanwhile, PHAC-funded public opinion research from 2023 found that only about a quarter (27%) of surveyed Canadians felt comfortable having their health data shared, while many others' comfort levels were conditional on factors like why the data is being shared.[13] Some of this distrust was manifested in how PHAC faced public backlash for its use of high-level mobility data during the COVID-19 pandemic, even though the data was anonymized and aggregated. Similarly, a recent report from the Institute for Research on Public Policy found that factors such as inconsistent communication about COVID-19 from public officials, shifting scientific evidence, and perceived policy incoherence negatively affected the public's trust in public health institutions and public health officials, during and after the COVID-19 pandemic.[14]

  Recognizing more collaboration is need in this area, PHAC and its partners identified a commitment in the join FPT Health Data Action Plan to build public trust around health data sharing. Meanwhile, DSFB's Behavioural Science Office has collaborated with the Privy Council Office to better understand mistrust and fostering public trust through public opinion surveys and focus groups.

- **Promoting health equity and data disaggregation:** Recent public health literature outlines the need to prioritize health equity in data and surveillance modernization as the underrepresentation and underfunding of data on marginalized communities present a health justice issue.[15,16,17,18,19] Many experts see data and surveillance modernization initiatives as opportunities to build equity-centred public health data systems that address structural racism and other inequities in health data collection. Moreover, the 2023–2026 Data Strategy for the Federal Public Service has called on federal organizations to strive to disaggregate data to the lowest level, while respecting privacy and data security requirements.

While the Health Portfolio SGBA Plus policy calls for integrating health equity into policies, programs, research, evaluation, and surveillance, there are challenges to implementing this policy. Surveillance systems vary on which SGBA Plus variables they collect and, in many cases, limited quality and completeness of those variables make it difficult to report disaggregated data. In addition to varying standards and definitions for SGBA Plus variables, there continue to be barriers to collection or sharing of identity and socio-demographic or socio-economic data due to broader reasons, including issues of trust in the government and privacy concerns.

An internal PHAC analysis from 2023 found that three quarters (75%) of the Agency's surveillance systems reported collecting some SGBA Plus data, mostly on age and sex variables. However, less than a quarter of systems reported collecting other equity variables such as ethnicity or race, which has resulted in limited ability to stratify data by these additional socio-economic or socio-demographic factors. Over the same time period, just over two-thirds (38%) of PHAC surveillance systems reported collecting Indigenous data, although there are limitations to how this data could be used, as most systems do not have data sharing agreements with Indigenous organizations, communities, or leaders. Moreover, data on these variables was often subject to issues of quality, interpretation, and small sample sizes, which can undermine statistical power and privacy for underrepresented populations. Still, the results of this analysis provide a baseline for understanding the current landscape and measuring progress for initiatives intended to improve the collection and use of health equity data in surveillance at PHAC. Similarly, a 2024 internal strategic review of PHAC's surveillance system recommended that the Agency prioritize disaggregated data to support SGBA Plus and equity analyses.

- **Risks of focusing on quantity of data over quality:** Many experts flag the risks associated with big data and the "infodemic" that has resulted from the COVID-19 pandemic. In short, the escalating volume, variety, and complexity of data from sources of varying reliability mean that public health organizations struggle to produce and disseminate data that is sufficiently precise, accurate, and timely.[20,21,22,23] As such, there is a need for more purposeful and high-quality data to support effective public health surveillance. Public health surveillance, which is the collection, analysis, interpretation, and dissemination of health data, is a core Agency function and relies on quality and appropriate data to support effective public health decision making. Presently, a few external interviewees and consultations describe concerns with the quality and comprehensiveness of PHAC's public health data. They describe opportunities to better tailor data collection to the

needs of decision makers and to review the potential impacts of data gaps and appropriateness of current data collection methods.

SPOTLIGHT: Data best practices from the CITF's Sero-Surveillance Research Program

In April 2020, the Government of Canada set up the COVID-19 Immunity Task Force (CITF) to improve understanding of SARS-CoV-2 infection and immune responses in the Canadian population, and in specific priority sub-groups. The CITF's Sero-Surveillance and Research Program (SSRP) funded 120 serological and vaccine surveillance studies. The SSRP, as a small and new program, was nimble in addressing many important priorities and needs for data and surveillance modernization, as summarized below.

- **Health equity**: The program made efforts to fill in research and data gaps on priority populations by establishing common data elements to encourage funded projects to collect sociodemographic variables.
- **Data harmonization and integration**: The CITF implemented initiatives to promote data standardization, harmonization, and ease of data sharing. These included a set of core data elements for COVID-19 immunity data collected by funded studies and a CITF Databank to store and enable access to research data across studies. These measures were widely perceived as beneficial by stakeholders, as they supported rapid data collection, harmonized data across funded studies, and informed evidence briefings for decision makers.
- **Data governance**: The CITF developed a Data Governance Framework to define the legal and ethical foundations for data sharing from CITF-supported studies.
- **Open data**: Data from studies is accessible through an interactive portal on the CITF Data Dashboard.

Perspectives on PHAC's approach

Key takeaway: Creating a dedicated branch for data and surveillance integration and modernization has attracted resources and attention to data and surveillance modernization, filled gaps in the capacity and mandate for corporate initiatives, and

achieved notable successes in a short time frame. There remain opportunities for PHAC to facilitate the adoption of initiatives by clarifying and communicating roles and responsibilities, identifying a common set of priorities and vision, and improving internal coordination.

Strengths of PHAC's current approach

PHAC created a dedicated branch to lead corporate data and surveillance activities, which has filled in gaps in technical capacity and expertise, and addressed the need for centralized coordination and priority setting.

In October 2020, PHAC established the Corporate Data and Surveillance Branch, now called the Data, Surveillance and Foresight Branch (DSFB), to coordinate and provide corporate oversight over the Agency's surveillance, data management, and innovation efforts.[24] The new branch was also intended to lead collaborations with FPT and other data partners in response to findings from recent reviews.[25] Over the past three years, this branch has led corporate initiatives that helped address some of the Agency's gaps in capacity, expertise, and mandate related to data and surveillance coordination.

The evaluation found that DSFB is well placed to fulfil a need for centralized coordination and planning of horizontal data and surveillance modernization efforts. Internal consultations with other branch heads found that senior management see a role for DSFB to promote corporate data and surveillance coordination and modernization by overseeing uptake of more data science, building data capacity, and providing technical leadership on public health data and surveillance best practices. Similarly, external federal and provincial data partners expressed a desire for PHAC to fill the gap in leadership in coordinating the pan-Canadian health data system, including by negotiating data agreements and identifying common data elements. In the past three years, DSFB has stepped into this strategic leadership role as the PHAC lead on inter-branch, inter-departmental, and inter-governmental initiatives such as DUA implementation monitoring, development of the PCHDS, delivery of the joint FPT Health Data Action Plan, and PHAC Data Strategy implementation. As shown in the spotlight box below, the evaluation observed that PHAC's initiatives focus on similar activities to those being implemented by international counterparts.

SPOTLIGHT: The United States Centers for Disease Control and Prevention's (US CDC) Data Modernization Initiative

What it is: In 2020, the US CDC launched a multi-year, multi-billion dollar Data Modernization Initiative (DMI) to modernize public health data at the federal and state levels. The DMI is focused on five key priorities relating to technology, as well as people, processes, and policies. The ultimate goal of the DMI is to "get better, faster, actionable insights for decision making at all levels of public health."[26]

How it is implemented: The DMI is linked to the CDC's Public Health Data Strategy, which lays out public health data goals and priorities. The DMI and the Public Health Data Strategy are part of the CDC's Office of Public Health Data, Surveillance, and Technology portfolio, which includes the National Center for Health Statistics as part of its structure.

What it accomplished: Between 2020 and 2023, internal evaluations and reviews showed that the DMI improved the US' ability to respond to, and prepare for public health threats through advancements in cloud-based infrastructure and modern tools for data collection and analysis, as well as publication of accessible datasets within weeks and building workforce capacity through the Data Academy and Data Science Upskilling program. The DMI also improved its strategies to hire and retain critical staff.[27,28]

Where it is going: For 2024, the CDC identified a continued need to focus on three goals with respect to its public health data strategy and DMI. These are:

- strengthening and expanding on previously established core capacities;
- accelerating access to public health data; and
- visualizing data and enabling data exchanges between state health departments and CDC programs.

Moving forward, the CDC indicates that the DMI requires "sustained investments to improve accessibility and interoperability with state and local partners, scale services across the agency, and ensure widespread adoption" to maintain progress towards its ultimate goal of a response-ready public health system.[29]

Lessons learned and opportunities to improve PHAC's current approach

Implementation of corporate data and surveillance modernization initiatives has been hindered by limited strategic coordination of roles, responsibilities, priorities, and objectives, as well as inadequate attention to change management. However, staff in DSFB recognize these shortcomings and are taking measures to address them. There are also further opportunities to leverage existing efforts and improve internal collaboration.

Shortcomings of the current approach

As noted previously, PHAC introduced various corporate and intergovernmental initiatives to improve data collection, management, sharing, and use in response to long-standing calls for improvements to the pan-Canadian health data system. While these initiatives promised bold transformation, the evaluation observed challenges with facilitating uptake and buy-in across the Agency.

To start, as the Agency's focus was concentrated on immediate pandemic response, particularly throughout 2020 and 2021, there was limited capacity to focus on initial planning and coordination of the numerous data and surveillance modernization initiatives. Moreover, planning documents from various initiatives spearheaded by DSFB, from development of an Agency-wide data governance framework to adoption of new tools for surveillance system interoperability, did not identify a shared end goal or common set of outcomes that unified these activities. Accordingly, staff expressed uncertainty over how to prioritize between their own program mandates and viewed these horizontal initiatives and perceived some efforts as overlapping. The lack of clarity was further exacerbated by several organizational changes within the Agency over the past four years, that altered accountabilities and shifted activities based on senior management priorities. Meanwhile, the performance measurement gaps discussed in this report also indicated shortcomings in planning and coordination at the early stages of some corporate data and surveillance modernization initiatives.

Additionally, some internal and external interviewees felt these data-related initiatives were more focused on introducing new technologies, rather than more directly responding to public health information needs. While DSFB was encouraged by senior management to advance innovative pilots and novel technological solutions, staff observed barriers to implementing some potential solutions due to federal government's privacy and procurement requirements or limitations in their ability to meet current needs for public health surveillance. Accordingly, this approach hindered uptake, as staff in other branches were not always aware of how the initiatives could potentially benefit their work, and negatively affected perceptions of trust and willingness to collaborate. This was further

shown by staff within DSFB indicating they concentrated on working with those teams that proactively reached out to their branch for support.

Finally, several internal and external interviewees noted that there was hesitation in adopting innovations to technology, processes, and approaches for data collection and sharing. While DSFB was established in part to lead engagements with partners on public health data, surveillance program staff expressed concerns about introducing an intermediary to their pre-existing relationships with data partners, as well as risks of overlapping engagement requests that could create a consultation burden for partners.

Lessons learned and further opportunities

Staff in DSFB recognize these gaps and challenges and have begun to take measures to address them. For instance, in August 2023, the DUA performance measurement team worked with program areas to develop clearer and more measurable milestones to improve performance monitoring and activity planning. Moreover, there have been more recent efforts to promote horizontal coordination. In April 2024, working-level staff in DSFB took part in a workshop to develop an integrated vision for the future of surveillance at the Agency. The workshop included a discussion of strategies to align ongoing corporate data initiatives and to identify how these initiatives can support PHAC renewal. Meanwhile, DSFB led an internal review of PHAC's surveillance systems in early 2024 that identified a recommendation to strengthen horizontal collaboration and governance, including by establishing working groups. This work is now underway through the development of the Strategic Surveillance Review Action Plan, which brings together multiple data initiatives through the surveillance lens. DSFB has also launched communities of practice for surveillance and behavioural science that could provide a forum for identifying opportunities to collaborate on shared goals.

The evaluation also identified opportunities to collaborate with external data partners to promote efficiency, while also promoting a culture of data sharing and greater interoperability. To start, the Strategic Surveillance Review recommended supporting more data linkages at PHAC. Similarly, policy makers, subject matter experts, and data partners have suggested that PHAC could better leverage data holdings among other federal and pan-Canadian organizations and different levels of government that collect or steward public health data. Meanwhile, as the PHAC Data Strategy Renewal seeks to align with the 2023–2026 Data Strategy for the Federal Public Service, PHAC has opportunities to collaborate with other departments in advancing particular data files. For example, Indigenous Services Canada is leading a whole-of-government approach to the

management and sharing of Indigenous data, while Statistics Canada is implementing a Disaggregated Data Action Plan.

Lastly, literature review findings highlighted the importance of ensuring strategies are in place to prioritize change management for effective data modernization. An example of how this can be done is from the US CDC's DMI, which lists "management change and governance to support new ways of thinking and working" as one of five priorities in the initiative's strategic implementation plan.[30] Experts advised on best practices, including ensuring appropriate senior leadership involvement and aligning the incentives and expectations of all involved.

Conclusions and recommendations

Conclusions

Public health professionals within and outside PHAC described risks and opportunities for data and surveillance modernization as the Agency moves on after three years of being in a state of pandemic emergency response. From 2020 to 2023, there was heightened attention and resources for public health improvement during the pandemic, particularly for infectious disease detection and response. Thanks to emergency response resources, PHAC was able to deploy innovative methods for public health data collection, analysis, and sharing. However, moving forward, the Agency will have to contend with other emerging concerns, both within public health, such as gaps in addressing chronic conditions and the need to take a One Health approach, and beyond it, including continuing to deliver on the Agency's mandate amidst government spending reductions and the conclusion of COVID-era investments such as DUA funding.

Still, as reiterated through multiple reviews and expert reports, a modern and appropriate public health data system is essential to effective public health action and preparedness for the next public health emergency. As such, with less than one full fiscal year remaining of DUA funding, there is a need for the Agency to examine remaining gaps, needs, and risks around data and surveillance modernization in order to ensure that the Agency will be appropriately prepared for future public health emergencies. At the same time, the Agency will need to ensure it can preserve and continue to build on the progress it has made in the past four years in advancing collaboration and data governance, introducing modern tools and systems, and growing the Agency's capacity for insight generation based on integrated data analysis, surveillance, and risk assessment.

As PHAC transitions away from a state of pandemic emergency response, it will need to consider how to preserve the rapid progress it has made on data modernization during an exceptional time for public health, while addressing outstanding commitments. There are immediate opportunities to reduce duplication, leverage external resources and collaborations, and prioritize resources and efforts towards the most critical elements. The Strategic Surveillance Review and Vision 2030 consultations worked to identify internal and external needs and priorities that could inform next steps.

Recommendations

Recommendation 1: Coordinate PHAC's ongoing and planned corporate data and surveillance modernization initiatives, and ensure they all align with a common, clearly defined, and public health-driven vision.

Currently, there are many data and surveillance modernization, innovation, and improvement efforts at PHAC. The evaluation observed opportunities to improve coordination across these efforts to reduce potential siloes and leverage existing efforts. There were also opportunities to better clarify the links between these corporate initiatives and public health priorities, in order to better engage staff. As such, there is a need for representatives from all program areas implicated in public health data and surveillance to collaboratively define a clear and shared vision and end state for PHAC's data and surveillance modernization initiatives.

Recommendation 2: Clarify and communicate roles and responsibilities at PHAC for public health data and surveillance to Agency staff and external data partners.

DSFB's role in corporate data and surveillance oversight and coordination at PHAC has evolved greatly since its launch in October 2020. However, there is neither consistent understanding of, nor agreement on DSFB's mandate and purpose across the Agency. Moving forward, many PHAC staff and external data partners will continue to see the need for a policy and strategic lead in the Agency, with the capacity and mandate to coordinate and integrate corporate data and surveillance initiatives. At the same time, there are many existing programs within and outside of PHAC that have well-established data collection, sharing, and use processes and infrastructure. Ensuring clear and agreed-upon roles and responsibilities on data across PHAC can help avoid unnecessary duplication, leverage existing efforts, and facilitate progress, particularly for DSFB in acting as the Agency's policy and strategic lead on data and surveillance.

Recommendation 3: Develop a feasible and realistic implementation plan to achieving the shared vision defined in Recommendation 1, based on the accountabilities defined in Recommendation 2.

As PHAC moves forward beyond its pandemic response, there remain incomplete commitments for corporate data modernization and further opportunities to promote a more effective pan-Canadian health data system. As such, there is a need for a clear plan that could identify feasible actions and deliverables moving forward. This could come in the form of an implementation plan with the following characteristics:

- Tied to the roles and responsibilities described in Recommendation 1 to ensure the appropriate accountabilities.

- Identifies concrete timelines and targets to make sure progress is measurable.

- Has actions and deliverables driven by public health priorities for the Agency, so that data and surveillance modernization efforts can meaningfully contribute to the Agency's mandate and can be understood and supported by all PHAC program areas.

- Ensures actions are feasible by prioritizing the necessary solutions and setting aside efforts that are already being pursued by other parties.

Management Response and Action Plan

Data modernization at PHAC goes beyond the accountability of a single Vice-President or Branch. It requires a shared commitment to institutionalize a culture change across Branches and data systems, often in partnership with others such as provinces and territories and/or other federal departments. While we concur with the recommendations, relative prioritization of public health data priorities will need to occur through operational planning and whole-of-Agency governance to ensure that data modernization activities are targeted in the most effective and efficient way in service of public health objectives. This work will occur in the context of the overall PHAC Renewal process and will include refinement of which Vice-Presidents outside of DSFB are accountable. Updates and adjustments of approach and scope will be handled through the standard MRAP reporting process coordinated through the Office of Audit and Evaluation.

Recommendation 1

Coordinate PHAC's ongoing and planned corporate data and surveillance modernization initiatives, and ensure they all align with a common, clearly defined, and public health-driven vision.

Management response

Management agrees with this recommendation.

Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
In consultation with Agency partners, a renewed Data Strategy for PHAC will be developed. The renewed Data Strategy will align with the vision outlined in Roadmap 2030 and will	Formally publish the 2025-2029 PHAC Data Strategy.	Q4 2024-2025	Chief Data Officer, PHAC	Existing human and financial resources
	Complete the data maturity and interoperability assessment for PHAC.	Q4 2024-2025	Chief Data Officer, PHAC	Existing human and financial resources

Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
be coordinated with public health data priorities related to the FPT Joint Health Data Commitments and Pan-Canadian Interoperability Roadmap, the PHAC Strategic Surveillance Review, the opportunities for action in the Public Health Surveillance Vision 2030, and priorities of PHAC's Science Strategy.			Collaboration from PHAC Branches	
Public Health Surveillance Vision 2030 will be finalized as a forward-looking vision for public health surveillance in Canada. The opportunities for action will align with the clearly defined vision of Roadmap 2030 and support the	Public Health Surveillance Vision 2030 Report is published on Canada.ca.	Q3 2024	VP, DSFB	Existing human and financial resources

Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Roadmap's commitments to strengthening PHAC's approach to science by enhancing our surveillance functions; as well as the public health data priorities related to the FPT Joint Health Data Commitments and Pan-Canadian Interoperability Roadmap.				

Recommendation 2

Clarify and communicate roles and responsibilities at PHAC for public health data and surveillance to Agency staff and external data partners.

Management response

Management agrees with this recommendation.

Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
DSFB will implement a series of actions that	In partnership with Statistics Canada (StatCan),	Q1 2025 and annually	VP, DSFB VPs, Program Branches	Existing human and financial resources

Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
describe its role and responsibilities vis a vis Program Branches, as well as engage and communicate priorities and progress internally using established Agency governance to ensure horizontal Agency input and participation in priorities.	develop a Memorandum of Understanding and an annual workplan of shared priorities, as well as implement a new approach for accessing StatCan data known as the data visitation model, with clearly defined and complementary roles and responsibilities for DSFB and Program Branches.			
	In partnership with the Canadian Institute for Health Information (CIHI), develop an annual workplan of shared priorities and opportunities for strategic collaboration, with clearly defined and complementary roles and	Q1 2025 and annually	VP, DSFB VPs, Program Branches	Existing human and financial resources

Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
	responsibilities for DSFB and Program Branches.			
	Develop, seek endorsement, and communicate an annual workplan for the Public Health Data Steering Committee, outlining roles and responsibilities for PHAC and its partners, to coordinate the implementation of key initiatives on the use of health data for public health purposes and advance the priorities of the Working Together to Improve Health Care for Canadians Plan and the FPT Joint Action Plan on Health Data and Digital Health. The workplan will clearly define complementary roles and	Q1 2025 and annually	VP, DSFB VPs, Program Branches	Existing human and financial resources

Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
	responsibilities for DSFB and Program Branches.			
DSFB will launch the process to develop a modernized national multilateral information sharing agreement that provides a clear foundation for federal, provincial, and territorial public health data sharing, articulates clear roles and responsibilities, and recognizes jurisdictional and Indigenous data sovereignty principles.	Launch collaborative process with provincial and territorial partners to codevelop provisions of the new Public Health Data Sharing Agreement.	Q3 2024	VP, DSFB VPs, Program Branches	Existing human and financial resources
	The new Public Health Data Sharing Agreement comes into force, with an accompanying Agency implementation plan defining clear and complementary roles and responsibilities for DSFB and Program Branches.	Q1 2025	VP, DSFB VPs, Program Branches	Existing human and financial resources
Clarify roles and responsibilities for DSFB and	Define and document roles and responsibilities	Q4 2024	VP, DSFB	Existing human and financial resources

Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
other program areas implicated in surveillance.	for Agency surveillance collaboration and governance (e.g., RASCI Matrix), with clear and complementary roles and responsibilities for DSFB and program branches.		Collaboration from PHAC branches	

Recommendation 3

Develop a feasible and realistic implementation plan to achieving the shared vision defined in Recommendation 1, based on the accountabilities defined in Recommendation 2.

Management response

Management agrees with this recommendation.

Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
Develop an implementation plan for the renewed PHAC Data Strategy.	Develop an implementation and monitoring plan to accompany the Data Strategy that identifies clear roles and responsibilities across the Agency and	Q2 2025-26	VP DSFB, Supported by Chief Data Officer, PHAC VPs, Program Branches	Existing human and financial resources

Action Plan	Deliverables	Expected Completion Date	Accountability	Resources
	establishes core KPIs to support annual reporting.			
Develop the Strategic Surveillance Review Action Plan to address the opportunities for action identified in Public Health Surveillance Vision 2030.	Strategic Surveillance Review Action Plan (2024-2026) is completed and approved by DSFB and reviewed by program partners.	Q3 2023-24	VP, DSFB VPs, Program Branches	Existing human and financial resources

Appendix A: Methodology and evaluation details

Data collection sources and methods

The evaluation collected and analyzed multiple lines of evidence from internal and external sources. Findings and conclusions were developed based on a triangulation of findings across these lines of evidence to improve their reliability and credibility. The evaluation team collected data using the following data sources and methods:

Document review: Evaluators reviewed 336 internal and external files relating to PHAC's data modernization activities. Internal documents included presentations on progress, resourcing, and risks for key commitments and activities, strategic planning documents, meeting summaries and terms of references, examples of deliverables, administrative files, internal reviews, and consultation reports. External files included departmental reports, Canada.ca web pages, and external reviews. Data from documents was coded and analyzed using the qualitative analysis software NVivo 14. The information was subsequently summarized by strongest findings per evaluation question and indicator in an evidence matrix.

Interviews: Evaluators conducted loosely structured interviews with 23 representatives from the following groups:

- Internal DSFB working level and executive staff: 11
- Internal NMLB working level and executive staff: 2
- Internal staff from other PHAC branches: 3
- External stakeholders and partners: 5 from other federal departments, and two from PT governments

Interview notes were analyzed in NVivo 14 and the strongest findings were summarized by evaluation question and indicator in an evidence matrix.

Performance data review

The evaluation examined available performance data on the implementation of the three key commitments scoped into the evaluation to track progress on commitments since January 2020. The evaluation consulted the following sources:

- Performance data on DUA-funded activities was obtained from the Integrated Management Response Action Plan Plus (iMRAP+) that provided data up to

September 2022. Performance data from September 2023 to February 2024 was obtained through the DUA Performance Reporting Dashboard.

- The Office of Audit and Evaluation (OAE) tracked updates on the implementation of recommendations from audit response and action plans through Management Response and Action Plan status reports. The evaluation consulted status reports that detailed progress on recommendations for data modernization and data sharing at PHAC.
- The evaluation reviewed updates of the PHAC Data Strategy through implementation updates presented to the PHAC Executive Committee.

Financial data review

Evaluators reviewed budgeted versus actual expenditures for the following financial data provided by the Corporate Financial and Operations Management Branch (CFOCMB):

- DSFB spending on data modernization for fiscal years 2020-21 to 2023-24.
- NMLB spending on the Wastewater Innovative Technologies Program and the Integral Genomics Program for fiscal years 2022-23 to 2023-24.
- DUA funding earmarked for DSFB-led activities for fiscal years 2022-23 to 2023-24.

The financial data was triangulated with additional program documents and financial update presentations provided by DSFB, NMLB, and CFOCMB.

Literature review: The PHAC Health Library conducted a search in Medline [Ovid] of academic publications related to public health data modernization. The search yielded 247 results after removal of duplicates. The results were further triaged by evaluators according to relevance to the evaluation, and 13 peer-reviewed articles and one expert report were scoped into the literature review. Evaluators used the Summarify AI tool to summarize the articles, then manually reviewed the articles to identify common themes and findings in correspondence with evaluation questions and indicators.

Case studies

NMLB case studies: For the case studies of the Integral Genomics Program and the Wastewater Innovative Technologies Program, evaluators reviewed several data sources including four interviews, two internal and two external, internal documents, such as program guides, presentations on programs, and funding recipient reports, as well as NCCID webinars on wastewater surveillance in Canada presented in February and March

2024. Findings across the various sources were coded and analyzed in NVivo 14, and then summarized in an evidence matrix by evaluation question and indicator to identify the strongest findings.

CITF Sero-surveillance case studies: Evaluators examined key findings and recommendations from two reviews of the COVID-19 Immunity Task Force (CITF) completed in early 2024. The first is a review of the Sero-Surveillance and Research Program (SSRP) and CITF commissioned by PHAC's Office of the Chief Science Officer. The review of the SSRP was completed by consulting firm PRA Inc., in collaboration with policy evaluation firm Science-Metrix, and included a document and literature review, a bibliometric analysis, key informant interviews, and a survey of funding recipients. The review was launched in late May 2023 and the final report was published in March 2024. The second review was the CITF Final Report, published by the CITF Secretariat. The CITF secretariat reviewed source materials, including study surveys and annual reports, CITF annual reports, and metrics on key performance indicators. The report also incorporated a qualitative assessment conducted by AXDEV, a Canadian-based performance evaluation firm. The CITF Final Report was finalized in March 2024, and includes metrics up to December 31, 2023.

International comparative analysis

Evaluators conducted an international comparative analysis with four countries: the United States, the United Kingdom, Australia, and New Zealand. These four countries were included in the international comparison because their needs, priorities, challenges, and public health systems are comparable to Canada's. The evaluation reviewed publicly available documents on each country's public health data strategies and data modernization efforts to identify strengths, challenges, and best practices that could be considered for the Canadian context. Additionally, to fill in gaps around impacts, lessons learned, and future priorities in the comparative analysis, the evaluation used the Copilot AI tool to conduct targeted searches of publicly available information on efforts to improve public health data among the four countries. The search specified that sources include news articles, grey literature, and academic publications. The information identified and summarized by Copilot was then manually verified and summarized for inclusion in the evaluation.

Limitations

Table 1: Limitations, impacts and approach for addressing them

Limitation	Impact on the evaluation	Approach for addressing the limitation
DSFB was conducting external reviews and consultations at the same time as the evaluation. Therefore, to reduce consultation burden and fatigue, the evaluation collected limited primary data from external partners.	The evaluation was unable to directly assess the perspectives and experiences of external data partners regarding PHAC's activities.	The evaluation leveraged secondary data from concurrent reviews, consultations, and public opinion research to fill in gaps on external perspectives regarding the progress and impact of PHAC's activities.
Many internal documents reviewed were summary presentations or plans, rather than completed deliverables.	Some proposed activities or examples of achievements reviewed for the evaluation may be outdated or incomplete.	The evaluation made sure to incorporate the latest available information, and to validate information cited in the report with staff to confirm if deliverables were completed or cancelled.
There were several performance data limitations and gaps. • Current DUA performance reporting only includes data on DUA funded deliverables and does not track progress for other activities in the DUA Framework. • There was no performance data associated with the 2019 PHAC Data Strategy due to major changes to the implementation strategy in 2021. • There was no data on the FPT Health Data	The evaluation did not have consistent measures to assess progress across the entire period examined. The evaluation was also not able to fully assess all medium- and longer-term outcomes.	Where possible, the evaluation used internal documentation and interviews with DSFB staff to fill in gaps on implementation of data modernization activities outside of DUA-funded deliverables. The evaluation also used implementation update presentations provided by DSFB's Office of the Chief Data Officer and interviews with staff working on the Data Strategy implementation and renewal to fill in gaps around Data Strategy implementation.

Limitation	Impact on the evaluation	Approach for addressing the limitation
Action Plan as implementation has just begun. • There was no reporting on medium- and long-term outcomes for all commitments.		
Progress on DUA milestones and deliverables are self-reported by lead teams and were not validated by the DUA Performance Measurement and Reporting team.	Results on the extent of progress and achievements needed to be interpreted with caution.	Where possible, the evaluation sought to validate progress using other internal documentation or evidence of completed deliverables.
The international comparative analysis only used publicly available documentation from other jurisdictions.	Other jurisdictions may have internal documents that provide more detailed and up-to-date information on plans, progress, and best practices for their data modernization initiatives that were not included in this evaluation.	The analysis used other sources of information, including news articles and reviews in academic journals to fill in gaps around data modernization initiatives from other jurisdictions.
There was limited granularity to the financial data, as there was no specific financial tracking for key commitments included in this evaluation, other than DUA-funded deliverables. DSFB spending included commitments outside of those scoped into the evaluation.	The evaluation was unable to identify the exact amount spent for each data modernization commitment.	Despite the limited granularity, the evaluation was able to verify through other documents and analysis provided by CFOCMB and DSFB on the overall picture of funding and spending for data modernization at PHAC.

Evaluation lenses and government priorities

The evaluation applied several lenses and frameworks to assess the progress and impacts of PHAC's corporate data and surveillance modernization activities with respect to Government of Canada priorities. These were:

- **Sex- and Gender-Based Analysis Plus Lens**: The evaluation found that there is a need to promote health equity and data disaggregation in public health data modernization. While PHAC has made strides in addressing research and surveillance data gaps for priority populations through population-based studies and novel surveillance tools, there continues to be gaps in socio-demographic, race-based, and Indigenous data in Canada's public health surveillance systems.

- **Quality of Life Framework for Canada**: The evaluation recognized key issues within the Good Governance domain of the Statistics Canada Quality of Life Framework for Canada. In alignment with several indicators of the Democracy and Institutions sub-domain, the evaluation findings discussed how rising distrust in government institutions and misinformation, particularly since the pandemic, are an emerging risk for Canada's public health data system. In addition, the growing need to address Indigenous data sovereignty, as noted in this evaluation, supports the indicator under this domain for Indigenous self-determination.

- **Truth and Reconciliation Commission Calls to Action**: The evaluation acknowledged the importance of Indigenous data sovereignty as part of the Government of Canada's commitment to Indigenous reconciliation. The evaluation also recognized persistent gaps in Indigenous data in Canadian public health surveillance and the importance of addressing these gaps as part of reducing health inequities faced by Indigenous populations.

In addition, the evaluation of PHAC's corporate data and surveillance modernization activities responded to a Government of Canada priority to strengthen Canada's universal public health system. The Minister of Health Mandate Letter from December 2021 outlined a commitment to work with PT and other partners to "create a world-class health data system that is timely, usable, open-by-default, connected and comprehensive."[31]

A detailed examination of the Sustainable Development Goals was also not applicable for this evaluation. However, findings associated with improvements to public health data collection, analysis, and use to enable more responsive public health action supports the third goal on good health and well-being. The evaluation also did not specifically examine

compliance with, and implementation of the *Official Languages Act*, although use of official languages did not appear to be an issue for data and surveillance modernization activities.

Evaluation governance

To conduct the evaluation, OAE worked closely with single-window contacts in DSFB and NMLB. OAE shared the evaluation scope with the PHAC Performance Measurement and Evaluation Committee (PMEC) and the DSFB Branch Executive Committee in January 2024. The preliminary findings were presented to PMEC on July 8, 2024. The final report was presented to PMEC in October 2024, where committee members recommended the evaluation for President's approval.

Appendix B: Financial information

DSFB spending on data modernization

Over the last five fiscal years, DSFB was allocated a budget of $176M for corporate data and surveillance modernization activities and reported $131M in actual expenditures, equal to 74% of the budgeted amount. DSFB, formerly the Corporate Data and Surveillance Branch, was not formally created until October 2020, therefore a budget for fiscal year 2019-20 is not available.

CFOCMB provided the following explanations for the consistent surplus reported:

- **Fiscal year 2021-22:** Surplus accumulated due to increased funding approvals and uncertainty regarding project progress.
- **Fiscal year 2022-23:** Surplus accumulated primarily from Operations and Maintenance (O&M) due to postponed activities, lower-than-expected contracting expenditures, and changes in direction for certain O&M expenditures. The surplus was identified early with no forecasted plans to spend it.
- **Fiscal year 2023-24:** Surplus accumulated mainly due to the inability to spend funds. DSFB's forecast remained consistent, with O&M surplus from spending challenges and salary surplus from staffing delays.

Table 2: DSFB budget and percentage of budget spent, 2019-20 to 2023-24

Fiscal year	Allocated budget	Actual expenditures	Surplus or deficit	Percentage of budget spent
2019-20	N/A	$5,102,675	-$5,102,675	N/A
2020-21	$20,720,000	$8,756,400	$11,963,600	42%
2021-22	$50,619,512	$19,280,404	$31,339,106	38%
2022-23	$51,117,723	$35,766,294	$15,351,428	70%
2023-24	$54,013,663	$51,845,458	$2,168,205	96%

Fiscal year	Allocated budget	Actual expenditures	Surplus or deficit	Percentage of budget spent
Total	**$176,470,898**	**$120,751,233**	**$55,719,665**	**68%**

NMLB grants and contributions (G&Cs) program spending

From fiscal year 2022-23 to 2023-24, NMLB spent $6.6M on the Integral Genomics Program and $10M on Wastewater Innovative Technologies Program.

Table 3: Integral Genomics Program budget and % budget spent, 2021-22 to 2023-24

Fiscal year	Allocated budget	Actual expenditures	Surplus or deficit	Percentage of budget spent
2021-22	$ -	$ -	$ -	
2022-23	$6,000,000	$2,233,521	$3,766,479	37%
2023-24	$5,450,000	$4,373,451	$1,076,549	80%
Total	**$11,450,000**	**$6,606,972**	**$4,843,028**	**58%**

Table 4: Wastewater Innovative Technologies Program budget and % budget spent, 2021-22 to 2023-24

Fiscal year	Allocated budget	Actual expenditures	Surplus and deficit	% of budget spent
2021-22	$ 600,000	$ -	$600,000	
2022-23	$ 5,262,000	$ 975,466	$4,286,534	19%
2023-24	$ 11,376,251	$ 9,127,358	$2,248,893	80%

Fiscal year	Allocated budget	Actual expenditures	Surplus and deficit	% of budget spent
Total	**$ 17,238,251**	**$ 10,102,824**	**$7,135,427**	**59%**

Appendix C: Description of key commitments

Branch descriptions

Data, Surveillance and Foresight Branch (DSFB)

PHAC created this branch in December 2020 to lead corporate data and surveillance modernization and integration. DSFB has three Centres that lead five core functions.

1. Centre for Data Management, Innovation and Analytics (DMIA): Oversees the functions of data analytics and data governance.
2. Centre for Strategic Data Partnerships, Policy and Planning (SD3P): Oversees the function of data partnerships.
3. Centre for Surveillance, Integrated Insights and Risk Assessment (SIIRA): Oversees the functions of surveillance leadership, risk analysis activities, and foresight integration.

From 2020-21 to 2023-24, the allocated budget for these activities was $176,470,898. See Appendix B for full details on budgets and expenditures.

National Microbiology Laboratory Branch (NMLB)

In the context of this evaluation, the NMLB coordinates and funds two time-limited G&Cs programs.

1. Integral Genomics Innovation Program: The “Integral” program is managed by the Medical and Scientific Affairs Directorate and advances public health genomics in Canada. The program budget was $14,450,000 over four years (2020-21 to 2023-24),
2. Wastewater Innovative Technologies Program: The “Wastewater” program is managed by the Science Reference and Surveillance Directorate. The program budget was $17,238,251 from 2021-22 to 2023-24.

See Appendix B for full details on budgets and expenditures and Appendix C for expanded descriptions of these programs.

Office of the Chief Science Officer

In the context of this evaluation, the Office of the Chief Science Officer administered G&Cs funding for the Sero-Surveillance and Research Program, managed by the time-limited COVID-19 Immunity Task Force. The Government of Canada set up the task force in April 2020. The $300M program was responsible for mobilizing serological and vaccine surveillance studies to determine the extent of SARS-CoV-2 infection and immune response in the Canadian population, and in specific priority subgroups. See Appendix C for expanded descriptions of this program. The Office of the Chief Science Officer was integrated into DSFB in 2024.

Pan-Canadian Health Data Strategy (PCHDS)

In December 2020, PHAC appointed an Expert Advisory Group (EAG) to provide advice on the development of a pan-Canadian Health Data Strategy. The EAG was composed of four leading experts and 45 representatives from across the country with public health and health data expertise. The EAG released three reports that provide evidence-informed advice to the federal government on the strategic use of public health data, principles for a public health data system, and a practical roadmap to address areas of greatest opportunity and impact.

Following early lessons learned from the COVID-19 pandemic and the EAG recommendations, DSFB led the co-development of the PCHDS through an FPT Time Limited Task Group, which convened between October 2021 and April 2022. The PCHDS was also informed by the latest research findings and advice from public health and data experts and interested Canadians.

The draft PCHDS was approved by the Conference of Deputy Ministers of Health and was presented to FPT Ministers of Health on November 8, 2022.

Federal, Provincial, and Territorial (FPT) Health Data Commitments and Joint Action Plan

The PCHDS has being foundational to informing development of the FPT Health Data Commitments. Key elements of the PCHDS were included in the Commitments, announced as part of the “Working Together to Improve Health Care for Canadians" Plan in February 2023. FPT governments, except that of Quebec, committed to five key health data commitments. Subsequently, in October, the FPT Ministers of Health approved a joint FPT Action Plan on Health Data and Digital Health with eight actions to deliver on the health data commitments.

Table 5: Summary of the Joint FPT Action Plan on Health Data and Digital Health

Data Commitment	Actions	Leads
1. Collecting and sharing high-quality and comparable information to improve health care for Canadians.	• CIHI to lead the Shared Health Priorities Advisory council on common health indicators. • Ensure readiness of Canada's public health system through consistent measurement, communications, and visibility to Canadians.	CIHI and Public Health Data Steering Committee
2. Adopting common interoperability standards to better connect Canada's health care system.	• Implement and adopt the shared pan-Canadian Interoperability Roadmap to better connect Canada's health care system.	Digital Health/ Health Data Table
3. Implementing aligned provincial and territorial policies and legislative frameworks to support the public good.	• Strengthen health information stewardship for secondary use, such as research and evidence-based decision making. • Prioritize efforts to achieve equitable and appropriate virtual care for all Canadians.	Digital Health/ Health Data Table
4. Advancing shared principles outlined in the Health Data Charter for the management of health data.	• Advance shared principles outlined in the Health Data Charter for the management of health data. • Increase public trust in health data sharing, and advance greater health data literacy among the public and stakeholders.	Public Health Data Steering Committee and Digital Health/ Health Data Table
5. Collecting and sharing public health data to support Canada's preparedness and	• Establish consistent approaches to data sharing to strengthen public health monitoring capabilities.	Public Health Data Steering Committee

Data Commitment	Actions	Leads
response to public health events.	• Increase access to quality immunization data for Canadians, health care providers and public health units by adopting common standards and technical solutions across FPT jurisdictions.	

Initiatives funded within the DUA Framework

In 2021, PHAC developed the Detect, Understand, and Act (DUA) Framework to conceptualize and integrate the Agency's core public health surveillance and risk assessment functions under three pillars:

1. Detect: Collect, access, and analyze data to detect public health threats.
2. Understand: Use data to support the risk assessment of potential public health threats.
3. Act: Respond to public health threats.

In addition, the Foundational Enablers, such as IT infrastructure and human resource capacity and skills, facilitate efforts across the Framework.

Budget 2022 provided PHAC with $399.5M "to strengthen key surveillance and risk assessment capacities". The funding was provided for 13 initiatives with 43 deliverables led by five PHAC branches to address the Detect, Understand and Foundation Enabler pillars.

Budget 2022 investments through DUA aimed to:

- Consolidate gains made during COVID-19;
- Build foundations to address non-COVID-19 needs;
- Carry forward lessons learned to ensure Canada's public health system is prepared for the future; and
- Enable Canada to be an active leader in the global identification, assessment, and management of public health risks.

DSFB is the lead on five of the 13 initiatives, as well as co-lead on a sixth initiative outlined in the DUA-funded commitments.

Table 6: DSFB-led activities receiving DUA funding

DUA Pillar	Initiative	# of deliverables (# of milestones)
A. Detect	A1. Establish Governance of Shared Health Data.	2 (9)
B. Understand	B1. Establish Agency-wide Integrated Risk Assessment. B2(a). Strengthen Program Risk Assessment. This does not include additional deliverables led by the Infectious Diseases and Vaccination Programs Branch and Office of the Chief Science Officer.	1 (7) 7 (26)
C. Foundational Enablers	C1. Modern Data Infrastructure C2. Strategic Data Acquisition C3. Talent Management	3 (16) 3 (10) 1 (1)

2019 PHAC Data Strategy

In November 2018, the Clerk of the Privy Council issued a directive to all federal departments and agencies to implement a departmental data strategy by September 2019. In response, DSFB led the development of PHAC's first data strategy, covering both public health and corporate data. The implementation plan laid out three phases from October 2019 to March 2024 and covered six themes: Data Governance, Data as an Asset, Data Infrastructure, Science-Based Analytics, Partnerships and Collaboration, and People and Culture. However, implementation of the plan was paused in March 2020 to focus resources on the pandemic response.

In 2021, PHAC resumed implementation of the Strategy, but under the following consolidated themes and goals:

1. Data Services: Delivering support, solutions, and services for building data capabilities across the organization, at the point of business. Offering rapidly deployable and highly skilled Data Service Teams that support programs with “anything data” across the organization.
2. Data as an Asset: Advancing the adoption of modern data infrastructure and supporting policy structures that promote ethics, enable users, and build trust with stakeholders, as well as the development and implementation of enterprise standards and accountability through data governance and stewardship.
3. People and Culture: Ensuring staff have the tools, knowledge, and training to manage, interpret, use, and understand data to inform public health decision making and action.

Integral Genomics Innovation Program

The purpose of this Program is to strengthen public health infrastructure in Canada by helping public health laboratories innovate and integrate genome-sequencing productivity into surveillance of high-consequence pathogens. The program complements existing partnerships by accelerating the speed of genomic sequencing and integrating its outputs within existing public health surveillance activities. The NMLB launched the first call for proposals in August 2021, as part of the Government of Canada’s Variants of Concern Strategy. The second call for proposals, launched in January 2023, expanded the Program’s focus beyond COVID-19 variants.

Wastewater Innovative Technologies Program

In 2020, PHAC received funding through Health Canada’s Safe Restart Agreement to establish wastewater-based monitoring of infectious diseases. The Agency collaborated with Statistics Canada to leverage existing wastewater sampling infrastructure and worked with Health Canada to support PT and academic partners. The NMLB has since obtained additional time-limited funding to sustain its G&Cs program for wastewater innovation.

The purpose of this Program was to build wastewater testing capacity for infectious disease surveillance at the FPT level. The program provided funding for provincial, territorial, Indigenous, and academic partners in the wastewater surveillance network to collect and test samples, within communities or at FPT public health labs, for pathogens such as SARS-CoV-2, influenza, RSV, and Mpox. Wastewater testing can provide an early warning signal to detect new and emerging infectious diseases, inform public health action like vaccination programs, and inform Canadians on the risk of infectious diseases in their community.

Sero-Surveillance and Research Program (SSRP)

In April 2020, the Government of Canada established the COVID-19 Immunity Task Force (CITF), a $300M program that has mobilized 120 serological and vaccine surveillance studies to determine the extent of SARS-CoV-2 infection and immune response in the Canadian population, and in specific priority subgroups.

PHAC administers CITF funds using grants and contributions through the Sero-Surveillance and Research Program (SSRP). Funding is coordinated by PHAC's Office of the Chief Science Officer, in collaboration with the CITF Secretariat housed at McGill University. PHAC's Vice President of the Infectious Diseases and Vaccination Programs Branch has the financial authority for CITF grants and contributions funding.

The CITF is in its final year, with activities ending March 31, 2024. The program received a one-year extension without additional funds to complete studies and compile lessons learned, as it was originally scheduled to end on March 31, 2023.

Endnotes

[1] Pan-Canadian Health Data Strategy Expert Advisory Group, Public Health Agency of Canada. Expert Advisory Group Report 1: Charting a Path toward Ambition. Government of Canada; 2021. Available from: https://www.canada.ca/en/public-health/corporate/mandate/about-agency/external-advisory-bodies/list/pan-canadian-health-data-strategy-reports-summaries/expert-advisory-group-report-01-charting-path-toward-ambition.html

[2] SGBA Plus is an intersectional, analytical process used by the Health Portfolio to assess how determinants of health such as sex, gender, age, race, ethnicity, socioeconomic status, disability, sexual orientation, cultural background. migration status and geographic location, interact and intersect with each other and broader systems of power, to contribute to differences in accessing health-related resources and outcomes.

[3] Office of Audit and Evaluation. Audit of Surveillance Activities. Ottawa, ON: Public Health Agency of Canada; 2020. Available from: https://www.canada.ca/en/health-canada/corporate/transparency/corporate-management-reporting/internal-audits/surveillance-activities.html

[4] Office of the Auditor General of Canada. Report 8—Pandemic Preparedness, Surveillance, and Border Control Measures. Office of the Auditor General of Canada; 2021. Available from: https://www.oag-bvg.gc.ca/internet/English/parl_oag_202103_03_e_43785.html

[5] Office of the Auditor General of Canada. Report 9—COVID-19 Vaccines. Office of the Auditor General of Canada; 2022. Available from: https://www.oag-bvg.gc.ca/internet/English/parl_oag_202212_09_e_44175.html

[6] Pan-Canadian Health Data Strategy Expert Advisory Group, Public Health Agency of Canada. Expert Advisory Group Report 3: Toward a world-class health data system. Public Health Agency of Canada; 2022. Available from: https://www.canada.ca/en/public-health/corporate/mandate/about-agency/external-advisory-bodies/list/pan-canadian-health-data-strategy-reports-summaries/expert-advisory-group-report-03-toward-world-class-health-data-system.html

[7] Pan-Canadian Health Data Strategy Expert Advisory Group, Public Health Agency of Canada. Expert Advisory Group Report 3: Toward a world-class health data system. Public Health Agency of Canada; 2022. Available from: https://www.canada.ca/en/public-health/corporate/mandate/about-agency/external-advisory-bodies/list/pan-canadian-health-data-strategy-reports-summaries/expert-advisory-group-report-03-toward-world-class-health-data-system.html

[8] COVID-19 Immunity Task Force Secretariat. Final Report: Understanding SARS-CoV-2 infection and immunity in Canada. 2024 March 1.

[9] Pan-Canadian Health Data Strategy Expert Advisory Group, Public Health Agency of Canada. Expert Advisory Group Report 3: Toward a world-class health data system. Government of Canada; 2022. Available from: https://www.canada.ca/en/public-health/corporate/mandate/about-agency/external-advisory-bodies/list/pan-canadian-health-data-strategy-reports-summaries/expert-advisory-group-report-03-toward-world-class-health-data-system.html.

[10] As of March 2024, 14 of 53 surveillance systems are included on the CNPHI platform (definition #1) and 29 of 48 surveillance systems meet the minimum standard for Interoperability (definition #2; the review wasn't complete at the time, which is why the denominator is only 48).

[11] World Health Organization. Health Topics: Infodemic. Available from https://www.cdc.gov/surveillance/surveillance-data-strategies/dmi-investments.html

[12] Impact Canada. Stressors on trust in government and effective policy implementation: The influence of information ecosystems at individual, interpersonal, and structural levels: Preliminary findings from Wave 2 of the Trust, Information, and Digital Ecosystems Study (TIDES). 2024 January 23. Internal presentation.

[13] Earnscliffe Strategy Group. Baseline Assessment of Canadians' Health Data Literacy and Values Related to Health Data Sharing – Research Report. Public Health Agency of Canada; 2023. Available from: https://publications.gc.ca/collections/collection_2024/sc-hc/H14-536-2024-1-eng.pdf

[14] Breton C, Han JY, McLaughlin D, et al. Resilient Institutions: Learning from Canada's COVID-19 Pandemic. Montreal. Institute for Research on Public Policy; 2024. Available from: https://irpp.org/irpp-event/resilient-institutions-learning-from-canadas-covid-19-pandemic/
[15] Acosta JD, Chandra A, Yeung D, Nelson C, Qureshi N, Blagg T, et al. What Data Should Be Included in a Modern Public Health Data System. Big Data. 2022;10:S9-S14. Available from: https://www.liebertpub.com/doi/full/10.1089/big.2022.0205
[16] Christopher GC, Zimmerman EB, Martin LT. Charting a Course for an Equity-Centered Data System. The Robert Wood Johnson Foundation.; 2021. Available from: https://www.rwjf.org/en/insights/our-research/2021/10/charting-a-course-for-an-equity-centered-data-system.html
[17] Kadakia KT, Desalvo KB. Transforming Public Health Data Systems to Advance the Population's Health. Milbank Q. 2023;101:674-99. Available from: https://pubmed.ncbi.nlm.nih.gov/37096606/
[18] Martin LT, Nelson C, Yeung D, Acosta JD, Qureshi N, Blagg T, et al. The Issues of Interoperability and Data Connectedness for Public Health. Big Data. 2022;10:S19-24. Available from: https://www.liebertpub.com/doi/10.1089/big.2022.0207
[19] Schubert KG, Bird CE, Kozhimmanil K, Wood SF. To Address Women's Health Inequity, It Must First Be Measured. Health Equity. 2022;6(1):881-6. Available from: https://home.liebertpub.com/publications/health-equity/641
[20] Acosta JD, et. al. 2022. Available from: https://www.liebertpub.com/doi/full/10.1089/big.2022.0205
[21] Chiolero A, Tancredi S, Ioannidis JPA. Slow data public health. Eur J Epidemiol. 2023 Dec;38(12):1219-25. Available from: https://link.springer.com/article/10.1007/s10654-023-01049-6
[22] Schwalbe N, Wahl B, Song J, Lehtimaki S. Data Sharing and Global Public Health: Defining What We Mean by Data. Frontiers in Digital Health. 2020;2:612339. Available from: https://www.frontiersin.org/journals/digital-health/articles/10.3389/fdgth.2020.612339/full
[23] Schubert KG, et al. 2022. Available from: Available from: https://home.liebertpub.com/publications/health-equity/641
[24] Public Health Agency of Canada 2020-21 Departmental Results Report [Internet].; 2022 [updated -02-01; cited Jan 4, 2024]. Available from: https://www.canada.ca/en/public-health/corporate/transparency/corporate-management-reporting/departmental-performance-reports/2020-2021.html
[25] Government of Canada, Office of the Auditor General of Canada. Report 8—Pandemic Preparedness, Surveillance, and Border Control Measures. Office of the Auditor General of Canada; 2021-03-25. Available from: https://www.oag-bvg.gc.ca/internet/English/parl_oag_202103_03_e_43785.html.
[26] Centers for Disease Control and Prevention. (n.d.). Data Modernization initiative. https://www.cdc.gov/surveillance/data-modernization/index.html
[27] Centers for Disease Control and Prevention. (n.d.). Data Modernization initiative. https://www.cdc.gov/surveillance/data-modernization/index.html
[28] Centers for Disease Control and Prevention. (n.d.-a). 2022 DMI Snapshot. Available from: https://www.cdc.gov/surveillance/data-modernization/snapshot/2022-snapshot/index.html
[29] Why DMI Sustainable Funding Matters | CDC [Internet].; 2024 [updated April 23,; cited Jul 7, 2024]. Available from: https://www.cdc.gov/surveillance/surveillance-data-strategies/dmi-investments.html
[30] Centers for Disease Control and Prevention. Data Modernization Initiative Strategic Implementation Plan. 2021. Available from: https://www.cdc.gov/surveillance/data-modernization/index.html
[31] Minister of Health Mandate Letter. 2021. Available from: https://www.pm.gc.ca/en/mandate-letters/2021/12/16/minister-health-mandate-letter